

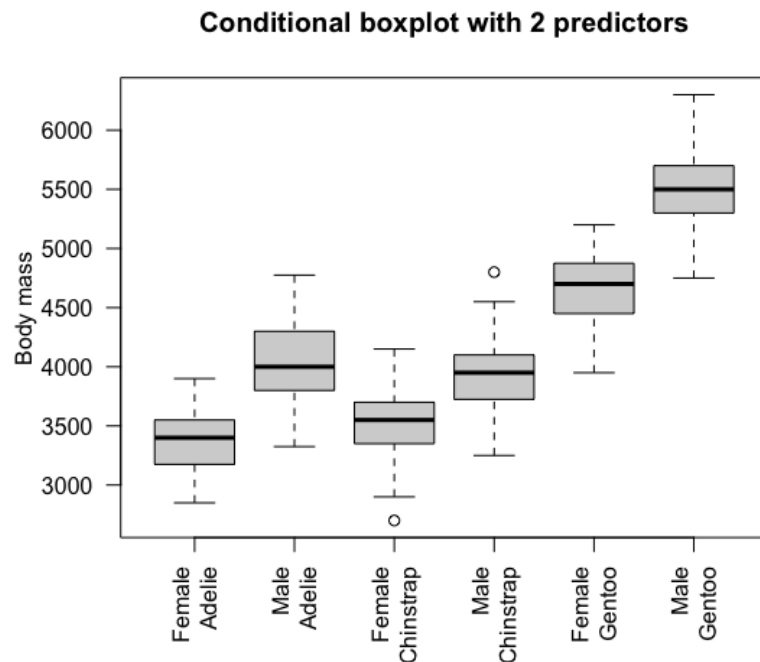
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ECo 602: Michael France Nelson

Using Models 2

Q1 (4 pts.): Re-create the conditional boxplot of penguin body mass conditioned on sex and species. Include your boxplot as a figure in your report.



Q2 (2 pts.): Based on the boxplots, do you think male penguins are significantly heavier than female penguins of the same species? Explain your reasoning and be sure to explain why you think any observed differences are significant or not.

Based on the boxplots, I think that male penguins are significantly heavier than female penguins of the same species because the interquartile ranges of the males and females of each species do not overlap at all, and in each case the male body mass is higher. I think that this is significant because that means that at least 50% of males that were sampled have a greater body mass than the females in each species.

Q3 (2 pts.): Do you think adding sex to a model that already includes species will improve the model fit?

Yes, I think that adding sex to the model that already includes species will improve the model fit because it demonstrates the same pattern between species and body mass that we saw prior to adding sex shows, and it gives more detail on the data. This model can be trickier to interpret, but in this case the trend and overall model is still clear despite adding another coefficient variable.

Q4 (2 pts.): Show the R-code you used to build fit_both.

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fit_both = lm(body_mass_g ~ sex * species, data = penguins)
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Q5 (2 pts.): What is the base case for the two-way model that includes sex and species?

The base case for the two-way model that includes sex and species is Female Adelie.

Q6 (2 pts.): What are the names of the two coefficients (from the first column of the coefficient table) that you need to calculate the average mass of female Chinstrap penguins?

The column names are “speciesChinstrap” and ‘Intercept’.

Q7 (2 pts.): What is the predicted average mass of female Chinstrap penguins in the interactive model?

3,527.21g

Q8 (2 pts.): What is the observed average mass of female Chinstrap penguins, calculated from the penguin’s data?

3,527.206g