Analysis of Environmental Data – Using Models 2
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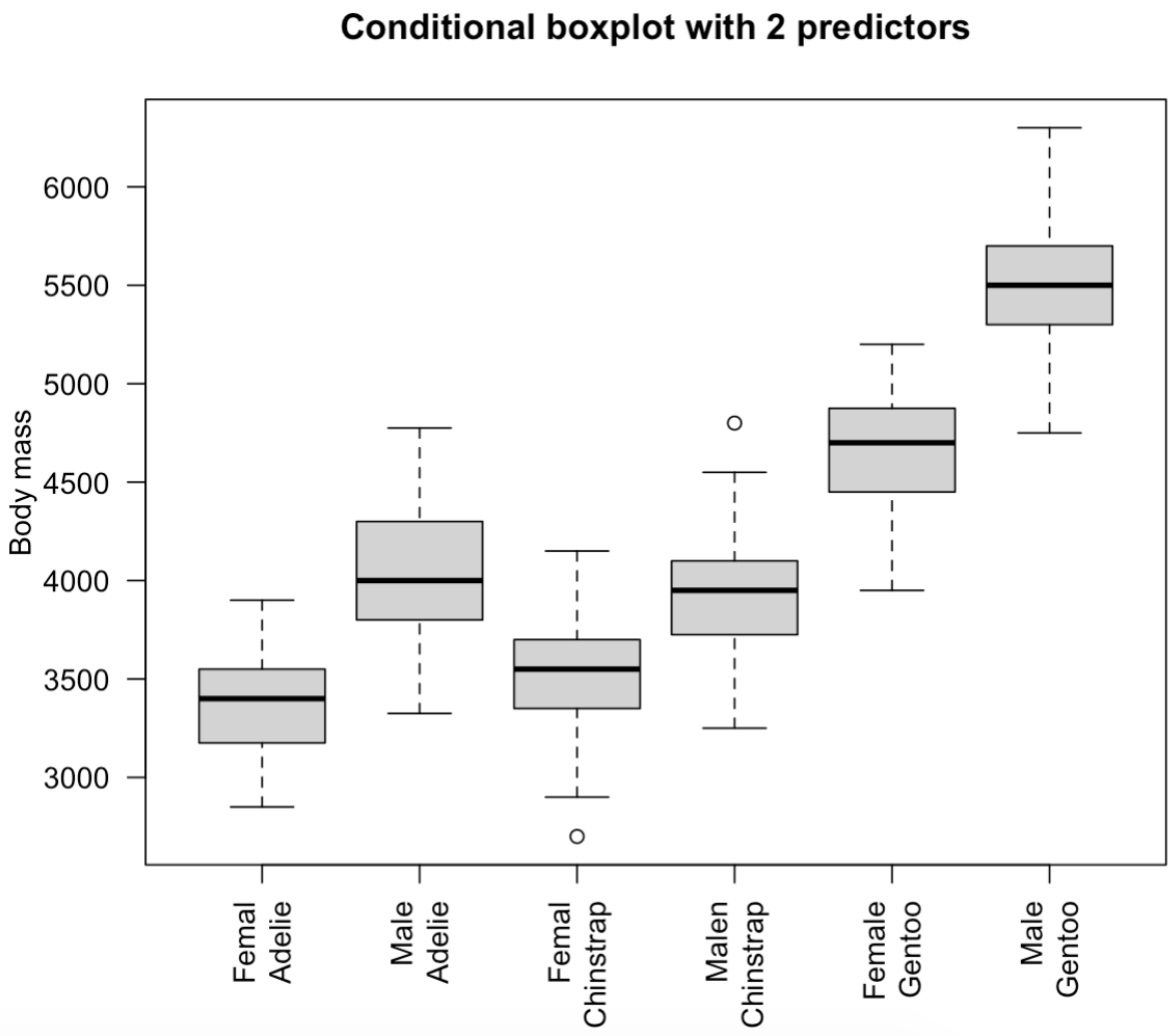
Q1 (4 pts.): Re-create the conditional boxplot of penguin body mass conditioned on sex and species. Include your boxplot as a figure in your report.



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 boxplot I assume sexual dimorphism in weight across all species. Males seem to be significantly heavier than females indicated through the higher mean in body weight. Also the different boxes do not overlap at any point.

Q3 (2 pts.): Do you think adding sex to a model that already includes species will improve the model fit?
Make sure you justify your answer based on the boxplots and not results of a statistical test.

I think it will improve the model fit, because it seems like that sex plays an important role in the difference of body mass within a species, indicated through the higher means of male body mass in the third boxplot.

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

fit_both = lm(body_mass_g ~ sex * species, data = penguins)

Q5 (2 pts.): What is the base case for the two-way model that includes sex and species?

sexfemale:speciesAdelie

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?

Intercept
speciesChinstrap

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

3527.21g

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

aggregate(body_mass_g ~ species:sex, data = penguins, FUN = mean)

3527.206g