

# Estadística Aplicada y Procesamiento de Datos con R

Código en: 

Clase 5. Ggplot e Introducción a RMarkdown y Quarto

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# Introducción

- GGPlot:
  - Gramática de los gráficos por capas (<http://vita.had.co.nz/papers/layered-grammar.pdf>)
  - Permite seguir los pasos y los distintos componentes del gráfico
  - Permite una fácil forma de iteración para distintos gráficos

\**Torpedo sobre ggplot*

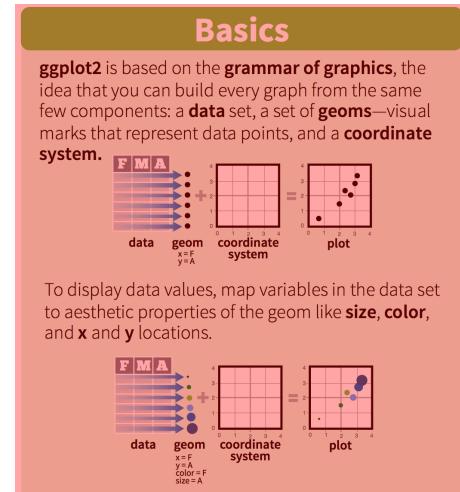
# Elementos

Gramática	Explicación
Datos	Base de datos a graficar
Geométrica	Forma geométrica que representará los datos (e.g., diagrama de cajas y puntos, histogramas)
Estética	La estética del objeto geométrico (e.g., color, tamaño, forma)

Traducción del github de @oliviergimenez

- Signo +
- `geom_point()` es un gráfico de puntos, `geom_line()` is un gráfico de líneas, `geom_col()` es un gráfico de columnas o barras, etc.
- `aes()` dinámico/variable
- Algunos argumentos son `color` (colores líneas o puntos), `fill`(rellenar el área), `linetype` para ver el tipo de línea (discontinua, continua, con puntos),`pch` estilo de puntos (forma), `size` tamaño o grueso de las líneas y `alpha` que es la opacidad (transparencia, de 1 a 0)

# Elementos (2)



# Aplicación

Estructura hipotética

Añadimos

Añadimos una etiqueta para el eje x y un formato

Añadimos un tema y la ubicación de leyenda

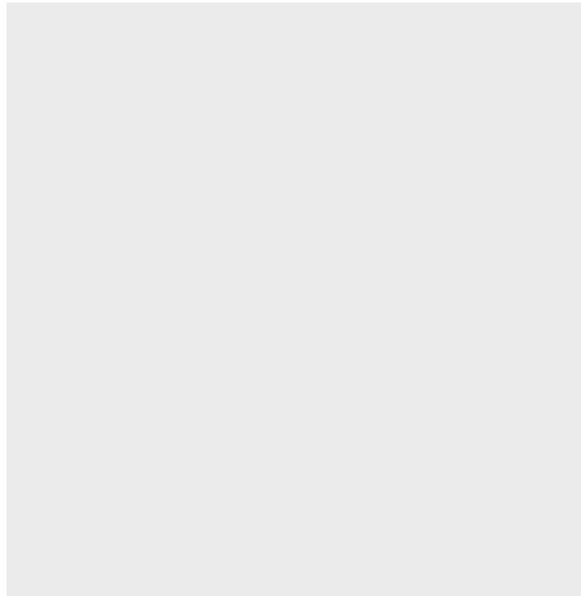
Se dividen los gráficos por región

- Generamos los datos

## ► código

- Hacemos un código en que definimos que faremos un gráfico desde la base de datos `covid19_chile_coq_val`.

```
library(ggplot2)  
covid19_chile_coq_val %>%  
  ggplot()
```



# Aplicación

Estructura hipotética

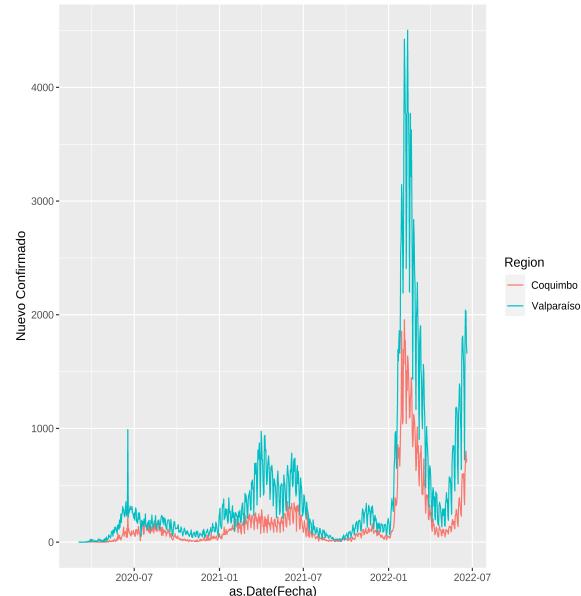
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Añadimos una etiqueta para el eje x y un formato

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Se dividen los gráficos por región

```
covid19_chile_coq_val %>%
ggplot()+
  geom_line(aes(x=as.Date(Fecha), y=`Nuevo Confirmado`, color=Region))
```



