

Load in the `mtcars` data by typing `data("mtcars")` This is described as Motor Trend Car Road Tests data. Rather than referring to `mtcars` everytime we want to use data from it, we can **attach** the variable to the environment so that we can refer to the column names directly. Do this by typing

```
attach(mtcars)
```

Now we can simply type a columns name from those available i.e. `mpg`, `cyl`, `disp`, `hp`, `drat`, `wt`, `qsec`, `vs`, `am`, `gear`, `carb`.

1. Plot Miles/(US) gallon versus Rear axle ratio by `plot(mpg,drat)`. On which axis does `mpg` appear?

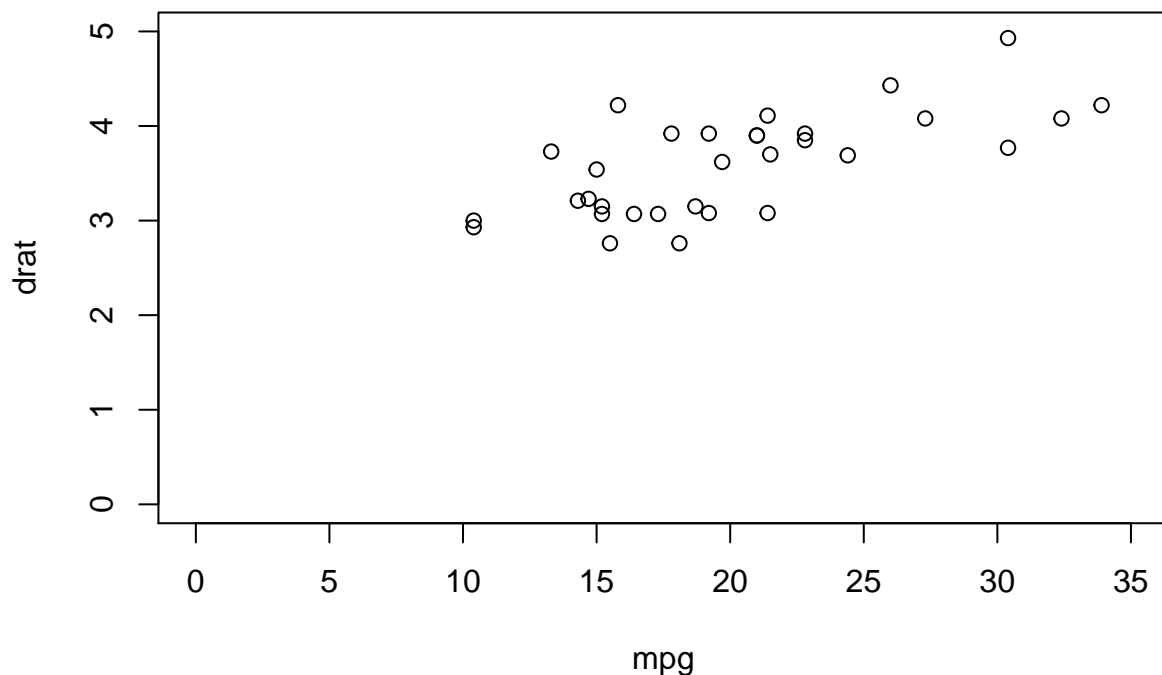
- a. `mpg` appears on the x axis
- b. `mpg` appears on the y axis

2. Is a scatterplot recommended for continuous or dichotomous variables?

- a. continuous
- b. dichotomous

3 We want to include the origin on the plots. To do this we use the argument `xlim = c(0,<xmax>)` and `ylim = c(0,<ymin>)`. Repplot the scatterplot with the origin.

