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ECo 602: Michael France Nelson
Reading Questions Week 10

Q1 (1 pt.): Why would we want a model selection criterion to penalize the number of parameters in a model?
We would want a model selection criterion to penalize the number of parameters in a model because we lose one degree of freedom for each parameter we estimate.

Q2 (3 pts.): In 2 - 3 short paragraphs, describe the meaning of the slope parameter β1 in the context of the relationship between the predictor variable, x, and the response variable y.
Your answer must be in plain non-technical language. Your explanation will be most effective if you use a narrative approach, using a concrete example to illustrate the concept.

The meaning of the slope parameter β1 is best explained as the expected change in the value of *y* (on average) for each 1-unit change in *x*. The variables *x* (the predictor variable) and *y* correspond to our observations, while the coefficient β corresponds to the quantity we are estimating. β1 is a model parameter multiplied by the variable *x*1.

Using a dataset of penguins, we can illustrate the concept. The Adelie species mean mass is 3700 grams and the Chinstrap species mean is 3700 + 32 grams. We are using the Adelie body mass data as the base case which means it will be the comparative group. The coefficient β is therefore equivalent to 32 grams (the increase in mean body mass from Adelie to Chinstrap penguins). $B_{Chinstrap}$, 32-unit increase in body mass, thus corresponds to a one-unit increase in Chinstrap penguins.

Q3 (1 pt.): Based on the model table, what is the base case water treatment?
The base case water treatment is the first row that represents the low water treatment.

Q4 (2 pts.): What is the average plant mass, in grams, for the low water treatment?

How did you calculate this quantity?

The average plant mass for the low water treatment is 2.4 grams. This quantity was given in the table because the low water treatment is the base case, so the mass doesn't need to be calculated.

Q5 (2 pts.): What is the average plant mass, in grams, for the medium water treatment?

How did you calculate this quantity?

The average plant mass for the medium water treatment is 3.7 grams. I calculated this quantity by adding the base case, 2.4 grams, and the regression slope for medium water treatment, 1.3 grams.

Q6 (1 pt.): Which of the following questions cannot be addressed with the model coefficient table? Select the correct answer or answers: B is the correct answer.

A. Is there a positive relationship between increased water availability and plant biomass accumulation?
B. Is water availability a significant predictor for plant biomass accumulation?
C. What is the average biomass of plants in the high water treatment?