# Aplicación

Estructura hipotética

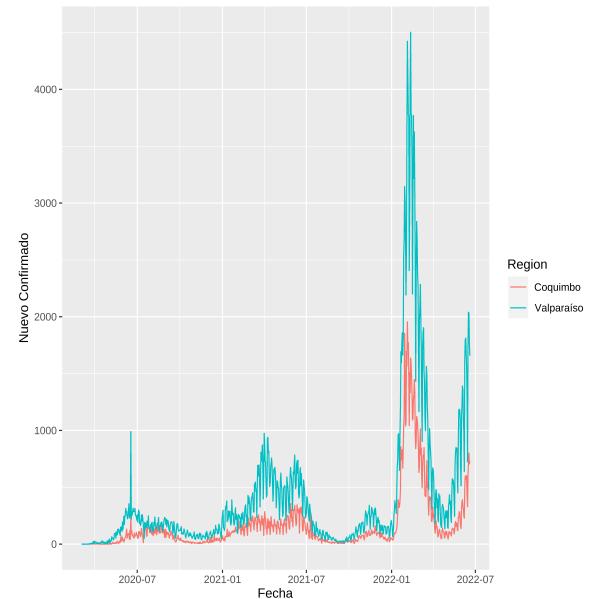
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Se dividen los gráficos por región

```
covid19_chile_coq_val %>%
  ggplot()+
    geom_line(aes(x=as.Date(Fecha), y='Nuevo Confirmado', color=Region))+
    scale_x_date()+
    xlab("Fecha")
```



# Aplicación

Estructura hipotética

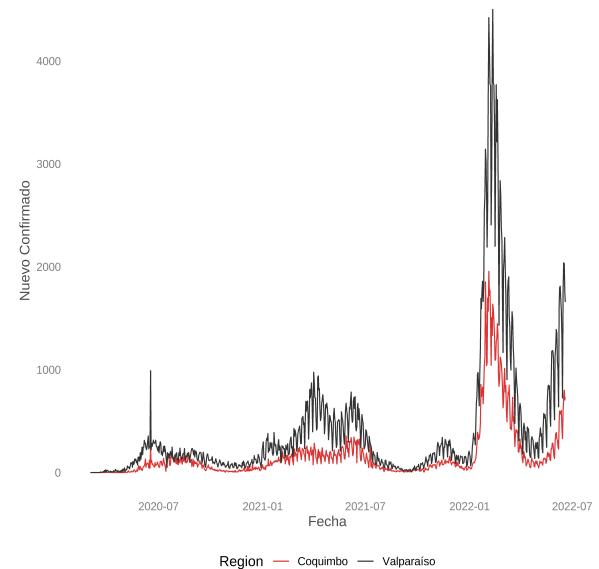
Añadimos

Añadimos una etiqueta para el eje x y un formato

Añadimos un tema y la ubicación de leyenda

Se dividen los gráficos por región

```
library(sjPlot)
covid19_chile_coq_val %>%
ggplot()+
  geom_line(aes(x=as.Date(Fecha), y=`Nuevo Confirmado`, color=Region))+
  scale_x_date()+
  xlab("Fecha")+
  sjPlot::theme_blank()+
  theme(legend.position="bottom")+
  scale_color_manual(values=c("#DD3333","#333333"))
```



# Aplicación

Estructura hipotética

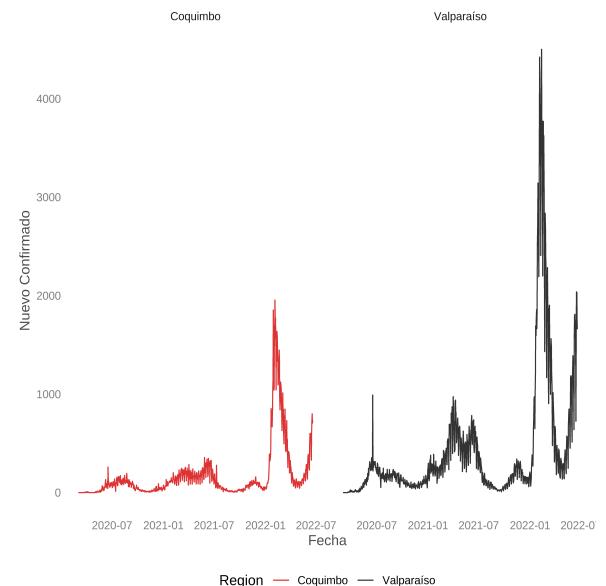
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Se dividen los gráficos por región

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covid19_chile_coq_val %>%
ggplot()+
  geom_line(aes(x=as.Date(Fecha), y=`Nuevo Confirmado`, color=Region))+  
  scale_x_date()+
  xlab("Fecha")+
  sjPlot::theme_blank()+
  theme(legend.position="bottom")+
  scale_color_manual(values=c("#DD3333","#333333"))+
  facet_wrap(~Region)
```