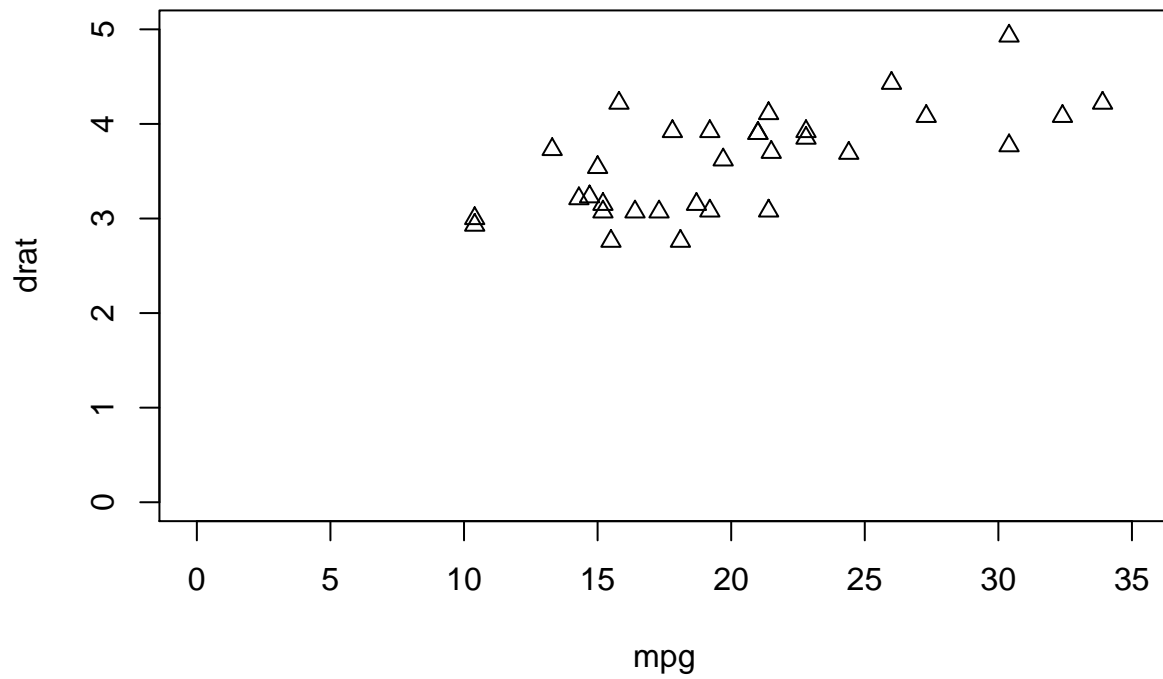
```
plot(x=mpg, y=drat, xlim = c(0,35), ylim = c(0,5))
```



4 Let's change the type of points. We do this using the `pch` argument.

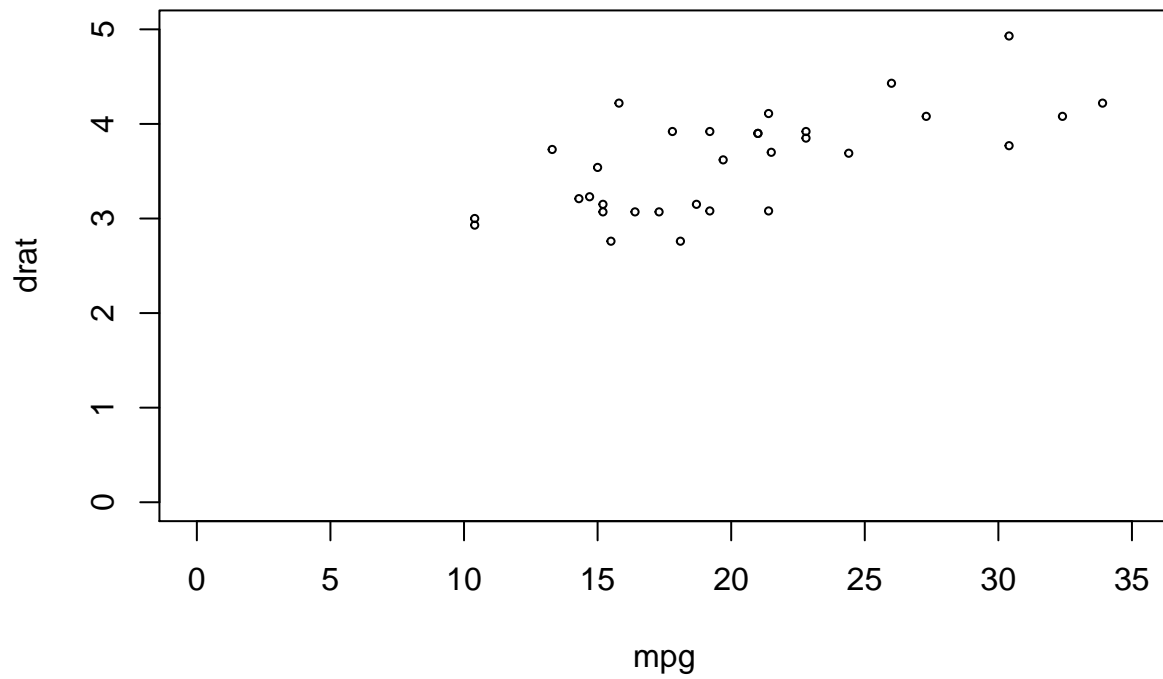
Redo the scatterplot with triangle points. HINT: read the `pch` help document.

```
plot(x=mpg, y=drat, xlim = c(0,35), ylim = c(0,5), pch = 2)
```



