

dviz-practice

1 dviz/5advcustomlab.org

1. The `fgl` data frame from the `MASS` package characterizes 214 forensic glass samples in terms of their refractive index (RI), a type designation (type), and percentages by weight of eight different elemental oxides.
2. Load `fgl` and display its structure.

```
library(MASS)
data(fgl)
str(fgl)
```

```
'data.frame':  214 obs. of  10 variables:
 $ RI  : num  3.01 -0.39 -1.82 -0.34 -0.58 ...
 $ Na  : num  13.6 13.9 13.5 13.2 13.3 ...
 $ Mg  : num  4.49 3.6 3.55 3.69 3.62 3.61 3.6 3.61 3.58 3.6 ...
 $ Al  : num  1.1 1.36 1.54 1.29 1.24 1.62 1.14 1.05 1.37 1.36 ...
 $ Si  : num  71.8 72.7 73 72.6 73.1 ...
 $ K   : num  0.06 0.48 0.39 0.57 0.55 0.64 0.58 0.57 0.56 0.57 ...
 $ Ca  : num  8.75 7.83 7.78 8.22 8.07 8.07 8.17 8.24 8.3 8.4 ...
 $ Ba  : num  0 0 0 0 0 0 0 0 0 ...
 $ Fe  : num  0 0 0 0 0 0.26 0 0 0 0.11 ...
 $ type: Factor w/ 6 levels "WinF","WinNF",...: 1 1 1 1 1 1 1 1 1 1 ...
```

3. How many samples in this data frame come from vehicle headlamps?

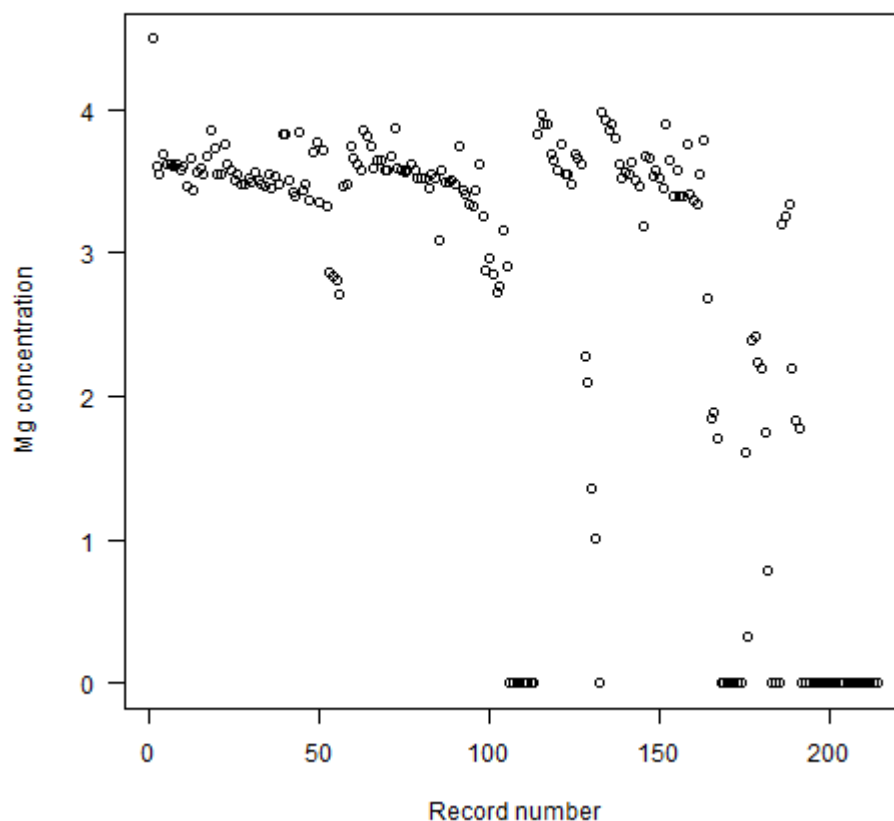
```
sum(fgl$type == "Head")
```

```
[1] 29
```

