Quiz 3

7 questions

1 point

1.
Consider the `mtcars` data set. Fit a model with mpg as the outcome that includes number of cylinders as a factor variable and weight as confounder. Give the adjusted estimate for the expected change in mpg comparing 8 cylinders to 4.

- -6.071
- -4.256
- -3.206
- 33.991

1 point

2.
Consider the `mtcars` data set. Fit a model with mpg as the outcome that includes number of cylinders as a factor variable and weight as a possible confounding variable. Compare the effect of 8 versus 4 cylinders on mpg for the adjusted and unadjusted by weight models. Here, adjusted means including the weight variable as a term in the regression model and unadjusted means the model without weight included. What can be said about the effect comparing 8 and 4 cylinders after looking at models with and without weight included?.

- Holding weight constant, cylinder appears to have more of an impact on mpg than if weight is disregarded.
-

Within a given weight, 8 cylinder vehicles have an expected 12 mpg drop in fuel efficiency.

- Including or excluding weight does not appear to change anything regarding the estimated impact of number of cylinders on mpg.
- Holding weight constant, cylinder appears to have less of an impact on mpg than if weight is disregarded.

---

1 point

3.

Consider the `mtcars` data set. Fit a model with mpg as the outcome that considers number of cylinders as a factor variable and weight as confounder. Now fit a second model with mpg as the outcome model that considers the interaction between number of cylinders (as a factor variable) and weight. Give the P-value for the likelihood ratio test comparing the two models and suggest a model using 0.05 as a type I error rate significance benchmark.

- The P-value is larger than 0.05. So, according to our criterion, we would fail to reject, which suggests that the interaction terms may not be necessary.
- The P-value is small (less than 0.05). Thus it is surely true that there is no interaction term in the true model.
- The P-value is small (less than 0.05). Thus it is surely true that there is an interaction term in the true model.
- The P-value is small (less than 0.05). So, according to our criterion, we reject, which suggests that the interaction term is necessary
- The P-value is larger than 0.05. So, according to our criterion, we would fail to reject, which suggests that the interaction terms is necessary.
- The P-value is small (less than 0.05). So, according to our criterion, we reject, which suggests that the interaction term is not necessary.

---

1 point

4.

Consider the **mtcars** data set. Fit a model with mpg as the outcome that includes number of cylinders as a factor variable and weight inlcuded in the model as

```
lm(mpg ~ I(wt * 0.5) + factor(cyl), data = mtcars)
```

How is the wt coefficient interpretted?

- The estimated expected change in MPG per half ton increase in weight for the average number of cylinders.
- The estimated expected change in MPG per half ton increase in weight for for a specific number of cylinders (4, 6, 8).
- The estimated expected change in MPG per one ton increase in weight.
- The estimated expected change in MPG per one ton increase in weight for a specific number of cylinders (4, 6, 8).
- The estimated expected change in MPG per half ton increase in weight.

---

1 point

5.
Consider the following data set

```
x <- c(0.586, 0.166, -0.042, -0.614, 11.72)
y <- c(0.549, -0.026, -0.127, -0.751, 1.344)
```

Give the hat diagonal for the most influential point

- 0.9946
- 0.2025
- 0.2287
- 0.2804

1

point

6.

Consider the following data set

```
1  x <- c(0.586, 0.166, -0.042, -0.614, 11.72)
2  y <- c(0.549, -0.026, -0.127, -0.751, 1.344)
```

Give the slope dfbeta for the point with the highest hat value.

- -.00134
- 0.673
- -0.378
- -134

---

1 point

7.

Consider a regression relationship between Y and X with and without adjustment for a third variable Z. Which of the following is true about comparing the regression coefficient between Y and X with and without adjustment for Z.

- It is possible for the coefficient to reverse sign after adjustment. For example, it can be strongly significant and positive before adjustment and strongly significant and negative after adjustment.
- Adjusting for another variable can only attenuate the coefficient toward zero. It can't materially change sign.
- The coefficient can't change sign after adjustment, except for slight numerical pathological cases.
- For the the coefficient to change sign, there must be a significant interaction term.

Submit Quiz