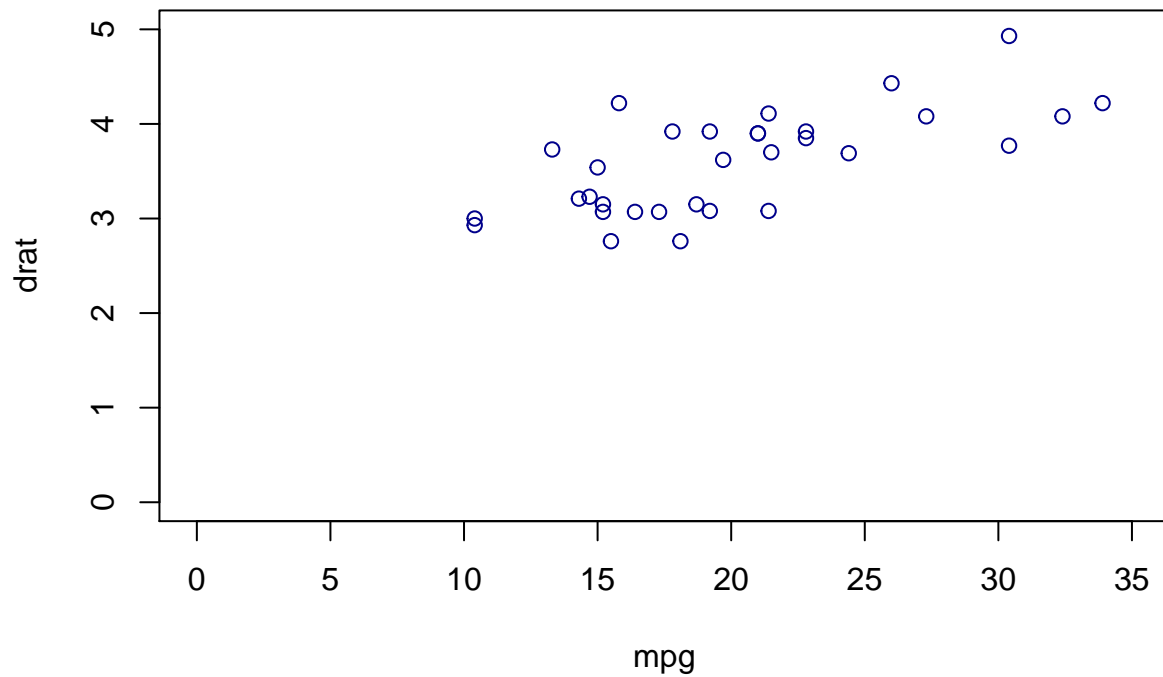
5. Give the plots a title using the `main` argument.
6. Give the plot a subtitle using `sub`.
7. Label the axes using `xlab` and `ylab`.
8. Make the size of the point half the size using `cex`

```
plot(x=mpg, y=drat, xlim = c(0,35), ylim = c(0,5), cex = 0.5)
```