```
#guardamos los datos
ggplot2::ggsave("./_figs/1.png", width = 5, height = 10, dpi = 100)
```

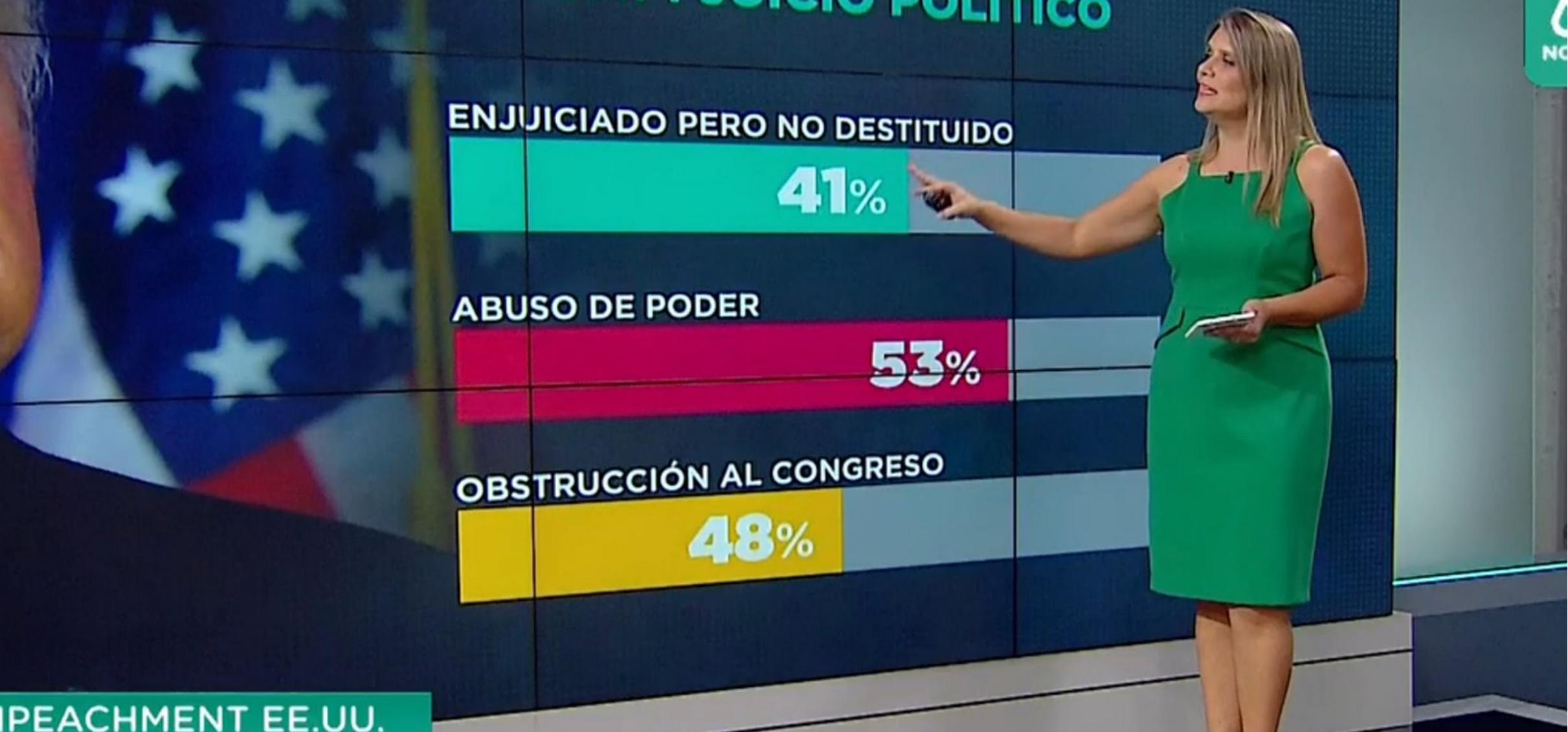
# Observaciones

- Autoexplicativo
- Los gráficos pueden estar sujetos a sesgos (cc. o icc.)
- Es necesario explicitar cómo se construyó el gráfico
- Misma escala
- Orden de los datos
- Citar fuentes (con caption)

Ejemplos:

- Datos Victimización
- Datos ENUSC
- Datos CASEN
- Desafíos gobierno
- Tasa de positividad
- Días sandwich
- Gráfico ritmo vacunación
- Aprobación presidencial





IMPEACHMENT EE.UU.

## REPORTE PARA APROBAR JUICIO CONTRA TRUMP

# Aplicación (2)

## Estructura hipotética

Usamos la base, la transformamos y hacemos un gráfico de barra

Añadimos una temática con una escala de colores

Se definen etiquetas y se gira el gráfico de barras, se pone el gráfico en mínimo