4. Generate a plot of the magnesium oxide concentration (Mg) versus record number, with these features:
 - x-axis label "Record number"
 - y-axis label: "Mg concentration"
 - title: "Magnesium oxide concentration in the fgl dataset"
 - use the `las` parameter to make the labels horizontal for both axis

```
plot(
  fgl$Mg,
  xlab = "Record number",
  ylab = "Mg concentration",
  main = "Magnesium oxide concentration records in the fgl dataset",
  las = 1)
```

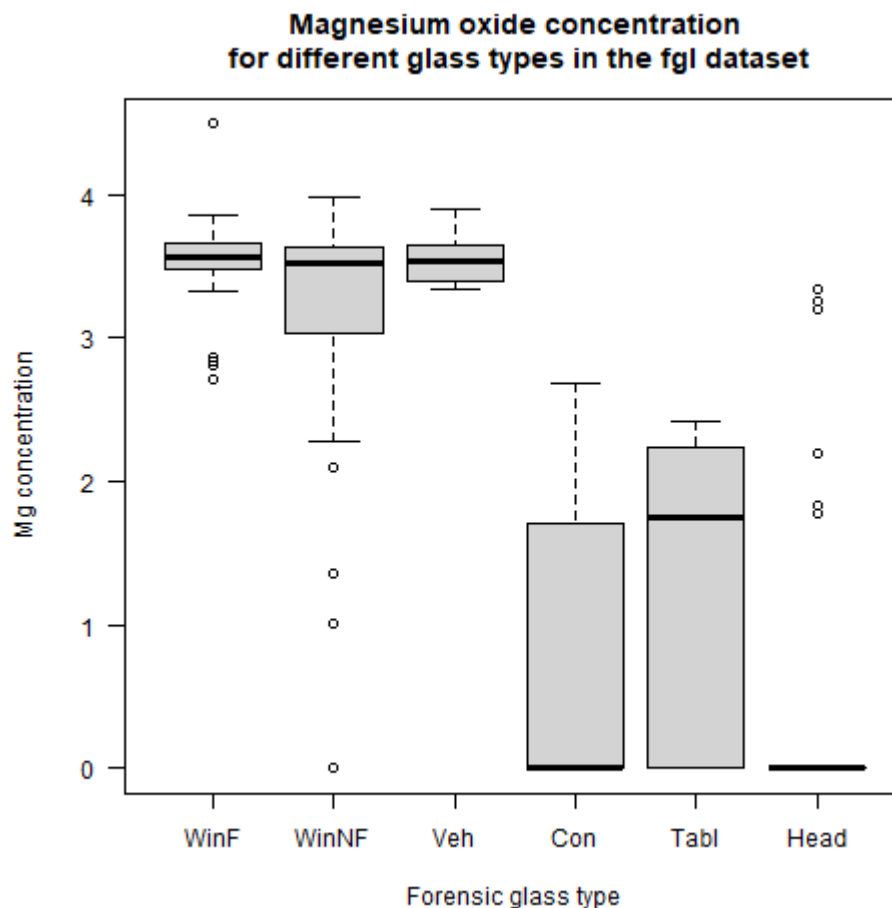
Magnesium oxide concentration records in the fgl dataset



5. The generic function `plot(x,y)` generates a boxplot when `x` is a categorical variable and `y` is a numerical variable. Create a boxplot summary showing how the magnesium concentration in the `fgl` dataset varies with the different values of the categorical type variable. Customize as follows:

- Specify the x-axis label as "Forensice glass type"
- Specify the y-axis label as "Mg concentration",
- Title the plot "Mg concentration for different glass types in the fgl data set". Use `\n` to break titles that are too long to fit
- Make the labels horizontal for both axes

```
plot(
  x = fgl$type,
  y = fgl$Mg,
  xlab = "Forensic glass type",
  ylab = "Mg concentration",
  main = "Magnesium oxide concentration\n for different glass types in the fgl dataset",
  las = 1)
```



