Motor Trend Cars

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Data

This data is from Motor Trend magazine in 1974. It presents data for 32 automobiles regarding performance and design.

Variables:

```
##  [1] "mpg"  "cyl"  "disp" "hp"   "drat" "wt"   "qsec" "vs"   "am"   "gear"
## [11] "carb"
```

Explanation of variable names: mpg is miles per gallon; cyl is number of cylinders; disp is displacement (in cubic inches); hp is horsepower; drat is rear axle ratio; wt is weight (in 1000 pounds); qsec is 1/4 mile time; vs is engine type (0 = vertical/1 = straight); am is transmission type (0 = automatic, 1 = manual); gear is number of forward gears; and carb is number of carburetors

Basic statistics

```
##          mpg cyl disp   hp  drat    wt  qsec vs am gear carb
## nbr.val   32  32   32   32  32.0  32.0  32.0 32 32   32   32
## nbr.null   0   0    0    0   0.0   0.0   0.0 18 19    0    0
## nbr.na     0   0    0    0   0.0   0.0   0.0  0  0    0    0
## min       10   4   71   52   2.8   1.5  14.5  0  0    3    1
## max       34   8  472  335   4.9   5.4  22.9  1  1    5    8
## range     24   4  401  283   2.2   3.9   8.4  1  1    2    7
## sum      643 198 7383 4694 115.1 103.0 571.2 14 13  118   90
```

There are no null or missing values. Displacement and horsepower have wide ranges.