```
library(jsonlite)
history1 = fromJSON("_data/StreamingHistory0.json", flatten = TRUE)
history2 = fromJSON("_data/StreamingHistory1.json", flatten = TRUE)
st = rbind(history1, history2)
rm(history1, history2)
# what does the dataframe contain.
head(st) %>%
knitr::kable("markdown")
```

endTime	artistName	trackName	msPlayed
2021-03-23 12:20	FREE SOLO	FREE SOLO - Chalas en Paris	2247988
2021-04-07 00:05	The Shapeshifters	Back To Basics	327280
2021-04-07 00:11	Fish Go Deep	The Cure & The Cause - Dr Packer Extended Remix	377121
2021-04-07 00:19	Pete Heller's Big Love	Big Love - Dr Packer Extended Remix	469124
2021-04-07 00:25	The Shapeshifters	Lola's Theme Recut - Dr Packer Remix	393015
2021-04-07 00:33	ATFC	Sleep Talk (feat. Lisa Millett) - Dr Packer Extended Remix	452070

## Aplicación (2)

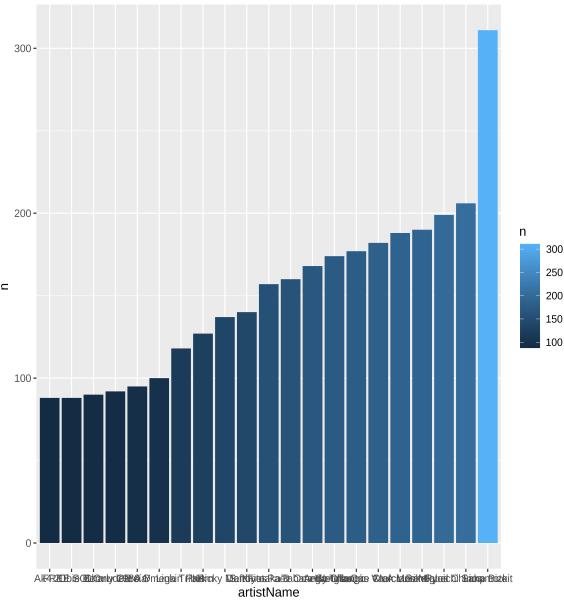
## Estructura hipotética

Usamos la base, la transformamos y hacemos un gráfico de barra

Añadimos una temática con una escala de colores

Se definen etiquetas y se gira el gráfico de barras, se pone el gráfico en mínimo

```
st %>%  
  dplyr::count(artistName, sort = TRUE) %>%  
  dplyr::top_n(20) %>%  
  dplyr::mutate(artistName = reorder(artistName, n)) %>%  
  ggplot(aes(x = artistName, y = n)) +  
  geom_bar(aes(fill = n),  
           stat = "identity")
```



# Aplicación (2)

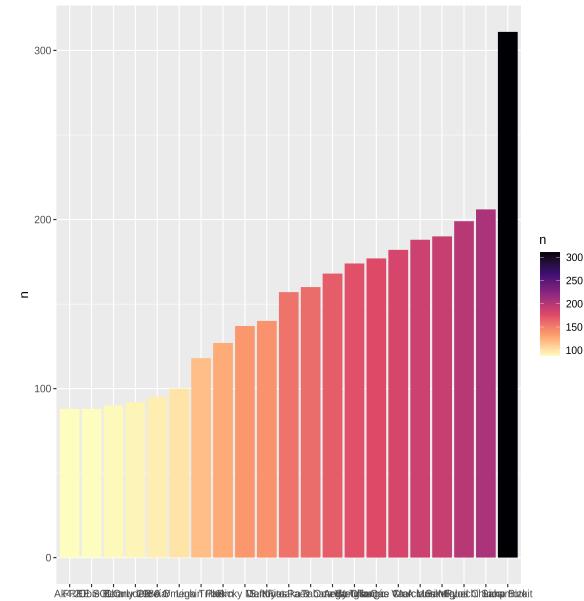
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  dplyr::mutate(artistName = reorder(artistName, n)) %>%
  ggplot(aes(x = artistName, y = n)) +
  geom_bar(aes(fill=n),
           stat="identity") +
  scale_fill_viridis_c(option = "magma",direction = -1) +
  xlab(NULL)
```



# Aplicación (2)

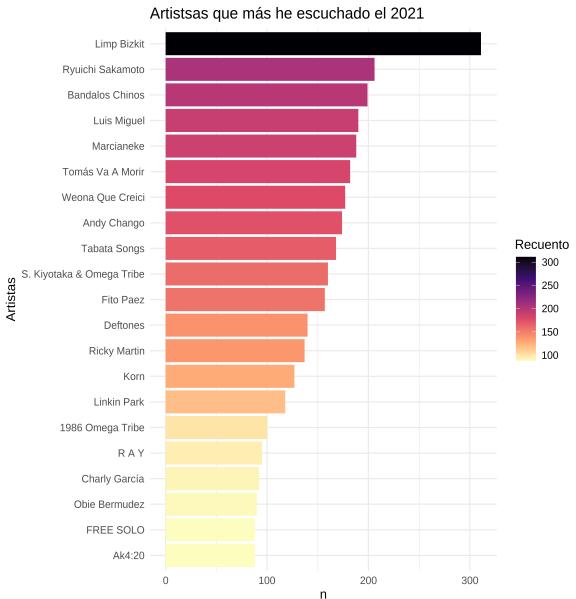
Estructura hipotética

Usamos la base, la transformamos y hacemos un gráfico de barra

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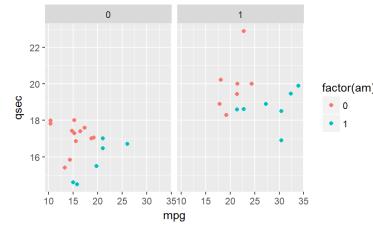
Se definen etiquetas y se gira el gráfico de barras, se pone el gráfico en mínimo

```
st %>%
  dplyr::count(artistName, sort = TRUE) %>%
  dplyr::top_n(20) %>%
  dplyr::mutate(artistName = reorder(artistName, n)) %>%
  ggplot(aes(x = artistName, y = n)) +
  geom_bar(aes(fill=n),
           stat="identity") +
  scale_fill_viridis_c(option = "magma", direction = -1) +
  xlab(NULL) +
  coord_flip() +
  labs(x = "Artistas",
       title = "Artistas que más he escuchado el 2021",
       fill = "Recuento") +
  theme_minimal()
```



