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INSTRUCTOR: ANSON XUAN

MATH 1281-01 Statistical Inference – AY2025-T3

MATH1281_LJ_U6_Starbucks_Dataset_PDF* (C:\Users\Yahya\Downloads)

Analyses | Synchronisation | Resize Data | Insert | Remove | Undo | Redo

	item	calories	fat	carb	fiber	protein	type
1	8-Grain Ro	350	8	67	5	10	bakery
2	Apple Bran	350	9	64	7	6	bakery
3	Apple Fritt	420	20	59	0	5	bakery
4	Banana Nu	490	19	75	4	7	bakery
5	Birthday C	130	6	17	0	0	bakery
6	Blueberry	370	14	47	5	6	bakery
7	Blueberry	460	22	61	2	7	bakery
8	Bountiful B	370	14	55	0	6	bakery
9	Butter Cro	310	18	32	0	5	bakery
10	Cheese Da	420	25	39	0	7	bakery
11	Chocolate	380	17	51	2	4	bakery
12	Chocolate	320	12	53	3	6	bakery
13	Chocolate	300	17	34	2	5	bakery
14	Chocolate	420	21	57	2	5	bakery
15	Chonga Ba	310	5	52	3	12	bakery
16	Cinnamon	480	18	70	3	7	bakery
17	Cranberry	490	18	73	2	8	bakery
18	Double Ch	410	24	46	3	6	bakery
19	Double Fu	130	7	16	0	0	bakery
20	Everything	280	2	56	2	10	bakery
21	Ginger Mo	360	12	58	0	3	bakery
22	Iced Lemo	490	23	67	0	5	bakery
23	Mallorca S	420	25	42	0	7	bakery
24	Maple Oat	440	18	59	3	8	bakery
25	Marble Po	350	13	54	0	6	bakery
26	Marshmall	210	4	43	0	0	bakery
27	Morning B	350	16	45	2	6	bakery
28	Multigrain	300	3	60	6	15	bakery
29	Old-Fashio	420	21	57	0	4	bakery
30	Outrageou	370	14	56	3	5	bakery

1. Pearson's correlation coefficient (r) between calories and carbs

Correlation

Pearson's Correlations

Variable		carb	calories
1. carb	Pearson's r	—	
	p-value	—	
2. calories	Pearson's r	0.675	—
	p-value	< .001	—

- **r = 0.675**
- **p-value < 0.001**, indicating a statistically significant correlation.

2. Interpretation of the relationship

- **The correlation coefficient of 0.675 suggests a moderate to strong positive correlation between calories and carbohydrates in Starbucks food items. This means that as the number of calories increases, the amount of carbohydrates also tends to increase.**

3. Descriptive Statistics

Descriptive Statistics

	calories	carb
Valid	77	77
Missing	0	0
Mean	338.831	44.870
Std. Deviation	105.369	16.552
Minimum	80.000	16.000
Maximum	500.000	80.000

Calories:

- Mean = **338.831**
- Standard Deviation = **105.369**

Carbs:

- Mean = **44.870**
- Standard Deviation = **16.552**

4. Linear Regression

Model Summary - carb

Model	R	R^2	Adjusted R^2	RMSE
M_0	0.000	0.000	0.000	16.552
M_1	0.675	0.456	0.448	12.293

Note. M_1 includes calories

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M_1	Regression	9486.404	1	9486.404	62.772	< .001
	Residual	11334.297	75	151.124		
	Total	20820.701	76			

Note. M_1 includes calories

Note. The intercept model is omitted, as no meaningful information can be shown.

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
M_0	(Intercept)	44.870	1.886		23.788	< .001
M_1	(Intercept)	8.944	4.746		1.884	0.063
	calories	0.106	0.013	0.675	7.923	< .001

- **Slope (b_1)** = 0.106 (from the regression coefficients table)
- **Intercept (b_0)** = 8.944
- **Regression Equation**: Carbs = 8.944 + 0.106 × Calories

5. Validation using JASP Linear Regression

The regression output in JASP confirms the equation:

- **Intercept = 8.944 (p = 0.063, not statistically significant)**
- **Calories coefficient = 0.106 (p < 0.001, statistically significant)**

This confirms that the relationship between calories and carbs is **significant**, and the model can reasonably predict carbs based on calories.

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6. R^2 Calculation and Interpretation

- **$R^2 = 0.456$**
- This means **45.6% of the variance** in carbohydrate content can be explained by the number of calories. The remaining 54.4% is due to other factors not included in this model.

Conclusion:

The analysis shows a moderately strong positive relationship between calories and carbohydrates, and the regression model provides a useful but incomplete explanation of the variability in carbohydrate content based on calories.