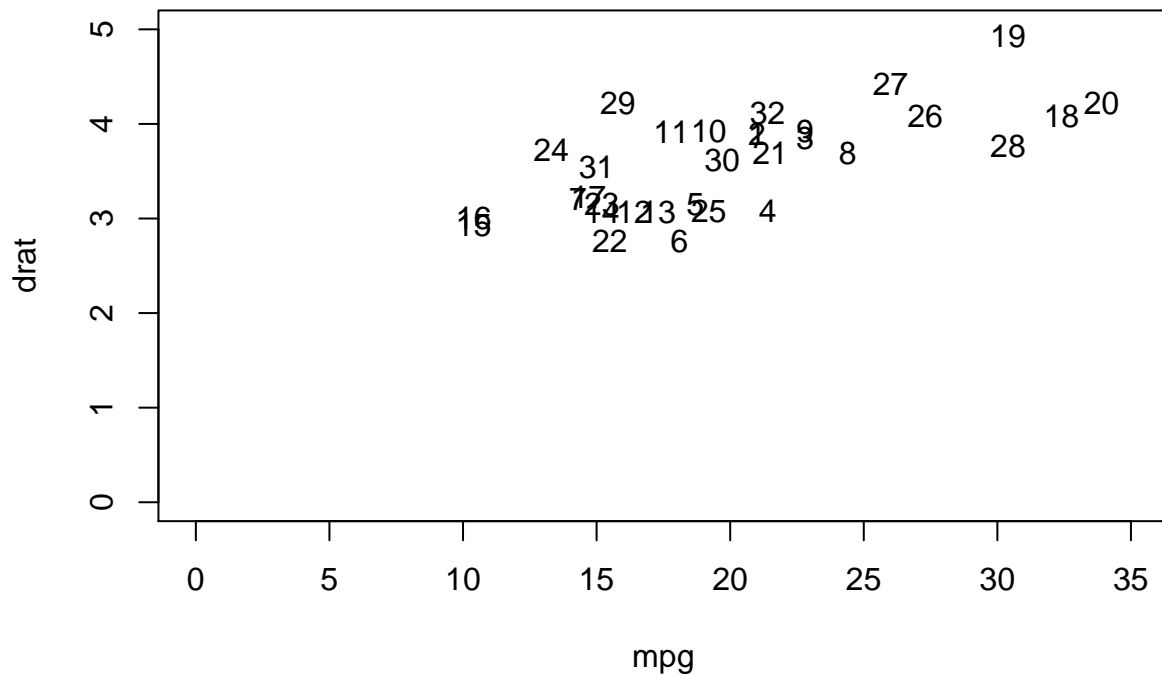
9. Change the colour of the points to dark blue.

```
plot(x=mpg, y=drat, xlim = c(0,35), ylim = c(0,5), col = "dark blue")
```



10 If we set the `type` of plot as an argument to `'n'` then an empty plot is made. Create an empty scatterplot. Then we can add points. Using the `text` function in the same way as `plot` (and `points`) plot a number for each point. HINT: with no `labels` argument in `text` sequential numbers are used.

```
plot(x=mpg, y=drat, xlim = c(0,35), ylim = c(0,5), type = 'n')
text(x=mpg, y=drat)
```



11. Produce a histogram with `hist(gear)`. What do you see?
 - a. frequencies
 - b. probability density
12. Change type of visualization of our scatterplot in Exercise 1 `plot(mpg,drat,type="")`. If we want to see lines what we have to type into "":
 - a. `type="l"`
 - b. `type="p"`
13. Now we want to see both point and lines in our plot. What we have to type into `plot(mpg,drat,type="")`.
 - a. `type=c("p","l")`
 - b. `type="b"`
14. Add another variable to our plot, for example `Weight`. What command do we have to use:
 - a. `plot(mpg, drat); plot(mpg, wt)`
 - b. `plot(mpg, drat); points(mpg, wt)`
15. Now we have added a new variable to our plot. Suppose we want to use two different colours to separate the points. Type `plot(mpg, drat, col=2)`. What colour have we selected:
 - a. red
 - b. green
16. Now we want to differentiate the two different variables in the scatterplot:
 - a. Let's change the colours of the second plot
 - b. Change use two different types of plot (e.g. points,lines)

17. Now we want to highlight a variable in the final plot. Type: `plot(mpg, drat, lwd=2) ; points(mpg, wt, lwd=1)`. Which plot is highlighted:
- `plot1 (mpg, drat)`
 - `plot2 (mpg, wt)`
18. Finally choose four different continuous variables from `mtcars` set and produce:
- Plot with lines and points for different variables with different colours (HINT: change y axis parameters by adding command `ylim=c(0,30)` to plot [e.g. `plot(a,b,type="p",ylim=c(0,30))`]).
 - Choose one variable from each and highlighted it set red colour and a broad line.

[<https://www.r-exercises.com/2015/10/09/vector-exercises/>]