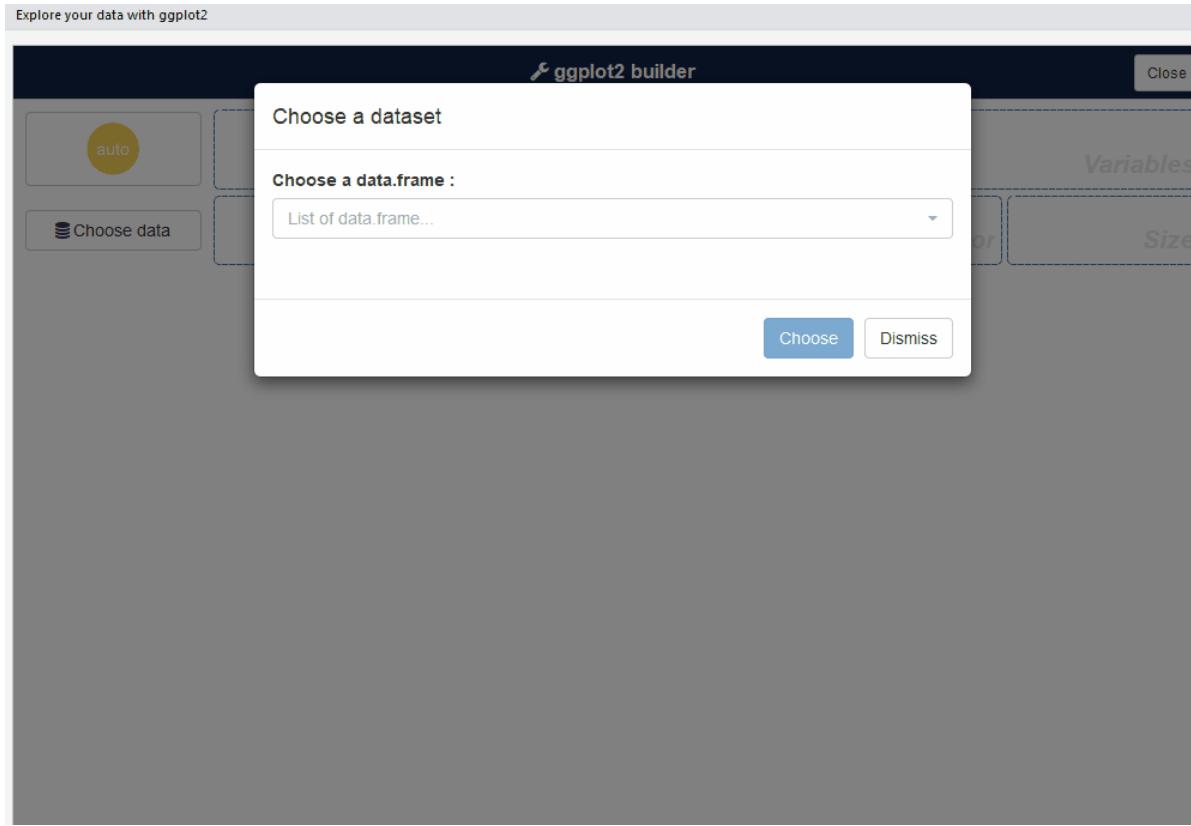
# Ejercicio 1

- Con los siguientes datos ([mtcars](#)), llegue al siguiente gráfico (tip: busque `facet_grid`):



