Comparison of Cylinder Count to Engine Displacement

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Goal

This report was commissioned by Big Dawg to investigate the relationship between the number of cylinders in a car engine and the engine displacement. Big Dawg believes that cars with more cylinders do not necessarily have bigger engines, which he thinks is a fabricated lie from the radical left. This report will address this research question by analyzing the 'mtcars' dataset.

```
library(tidyverse)
```

```
-- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
v dplyr     1.1.3     v readr     2.1.4
v forcats   1.0.0     v stringr   1.5.0
v ggplot2   3.4.3     v tibble    3.2.1
v lubridate 1.9.3     v tidyr     1.3.0
v purrr     1.0.2
-- Conflicts ------------------------------------------ tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to beco
```

```
library(knitr)
```

```
Warning: package 'knitr' was built under R version 4.3.3
```

```
library(kableExtra)
```

```
Attaching package: 'kableExtra'

The following object is masked from 'package:dplyr':

    group_rows
```

```
data(mtcars)
```

```
str(mtcars)
```

```
'data.frame':   32 obs. of  11 variables:
 $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
 $ cyl : num  6 6 4 6 8 6 8 4 4 6 ...
 $ disp: num  160 160 108 258 360 ...
 $ hp  : num  110 110 93 110 175 105 245 62 95 123 ...
 $ drat: num  3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
 $ wt  : num  2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num  16.5 17 18.6 19.4 17 ...
 $ vs  : num  0 0 1 1 0 1 0 1 1 1 ...
 $ am  : num  1 1 1 0 0 0 0 0 0 0 ...
 $ gear: num  4 4 4 3 3 3 3 4 4 4 ...
 $ carb: num  4 4 1 1 2 1 4 2 2 4 ...
```

Mean displacement for each number of cylinders

```
mean_displacement <- mtcars %>%
  group_by(cyl) %>%
  summarise(mean_disp = round(mean(disp, na.rm = TRUE), 2))

mean_displacement
```

```
# A tibble: 3 x 2
    cyl mean_disp
  <dbl>     <dbl>
1     4      105.
2     6      183.
3     8      353.
```

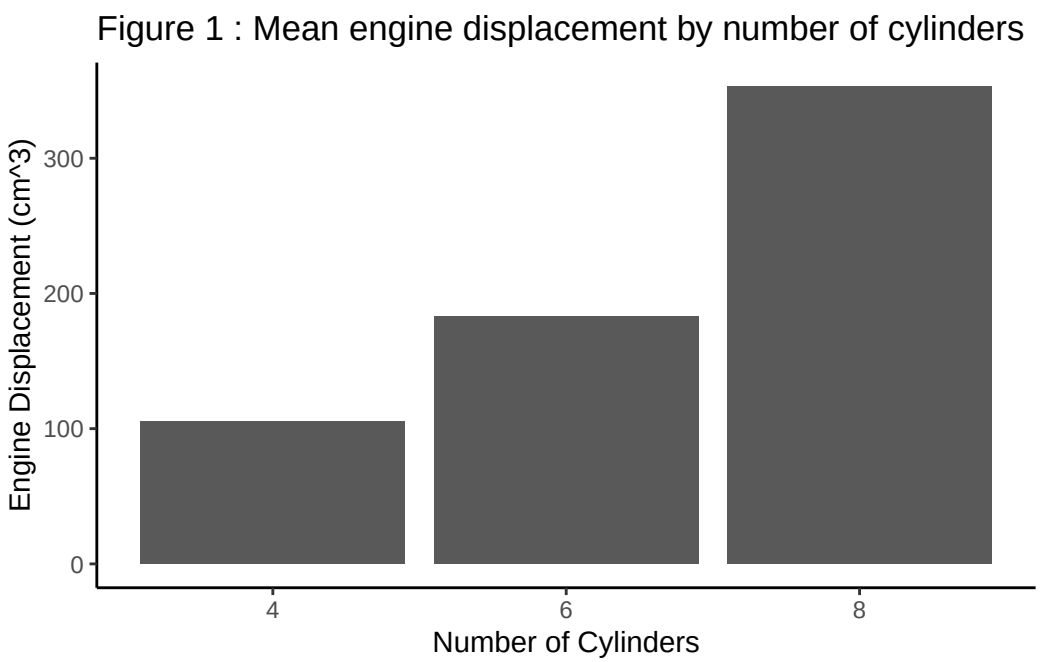
Table of Data

```
mean_displacement %>%
  kable(col.names = c("Cylinders", "Displacement"), caption = "Mean engine displacement by nu
  kable_styling(full_width = FALSE)
```

Table 1: Mean engine displacement by number of cylinders

Cylinders	Displacement
4	105.14
6	183.31
8	353.10

```
library(ggplot2)
ggplot(mean_displacement, aes(x = factor(cyl), y = mean_disp)) +
  geom_bar(stat = "identity") +
  labs(title = "Figure 1 : Mean engine displacement by number of cylinders",
       x = "Number of Cylinders",
       y = "Engine Displacement (cm^3)") +
  theme_classic()
```



The bar chart above shows the mean engine displacement for cars with different numbers of cylinders. It is evident that cars with more cylinders tend to have larger engine displacements, countering Big Dawg's initial belief. Cars with 8 cylinders have the highest mean displacement, followed by those with 6 and 4 cylinders.