

ME EN 2550

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Homework 8- Part A

8.2: a) Predicted birth weight = $120.07 - 1.93(\text{parity})$

b) If a child is not the first born then there is a predicted 1.93 decrease in predicted birth weight.

Predicted birth weight of firstborns = 120.07 oz.

Predicted birth weight of non-firstborns = 118.14 oz.

c) No, we fail to reject the null hypothesis that is, holding all other variables constant, parity is unproductive of birth weight. This is because the P-value = 0.1052 which is greater than $\alpha = 0.05$.

8.3: Predicted birth weight = $-80.41 + 0.44(\text{gestation}) - 3.33(\text{parity}) - 0.01(\text{age}) + 1.15(\text{height}) + 0.05(\text{weight}) - 8.40(\text{smoke})$

b) For a unit increase in gestation length, there is a predicted 0.44 oz. increase in birth weight all else held constant. For a unit increase in the age of the mother, there is a predicted 0.01oz.

Decrease in birth weight all else held constant.

c) There is a difference because we are dealing with a completely different model that has many more predictors. There is also the chance that parity might be correlated with another variable in the model.

d) Actual: 120 Predicted: 120.58 Residual: -0.58

e) $R^2 = 0.2504$ Adjusted $R^2 = 0.2468$

8.5: a) 95% CI ($-0.3212 < \text{coefficient of gender} < 0.1612$) There is a 95 % chance that the calculated interval contains the true coefficient of gender which predicts GPA when all other predictors are held constant.

b) Yes because for all other predictors the P-values are greater than $\alpha = 0.05$.

8.7 Age would be the predictor to be removed first because without it the model has the highest R^2 adjusted of any other model that had one predictor removed.

8.13: Nearly Normal Residuals: The probability plot appears linear and thus overall normally distributed.

Constant Variability: The scatterplots show no major patterns other than from the discrete domains of some of the predictors.

Independent: The residuals all appear randomly distributed.

Linearly Related: It appears that there are no major patterns in the residual plots thus a linear model appears to work decently well for this data.

Overall it appears that the assumptions for regression are met.

8.14: Nearly Normal Residuals: The probability plot appears approximately linear and it is reasonable to conclude the data is overall normally distributed, although possibly with some skewness.

Constant Variability: The scatterplots show no major patterns other than from the discrete domains of some of the predictors.

Independent: The residuals all appear randomly distributed.

Linearly Related: It appears that there are no major patterns in the residual plots thus a linear model appears to work decently well for this data.

Overall it appears that the assumptions for regression are met.