# Otros paquetes relacionados

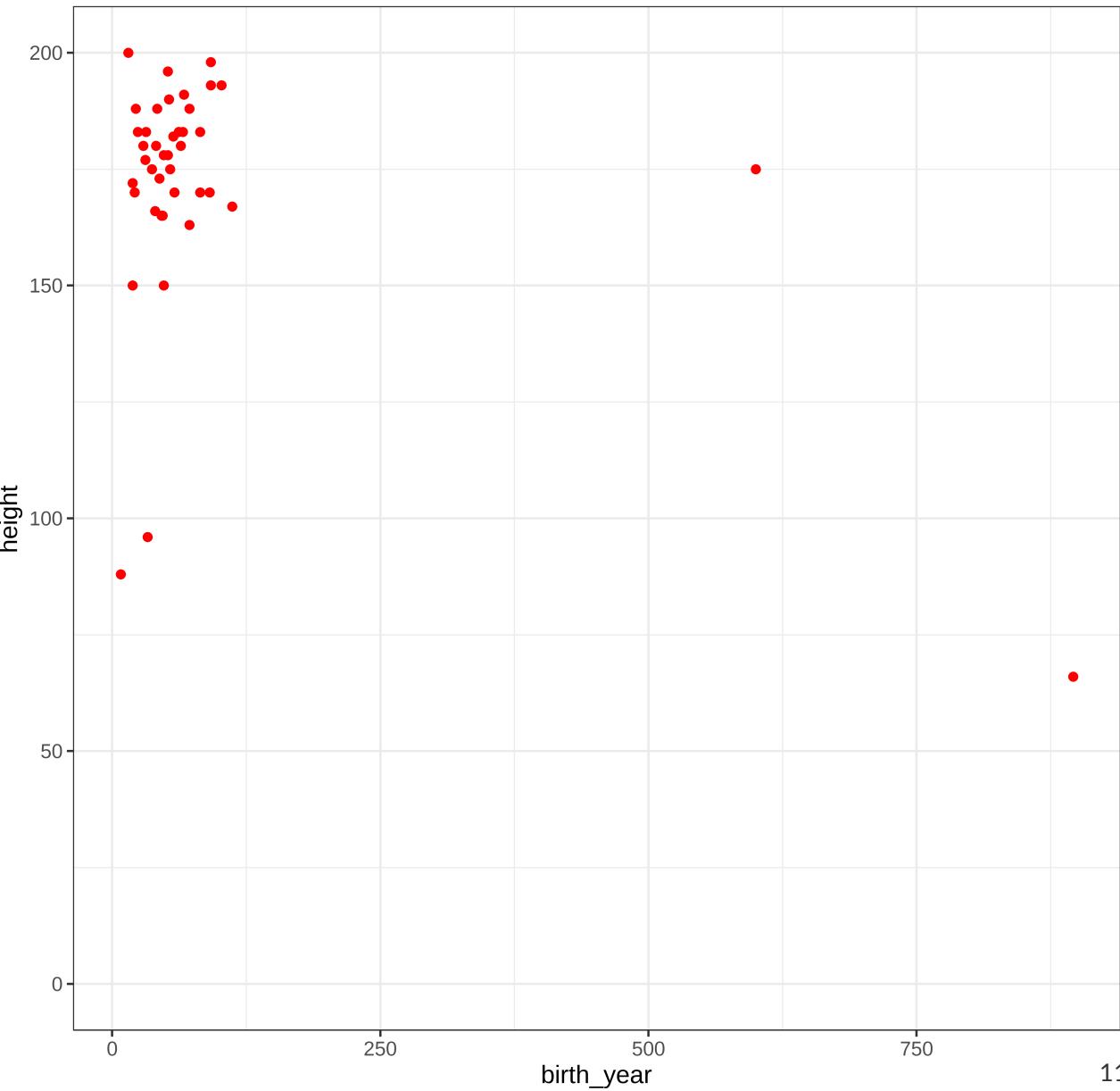
- [ggstatsplot](#)
- [gganimate](#)
- [ggplotly](#)
- [ggvis](#)
- [esquise](#)



```
starwars %>%  
  ggplot2::ggplot() +  
  geom_point(aes(x = birth_year,  
                 y = height), color = "red") +  
  scale_y_continuous(limits = c(0,200)) +  
  labs(title = "Un ggplot") +  
  theme_bw()
```

## Warning: Removed 46 rows containing missing values ('geom\_point()').

## Un ggplot



## Ejercicio 2

- Genere el gráfico que corresponda para analizar la distribución de los datos presentados más abajo. De acuerdo a las lecturas y fuentes que corresponda (busque en internet), indique su distribución.
- `set.seed(2125);datos<-data.frame(caso=runif(100,50,500))`
- Use la base **ChickWeight** y haga un diagrama de puntos entre el tiempo y el peso. Grafique la dispersión de los puntos y añada una línea suavizada (**smooth**) para ver si hay alguna tendencia. Añada etiquetas y un tema en blanco y negro.

# Ejercicio 3

- Use `ggplot()` y especifique la base de datos `gapminder` como input, pero habiendo filtrado sólo los datos del 2007. (Debe instalar la librería `gapminder` antes de cargar los datos).
- Agregue la capa `geom_point` al gráfico y cree un diagrama de puntos (`scatterplot`) mostrando el producto interno bruto per-capita `gdpPercap` en el eje x y la esperanza de vida `lifeExp` en el eje y.
- Use la estética color para indicar cada continente con un color diferente
- Use la estética de tamaño para ajustar el tamaño de los puntos según el tamaño de la población
- Use `scale_size_area()` para que el tamaño de los puntos refleje las diferencias de la población actual y configure el tamaño máximo de los puntos (`max_size`) de cada punto a 15.
- Determine el nivel de opacidad/transparencia de cada punto a 70% mediante el parámetro `alpha` (no debe ser visible en las leyendas).

