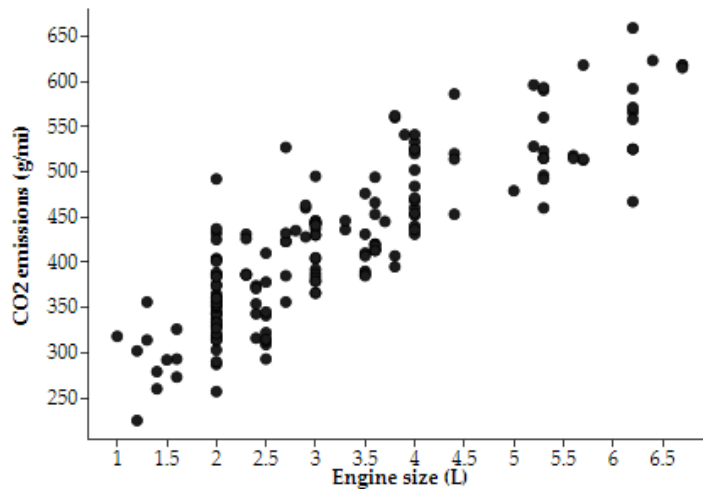


1.



There is a fairly strong, positive, linear relationship between x = engine size (L) and y = combined CO₂ emissions (g/mi). There are no unusual observations.

2. $\hat{y} = 244.718 + 54.873x$, where y = combined CO₂ emissions (g/mi) and x = engine size (L).

Slope = 54.873. For each additional 1 liter in engine size, the predicted combined CO₂ emissions increases by 54.873 g/mi.

3. The predicted combined CO₂ emissions for this vehicle is: $\hat{y} = 244.718 + 54.873(5.7) = 557.494$ g/mi.

Residual = $y - \hat{y} = 618 - 557.494 = 60.506$ g/mi

The combined CO₂ emissions for the 2021 Toyota Sequoia 4WD is 60.506 g/mi greater than the combined CO₂ emissions predicted for a vehicle with an engine size of 5.7 L.

4. $s = 45.233$ mg/L. *Interpretation:* The actual combined CO₂ emissions are typically about 45.233 g/mi away from the combined CO₂ emissions predicted by the least-squares regression line with x = engine size (L).

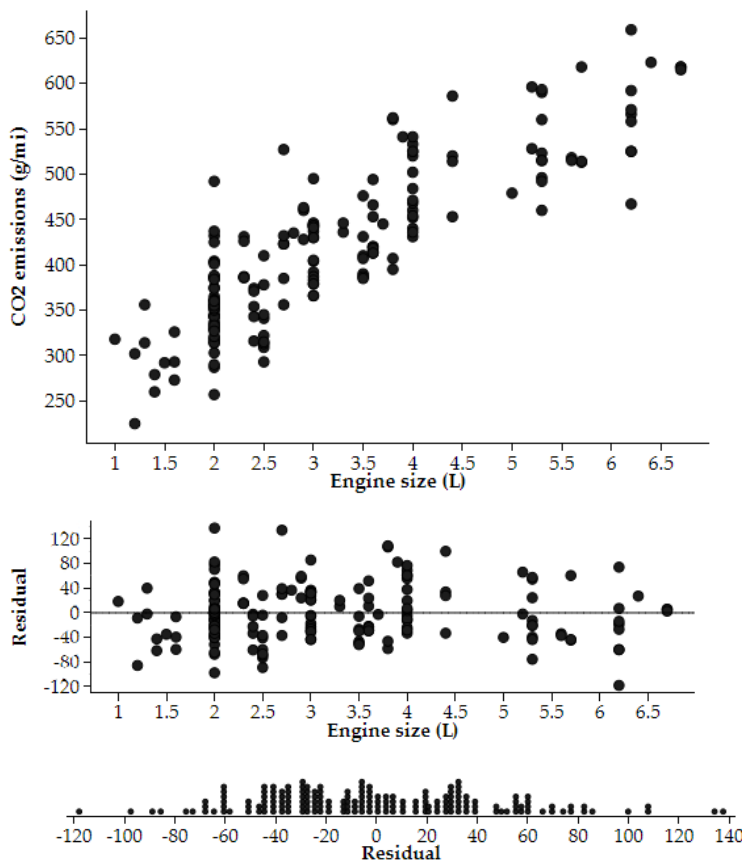
$r^2 = 0.738$. *Interpretation:* About 73.8% of the variation in combined CO₂ emissions is accounted for by the least-squares regression line with x = engine size (L).

Other factors that might account for the unexplained variability in combined CO₂ emissions are the type of fuel used, the age of the vehicle, and the speed/driver techniques.

5. **STATE:** $H_0: \beta = 0$, $H_a: \beta > 0$, where β is the slope of the population regression line relating y = combined CO₂ emissions (g/mi) to x = engine size (L) for all gas-powered cars and trucks produced in 2021. Use $\alpha = 0.05$. The evidence for H_a is: $b = 54.873 > 0$.

PLAN: t test for β

- Random: Random sample of 176 gas-powered cars and trucks produced in 2021. ✓
- Normal: A dotplot of the residuals does not show strong skewness or outliers. ✓
- Linear: There is a linear association between engine size and combined CO₂ emissions in the scatterplot. Also, there is no leftover curved pattern in the residual plot. ✓
- Equal SD: In the residual plot, there is not a clear < pattern or > pattern. ✓



DO: $t = 22.142$, $P\text{-value} \approx 0$, $df = 174$

CONCLUDE: Because the P -value of approximately 0 is less than $\alpha = 0.05$, we reject H_0 . There is convincing evidence of a positive association between engine size and combined CO₂ emissions for all gas-powered vehicles produced in 2021.

6. **STATE:** 95% CI for β is the slope of the population regression line relating y = combined CO₂ emissions (g/mi) to x = engine size (L) for all gas-powered cars and trucks produced in 2021.

PLAN: t interval for β

The conditions for inference are met, as shown in #5.

DO:

Using technology: 49.982 to 59.764 using $df = 174$.

CONCLUDE: We are 95% confident that the interval from 49.982 to 59.764 captures the slope of the population regression line relating y = combined CO₂ emissions (g/mi) to x = engine size (L) for all gas-powered cars and trucks produced in 2021.