

MATH 262 - Applied Statistics

Lab 8: Simple Linear Regression Inferences

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The file `starbucks.csv` contains nutritional information for various items on the Starbucks menu. The variables are as follows:

- **item:** Name of food item
- **calories:** Total number of calories
- **fat:** Total fat (in grams)
- **carb:** Total carbohydrates (in grams)
- **fiber:** Total fiber (in grams)
- **protein:** Total protein (in grams)
- **type:** Type of food (bakery, sandwich, salad, etc.)

When you walk to the counter at Starbucks, the number of calories is shown in the display for each item but no other nutritional information is visible. We'd like to use the total calories to estimate the total number of carbohydrates (carb).

- What is the predictor variable? What is the response variable?
- Make a plot displaying the relationship between the response variable and predictor variable. Describe the relationship between the two variables.
- Fit the regression model and display the output including the 95% confidence interval for the slope. Write the model equation. Use words/variable names when you write the equation (not " x " and " y "). Use both `jamovi` and by hand calculations to verify your results.
- What is the 95% confidence interval for the slope? Use both `jamovi` and by hand calculations to verify your results.
- Let β_1 denote the slope of the regression line. Test the null hypothesis that $\beta_1 = 0$ versus the alternative hypothesis that $\beta_1 \neq 0$. What is the p -value for this test? What is the conclusion of the test?
- According to the Starbucks menu, pumpkin bread has 410 calories. Estimate the **average** carbohydrates for all pumpkin bread sold by Starbucks. Include the estimate and appropriate interval.
- Find a 95% prediction interval for the number of carbohydrates in a single piece of pumpkin bread.