Exercise 7.30: Cats, Part I

The following regression outpout is for predicting the heart weight (in g) of cats from their body weight (in kg). The coefficients are estimated using a dataset of 144 domestic cats.

———————|————|————-|———–|————  
| Esitmate | Std. Error | t-value | Pr(>|t|)  
———————|————|————-|———–|————  
(Intercept) | -0.357 | 0.692 | -0.515 | 0.607  
———————|————|————-|———–|————  
body wt | 4.034 | 0.250 | 16.119 | 0.000  
———————|————|————-|———–|————  
x = 1.452 R2 = 64.66% R2adj = 64.41%

1. Write out the linear model.  
   When provided with a regression output, the value for b0 and b1 are provided by the first column titled “Estimate” respectively, hence, substituing the data, we have the following:  
   heartweight^=−0.357+4.034×bodyweight

heartweight^=−0.357+4.034×bodyweight

y^=−0.357+4.034×x

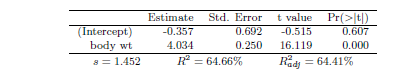
y^=−0.357+4.034×x

1. Interpret the intercept.  
   Should a cat have a body weight of 0 kg, it would have a heart weight of -0.357 g. This does not make sense. the value x=0 is out of the data range we were given.
2. Interpret the slope.  
   For an increment of 1 kg in body weight in a cat, the heart weight would increase by 4.034 g.
3. Interpret R2.  
   64.66% of the variance in hear weght (g) is due to the linear model.
4. Calculate the correlation coefficient.  
   The correlation coefficient is R, hence: R=R2−−−√=64.66−−−−√=8.041144=8.04

Cats, Part II. Exercise 7.30 presents regression output from a model for predicting the

heart weight (in g) of cats from their body weight (in kg). The coe\_cients are estimated using a

dataset of 144 domestic cats. The model output is also provided below.



(a) What are the hypotheses for evaluating whether body weight is positively associated with

heart weight in cats?

Ho 🡺 body weight is not positively associated with heart weight in cats

Ha 🡺 body weight is positively associated with heart weight in cats

(b) State the conclusion of the hypothesis test from part (a) in context of the data.

Pr(>|t|) = 0.00

Null hypothesis should be rejected

(c) Calculate a 95% confidence interval for the slope of body weight, and interpret it in context

of the data.

4.034 +- 1.97\*4.034

4.5265

3.5415

(d) Do your results from the hypothesis test and the confidence interval agree? Explain.

Confidence interval does not cross the zero boundary, it also implies that povery is a predictor of the murder rate.