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Homework 3

Chapter 2:

1.) (i) There're many factor will affect number of kids such as age, income, or career. It is correlated with level of education such people that more educated will earn more income.

(ii) No, $E(u|x) \neq 0$ which is resulted in SLR 4 fails.

4.) (i) $\widehat{bwight} = 119.77 - 0.514(0) = 119.77$

$bwight = 119.77 - 0.514(20) = 109.49$

For each additional 20 cigarettes, an estimate of $119.77 - 109.49 = 10.28$ oz. decrease in the baby birth weight.

(ii) The amount of cigarettes is the independent variable and the baby weight is dependent. It indicates there's a casual effect. The factor that can used to explain a baby's weight is such as smoking habits.

(iii) $125 = 119.77 - 0.514\,cigs \Rightarrow = -10.19509728$ which is impossible. The highest possible weight is the intercept or β_0 which is 119.77 oz.

(iv.) In order to make sample to be accurated, we should collect data from more observers. We need to use SLR3 so 85% of the sample smoke cig. = 0. Moreover, SLR2 means we need sample to be a better representation.

Chapter 3:

1. (i) Yes, it makes sense because if you are at the top of the class, the "hsperc" will be quite low but "colgpa" will be quite high. Therefore, the coefficient is negative.

(ii) $\widehat{colgpa} = 1.392 - 0.0135(20) + 0.00148(1050)$

$\widehat{colgpa} = 2.676$

(iii) The predicted difference in college GPA is $0.00148(140) = 0.2072$. The value is quite large if we compare it with std. dev.

(iv) $0.5 = 0.00148(sat) \Rightarrow sat = 337.83783783$. Therefore, a 337.83783783 difference of SAT score will make a difference in 0.5 of a grade point.

2. (i) Yes, number of years increase, the years of schooling decreases. $educ. = -1 \Rightarrow = -0.094\,sib \Rightarrow sibs = 10.639297$. This means that the # of sibs. will have to increase approximately by 11 to reduce predicted years of educ.

(ii) If mother is years of schooling (increase by 1), the predicted year of school would increase by 0.131

(iii) Man A predicted year of educ.

$10.36 - 0.094(0) + 0.131(12) + 0.210(12) = 14.452$ years

Man B predicted year of educ.

$10.36 - 0.094(0) + 0.131(16) + 0.210(16) = 15.816$ years

$\therefore$ Man B will have a predicted $15.816 - 14.452 = 1.364$ more years of schooling than Man A.