6. Using the `barplot` function, construct the following summary for the `type` variable from the `fgl` data frame in the `MASS` package:

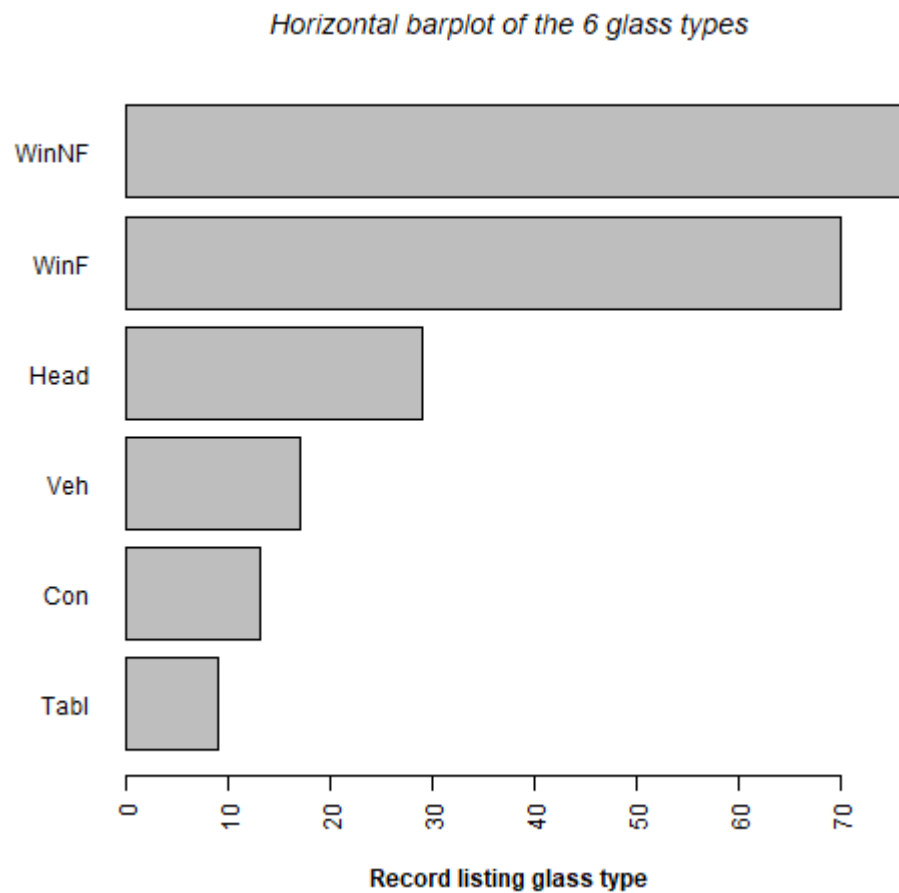
- Create a horizontal barplot of the `type` variable record frequencies (counts) using `table`
- Display the frequencies sorted from largest (top) to smallest (bottom)
- Label the x-axis "Record listing glass type"
- Remove the y-axis label
- Use the `las` parameter to make the type name labels horizontal
- Use the `font.lab` parameter to make the x-label bold face
- Use the `paste` function to create a string `tstring` for the title consisting of:
 1. the text "Horizontal barplot of the",
 2. the number of levels of the `type` variable,
 3. the text "glass types"
- Add a title to the plot using `title` and the `tstring` variable, and change the font to *italics* with the `font.main` parameter

Tip: plot the the simple `barplot(height=)` first before customizing!

```
types <- sort(table(fgl$type)) # sorted frequency table

barplot(
  height = types,
  xlab = "Record listing glass type",
```

```
ylab = "",  
font.lab = 2,  
horiz = TRUE,  
las = 2)  
  
tstring <- paste( "Horizontal barplot of the",  
                  length(types),  
                  "glass types")  
title(tstring, font.main=3)
```



Created: 2022-10-28 Fri 14:58