(Quartango Blog, 2020, Julio 28, <https://www.r-bloggers.com/2020/07/specify-additional-aesthetics-for-points/>)

## Ejercicio 4

- Cargue una base de datos del Bono Bodas de Oro correspondiente a Enero 2021 [aquí](#)
- Tip: Lea el contenido, información, diccionario de datos, etc.
- Seleccione la región 13
- Genere un histograma del total de beneficiados (**Total N°**), que contenga 10 quiebres.
- Genere un gráfico de barras con la frecuencia de los distintos niveles educacionales

# Introducción a Rmarkdown y Quarto

Fuente : Prof. Matias Placencio – Castro (placenci@bc.edu)

- **Markdown**: Lenguaje de marcado ligero para formatear texto.
- Creador: John Gruber, 2004
- Uno de los lenguajes de formateo más populares.
- **Rmarkdown**: Extensión de Markdown para integrar código R y otros lenguajes.
- Usos:
  - Comunicar resultados para toma de decisiones.
  - Colaboración en investigaciones, incluyendo pasos seguidos.
  - Ambiente de trabajo moderno que captura procesos y flujo de trabajo
- **Quarto**: Extensión avanzada de Markdown.
- Integración fácil con Python y otros lenguajes.
- Mejora en el procesamiento de Markdown en "trabajos".



# Ventajas y desventajas

- Todo en un mismo lugar
- Automatiza
- Facilita colaboración (claridad en pasos, rastreables, etc.)
- Difícil lectura (mucho código)
- No es tan rápido manejarlo
- Difícil aprender al principio

## Apuntes

- Apuntes Quarto
- Apuntes Rmarkdown

# Estructura (1): YAML

- Debe ir al principio de cada documento y entre "---" tanto al principio como al final de esta sección
- Respete la indentación (ej., espacios como " " para definir jerarquías de los argumentos del YAML)
- **Metadatos:** Hablan de la estructura del documento (ej., nombre, título). Cuando usted saca una foto, ésta tiene una fecha, el nombre de la cámara, información sobre la profundidad de la imagen, la resolución etc. Esta es similar.

```
---
```

```
title: "Untitled"
author: "ags"
date: '2023-08-15'
output: html_document
---
```

- Quarto

```
---
```

```
title: "Untitled"
format: html
editor: visual
---
```

- PDF

```
---
```

```
title: "Untitled"
author: "ags"
date: '2023-08-15'
output: pdf_document
---
```

- PDF (xelatex)

- Si el anterior metadato para exportar a PDF no le funciona, puede instalar 'tinytex'

```
---
```

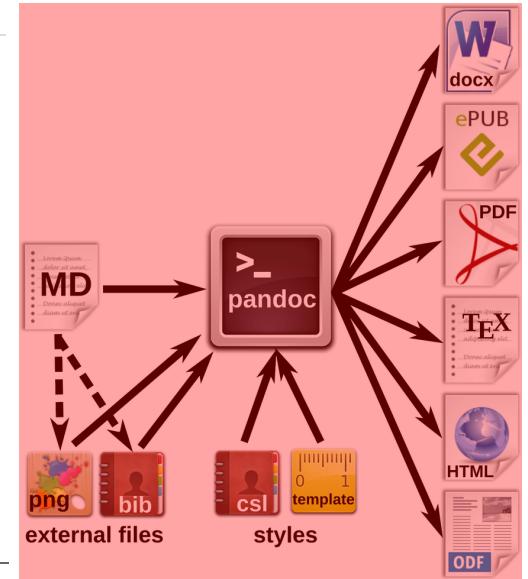
```
title: "Untitled"
author: "ags"
date: '2023-08-15'
output:
  pdf_document:
    latex_engine: xelatex
---
```

# Estructura (2): Chunks

Argumento	Ejemplo (por defecto)	Función
eval	eval=TRUE	El código corre y los resultados se incluyen en la salida.
include	include=TRUE	¿Se incluye el código y el resultado en la salida?
echo	echo=TRUE	¿Se despliega el código junto con los resultados?
warning	warning=TRUE	¿Se despliegan los mensajes de advertencia?
error	error=FALSE	¿Se despliegan los errores? ¿sigue la compilación si hay errores?
message	message=TRUE	¿Se despliegan los mensajes?
tidy	tidy=FALSE	¿Se formatea el código para que parezca "limpio"?
results	results="markup"	"Cómo se ven los resultados? ""hide"" = sin resultados ""asis"" = resultados sin formato ""hold"" = se compilan los resultados al final del chunk (usar si hay muchos comandos)"
cache	cache=FALSE	¿Se guarda en el cache para compilaciones futuras?
comment	comment="##"	¿Cuál es el signo en que los caracteres no se evalúan?
fig.width, fig.height	fig.width=7	¿Cuál es el ancho y largo (en pies) de la figura?
fig.cap	fig.cap=""	Título de la figura
fig.align	fig.align="left"	Ubicación de la imagen: (izquierda) "left" (derecha) "right" (centro) "center"