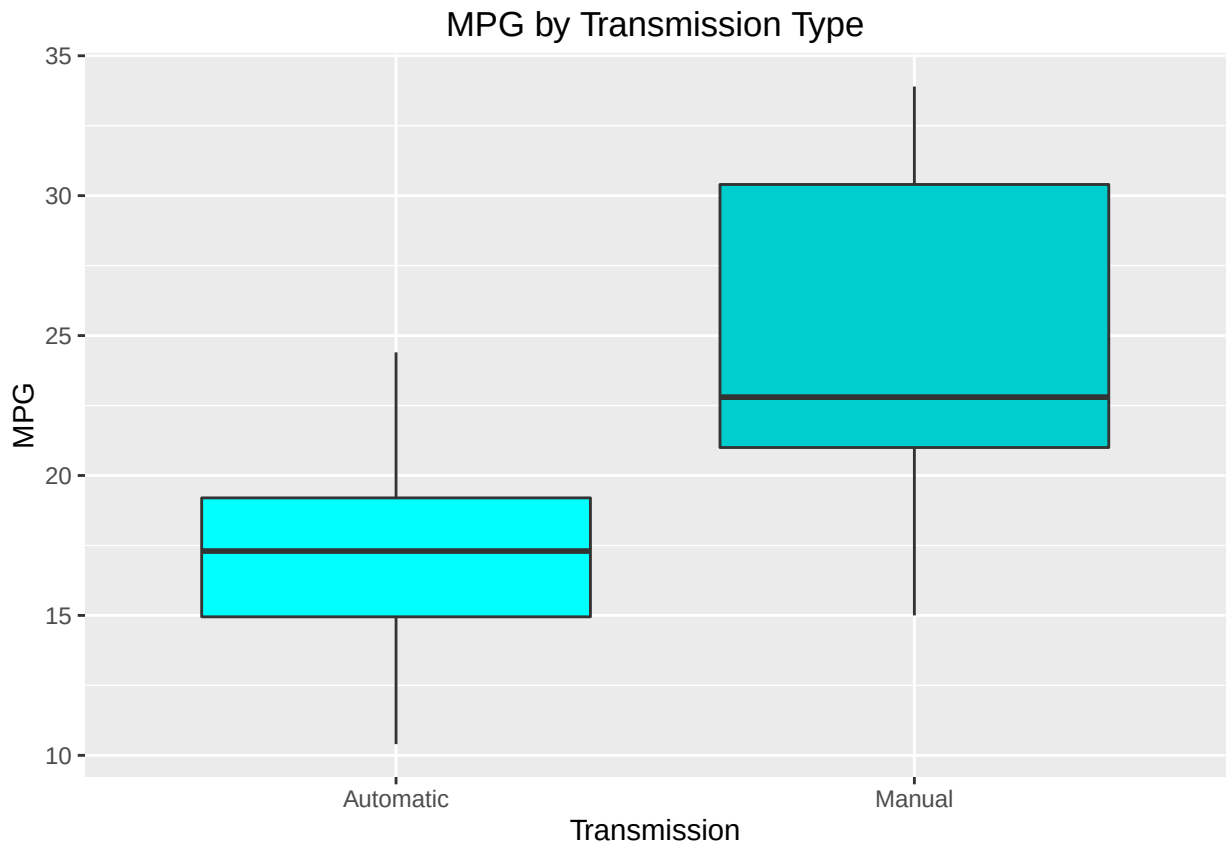
Means

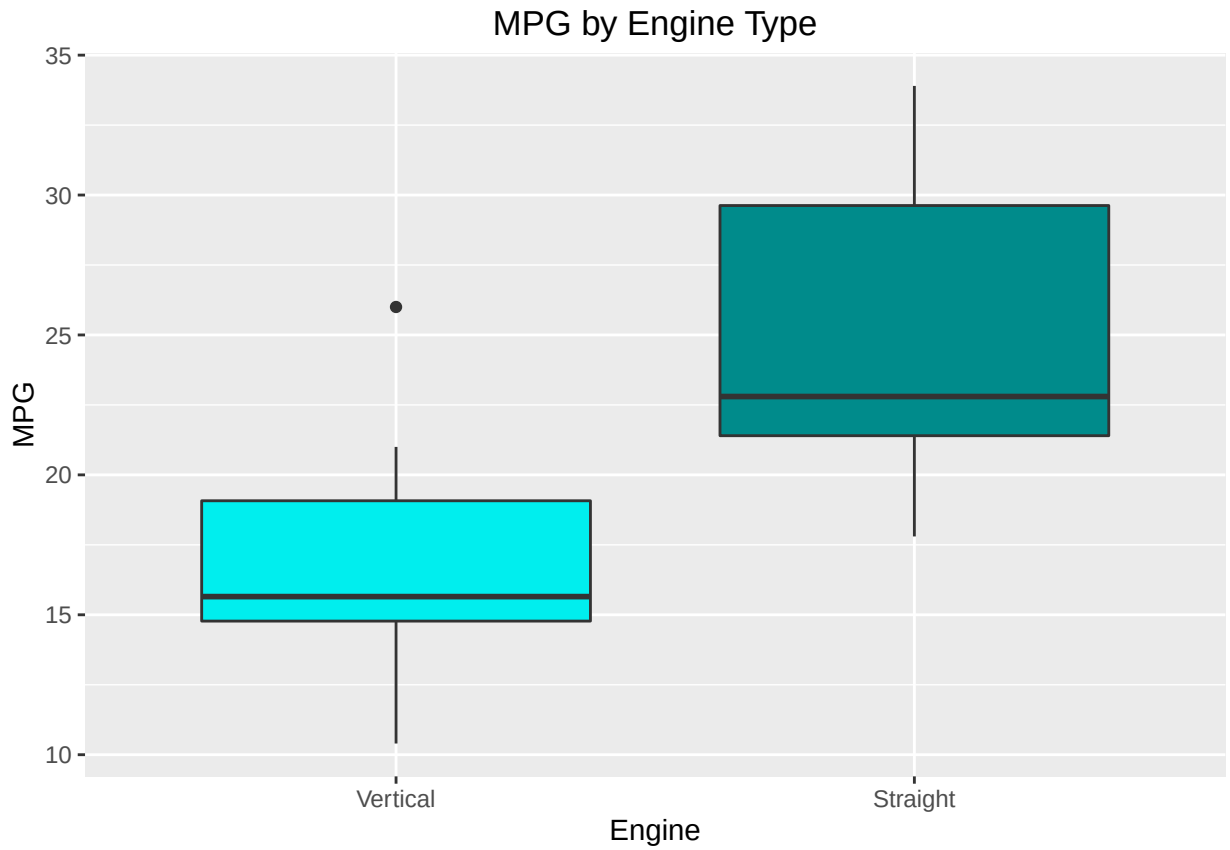
```
## mpg 20.09
## cyl 6.19
## disp 230.72
## hp 146.69
## drat 3.6
## wt 3.22
## qsec 17.85
## vs 0.44
## am 0.41
## gear 3.69
## carb 2.81
```

The average miles per gallon is about 20, the average horsepower is about 147, and the average quarter-mile time is about 18 seconds. For engine and transmission types, 44% have vertical-style engines and 41% have automatic transmissions. Other characteristics of the data will be further explored in the plots.

