

Feedback — Quiz 3

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Thank you. Your submission for this quiz was received.

You submitted this quiz on **Sat 11 Jul 2015 3:01 PM SGT**. You got a score of **7.00** out of **7.00**.

Question 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.

Your Answer	Score	Explanation
<input type="radio"/> 33.991		
<input checked="" type="radio"/> -6.071	✓ 1.00	
<input type="radio"/> -3.206		
<input type="radio"/> -4.256		
Total	1.00 / 1.00	

Question 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?.

Your Answer	Score	Explanation
<input type="radio"/> Holding weight constant,		

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

☒ Holding weight constant, cylinder appears to have less of an impact on mpg than if weight is disregarded. ✓ 1.00 It is both true and sensible that including weight would attenuate the effect of number of cylinders on mpg.

☐ 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.

Total 1.00 / 1.00

Question 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.

Your Answer	Score	Explanation
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☐ 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.

☐ 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). 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 larger than 0.05. So, according to our criterion, we would fail to reject, which suggests that the interaction terms may not be necessary. ✓ 1.00

☐ The P-value is small (less than 0.05). Thus it is surely true that there is an interaction term in the true model.

Total	1.00 / 1.00
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Question 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 included in the model as

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

How is the wt coefficient interpreted?

Your Answer	Score	Explanation
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☐ 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 half ton increase in weight for the average number of cylinders.

☐ The estimated expected change in MPG per half ton increase in weight.

☐ 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). ✓ 1.00

Total	1.00 / 1.00
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Question 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

Your Answer	Score	Explanation
<input type="radio"/> 0.2804		
<input type="radio"/> 0.2025		
<input type="radio"/> 0.2287		
<input checked="" type="radio"/> 0.9946	✓ 1.00	
Total	1.00 / 1.00	

Question 6

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 slope dfbeta for the point with the highest hat value.

Your Answer	Score	Explanation
<input type="radio"/> -0.378		
<input type="radio"/> 0.673		
<input checked="" type="radio"/> -134	✓ 1.00	
<input type="radio"/> -.00134		
Total	1.00 / 1.00	

Question 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 .

Your Answer	Score	Explanation
<input checked="" type="radio"/> 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.	✓ 1.00	
<input type="radio"/> Adjusting for another variable can only attenuate the coefficient toward zero. It can't materially change sign.		
<input type="radio"/> The coefficient can't change sign after adjustment, except for slight numerical pathological cases.		
<input type="radio"/> For the the coefficient to change sign, there must be a significant interaction term.		
Total	1.00 / 1.00	