Fuente: <https://ourcodingclub.github.io/tutorials/rmarkdown/>

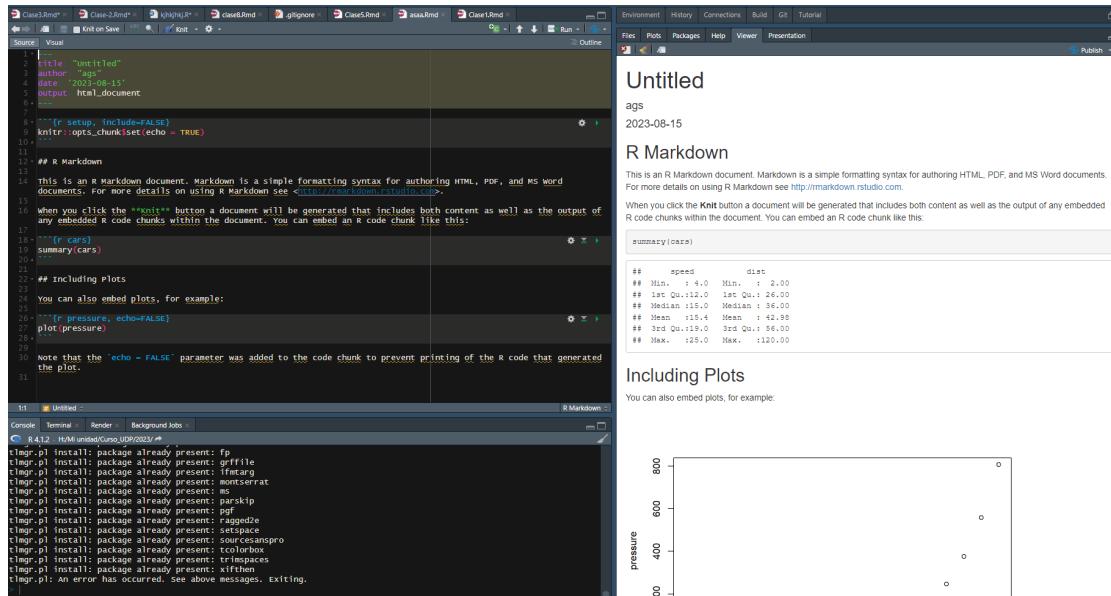
Nota: En quarto, los argumentos de cada chunk se presentan en formato #| debajo de cada chunk



# Ejemplos

```
```{r, "rmarkdown-output", echo = F, eval=TRUE, out.width = '50%', fig.align = 'center', fig.cap="Ejemplo markdown"}  
url<- '/_figs/rmarkdown.PNG'  
knitr::include_graphics(url)  
```
```

Salida:



# Ejemplos (2)

Necesario para hacer la interfaz con Python:

```
if(!require(reticulate)){install.packages("reticulate")}
```

```
```{python, "ejercicio-python", echo = F}
import numpy as np
np.random.seed(42)
data = np.random.randn(100)
mean_data = np.mean(data)
mean_data
```
```{r, "ejercicio-r", echo = F}
set.seed(42)
r_data <- rnorm(100)
mean_r_data <- mean(r_data)
mean_r_data
```

```

Salida:

```
## 0
## -0.10384651739409384
## [1] 0.03251482
```

# Ejercicio 5

Despliegue el siguiente ejercicio en un markdown en formato .html

- De algunas de las base de datos de permisos de circulación pagados y tramitados en la Municipalidad de Cochamó el 2016 (<https://datos.gob.cl/dataset/permisoscirculacion2016cochamo>),
  - Obtenga el porcentaje por columna, según corresponda al tipo de variable y nivel de medición.
  - Obtenga la media y la mediana, según corresponda al tipo de variable y nivel de medición.
  - **EXTRA:** Obtenga una tabla de 2 vías, según corresponda al tipo de variable y nivel de medición.

# Ejercicio 6

De los datos sobre interrupción voluntaria del embarazo, genere un gráfico de líneas en que el eje x sea el AÑO y las líneas sean la frecuencia. Cada línea debe representar cada causal (rojo= Causal 1: Peligro para la vida de la mujer; azul=Causal 2: Inviabilidad fetal de carácter letal; morado= Causal 3: Embarazo por violación), **utilizando tidyverse**

```
#https://deis.minsal.cl/#tableros
#notese, que no escribimos con ñ por notación
data_df <- data.frame{
  ANIO = c(2018, 2018, 2018, 2019, 2019, 2019, 2020, 2020, 2020, 2021, 2021, 2021, 2022, 2022, 2022, 2023, 2023, 2023),
  Frecuencia = c(262, 346, 124, 267, 414, 137, 160, 348, 154, 250, 442, 130, 254, 368, 209, 103, 162, 142),
  CAUSAL = c("Causal 1", "Causal 2", "Causal 3", "Causal 1", "Causal 2", "Causal 3", "Causal 1", "Causal 2", "Causal 3",
            "Causal 1", "Causal 2", "Causal 3", "Causal 1", "Causal 2", "Causal 3", "Causal 1", "Causal 2", "Causal 3")
}

#Ejemplo de un gráfico con el total, sin división en causales
data_df %>%
  group_by(ANIO) %>%
  summarise(total=sum(Frecuencia, na.rm=T)) %>%
  ggplot(aes(ANIO, total, group=1))+ #en algunos casos podría solicitarle el último argumento
  geom_point()+ #líneas
  theme_minimal() #temática
```



# Gracias!

Contacto: CANVAS

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# Fuentes

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# Fuentes

- Ballari, D. (2018). Funcion ggplot() de ggplot2. <https://rpubs.com/daniballari/ggplot>
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