Plots

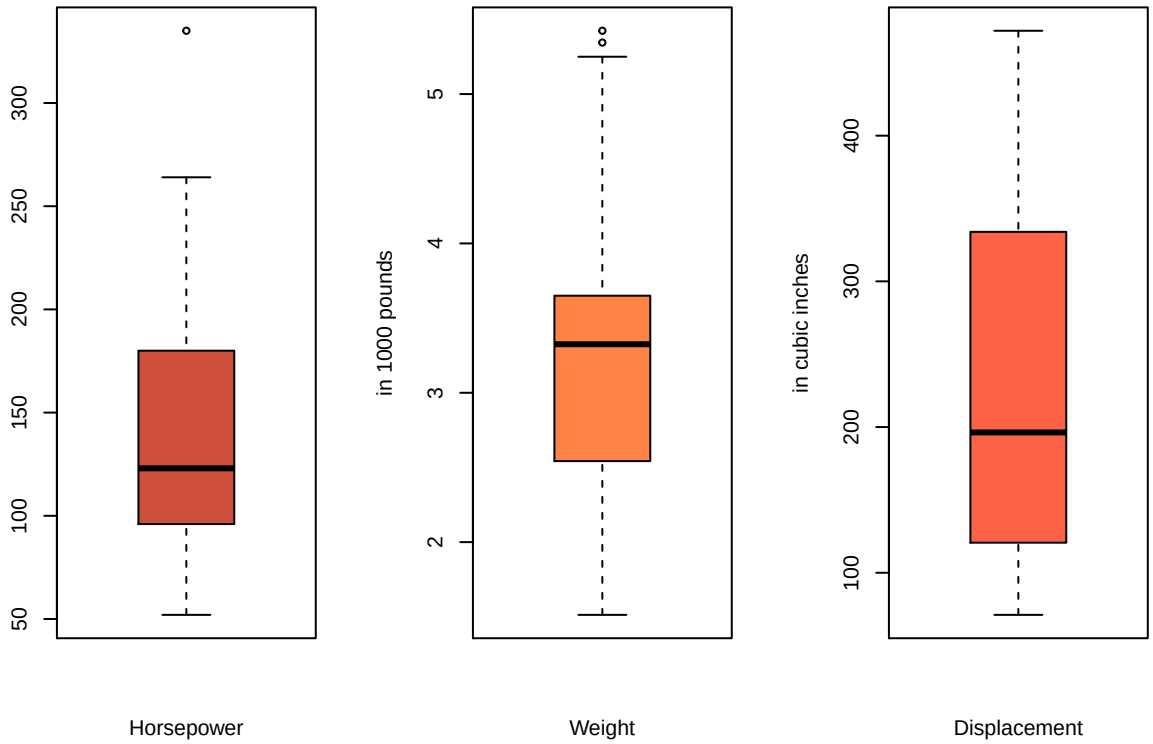
Boxplot distributions: MPG





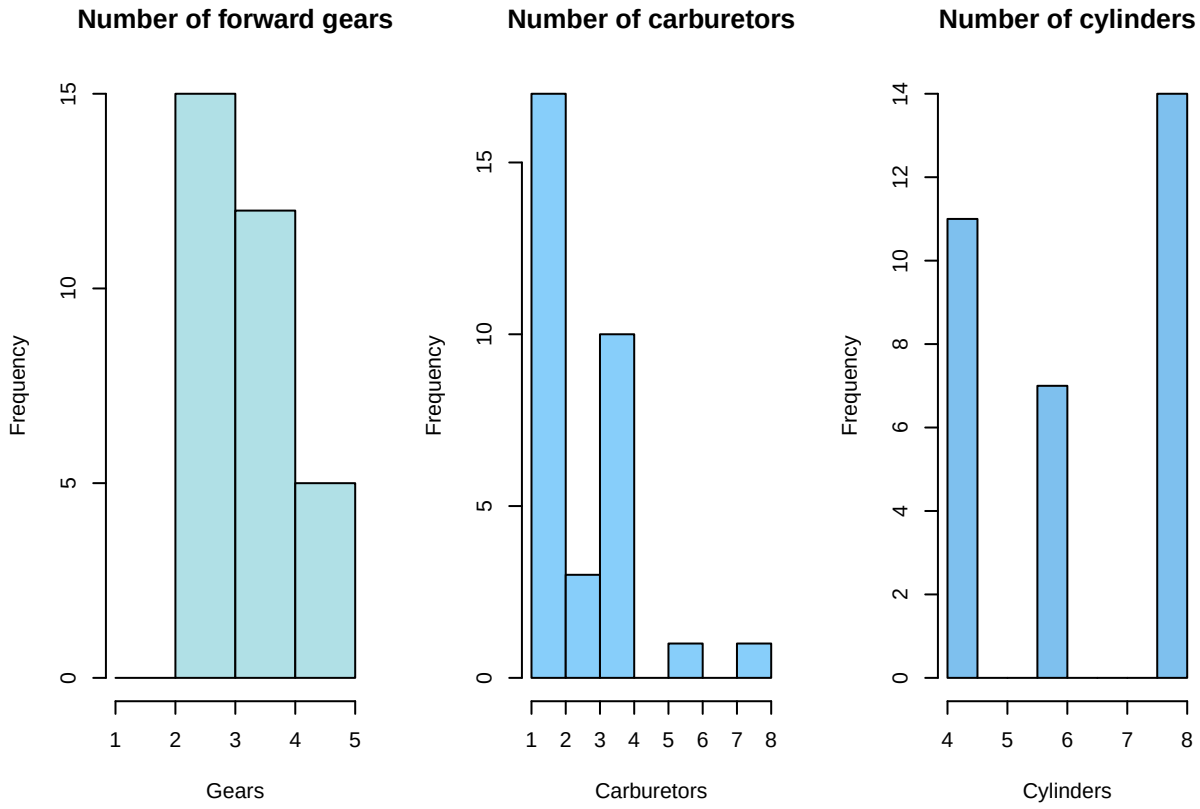
Manual transmissions and straight engines in this data set generally have better gas mileage.

