Math 327 – Chapter 8 Homework Ahmad M. Osman

1. In a regression analysis of on-the-job head injuries of warehouse laborers caused by falling objects, is a measure of severity of the injury, is an index reflecting both the weight of the object and the distance it fell, and and are indicator variables for nature of head protection worn at the time of the accident, coded as follows:

Type of Protection

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Hard hat 1 0

Bump cap 0 1

None 0 0

The response function to be used in the study is .

1. [6 pts] Write the response function for each of the three protection categories.

Hard hat:

Bump cap:

None:

1. [2 pts] What is the interpretation of ?

For both the “Hard hat” and the “Bump cap” formulas, represents the mean of the reference group when no head protection is worn. However, for “None”, is the y-intercept when and are equal to ZERO.

1. [2 pts] What is the interpretation of ?

is the slope that represents, when no head protection is worn, the height and weight of the object and the distance of its fall.

1. [2 pts] What is the interpretation of ?

is a qualitative measure that shows the change in mean response based on how much difference does wearing “Hard hat(s)” can make when keeping the height and weight constant.

1. [2 pts] What is the interpretation of ?

is a qualitative measure that shows the change in mean response based on how much difference does wearing “Bump cap(s)” can make when keeping the height and weight constant.

1. [2 pts] How would you test whether the expected severity of injury is the same when wearing a hard hat vs. when wearing a bump cap? Write the null and alternative hypotheses. Hint: The answer for each hypothesis is an expression involving more than one of the parameters.

The alternatives for the test would be as following:

H0: =

Ha: ≠

Where is wearing a “Hard hat” and is wearing a “Bump cap”.

1. [4 pts] Plot these data using the axes at right, connecting points with a line segment for level of . Include the scale on each axis.



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0 0 30

65

55

40

30

1 0 40

0 1 55

1 1 65

1

[2 pts] Based on the data above, what can you say about in the model,   
 Circle one.

From page 307 in the book, this graph suggests an additive mode.

1. 🡨 **Correct answer…**