Boxplot distributions: Horsepower, Weight and Displacement



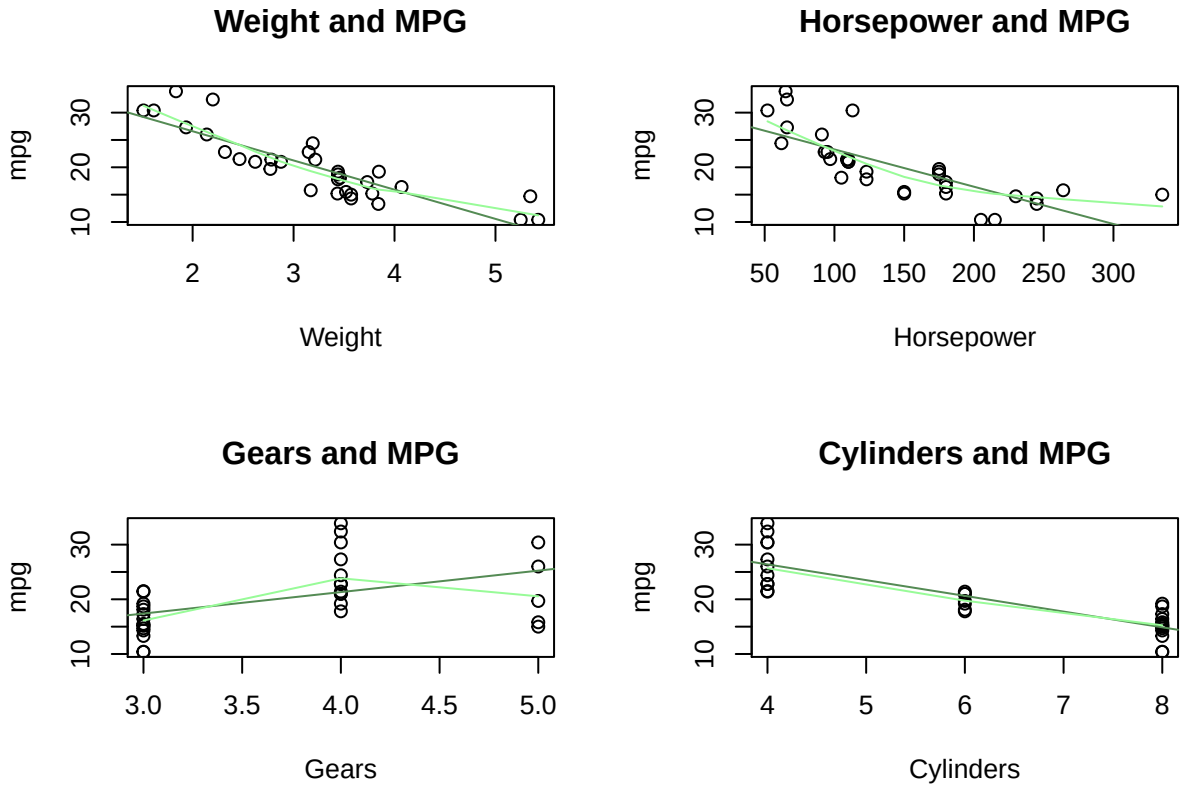
All three variables vary widely, but displacement has an especially wide distribution.

Histograms of gear, carburetor and cylinder Variables



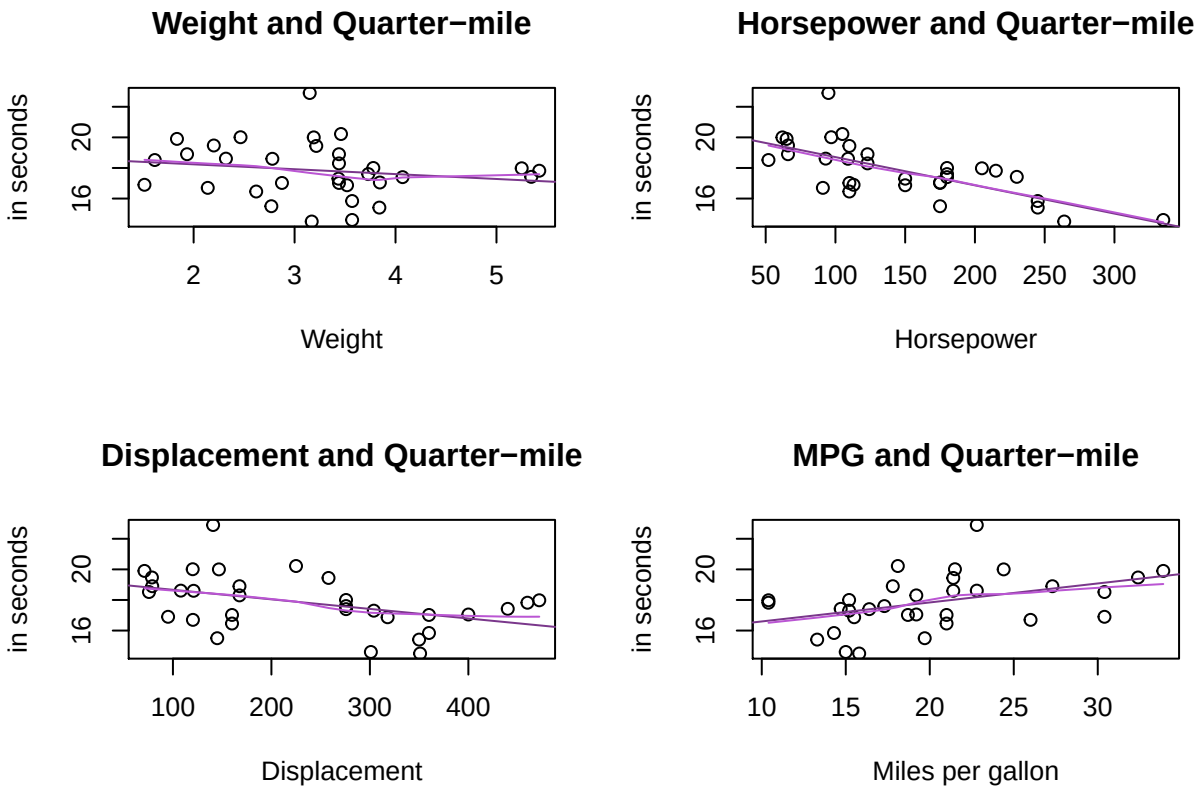
Most cars had 3 or 4 gears, 1 or 3 carburetors, and 4 or 8 cylinders.

Scatterplots showing correlation of variables with MPG, with lines of best fit and Lowess lines



Weight, horsepower and cylinders are all negatively correlated with gas mileage. The number of gears does not appear to have a strong effect, though the best-fit line shows a slightly positve correlation.

Scatterplots showing correlation of variables with quarter-mile time, with lines of best fit and Lowess lines



Horsepower and displacement are negatively correlated with the quarter-mile time, that is, cars with more horsepower or a larger engine have faster times. Weight shows a very slight negative correlation, too. Gas mileage and quarter-mile time are positively correlated: the better the gas mileage, the slower the time.