Model Summary for Calories vs Total Fat

Term	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	175.605382919636	56.1159610988424	3.12933039871357	0.00579502963505845
‘Total Fat‘	4.36173550935907	1.33992801680198	3.25520136504741	0.00439475628735309

Model Summary for Calories vs Total Carbohydrate

Term	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	157.531317805837	51.03254775544	3.08687934924911	0.0063591705470745
otal Carbohydrate‘	4.04102739968411	0.975058252875432	4.1443958735462	0.0006090153246562

Model Summary for Calories vs Sugars

Term	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	305.848646215924	75.346240888006	4.05924227421691	0.000736043899373319
Sugars	−8.18613987129747	12.8861067602639	−0.635268667534291	0.533246592149896

Model Summary for Calories vs Protein

Term	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	86.6715152637584	64.0265846761154	1.35368012681286	0.192593332232529
Protein	13.1517470680982	3.2947731144085	3.99170037250329	0.000855498400141991

Explanation of Predictions Based on Linear Regression Models

Introduction

This document provides a detailed explanation of how predictions for total calories were constructed based on previously estimated linear regression models. These models aim to understand the relationship between total calories and various nutritional components, specifically Total Fat, Total Carbohydrate, Sugars, and Protein.

Linear Regression Overview

Linear regression is a statistical method used to model the relationship between a dependent variable and one or more independent variables. The goal is to fit a linear equation to observed data to describe how changes in the independent variables affect the dependent variable. The general form of a simple linear regression equation is:

$$y = \beta_0 + \beta_1 x + \epsilon$$

where:

- y is the dependent variable (in this case, Calories).
- β_0 is the intercept.
- β_1 is the coefficient of the independent variable (Total Fat, Total Carbohydrate, Sugars, or Protein).
- x is the independent variable.
- ϵ is the error term.

Model Descriptions

Model 1: Calories Total Fat

This model predicts calories based on Total Fat content. The regression equation is:

$$\text{Predicted Calories} = 175.605383 + 4.361736 \times \text{Total Fat}$$

Model 2: Calories Total Carbohydrate

This model predicts calories based on Total Carbohydrate content. The regression equation is:

$$\text{Predicted Calories} = 157.531318 + 4.041027 \times \text{Total Carbohydrate}$$

Model 3: Calories Sugars

This model predicts calories based on Sugars content. The regression equation is:

$$\text{Predicted Calories} = 305.84865 - 8.18614 \times \text{Sugars}$$

Model 4: Calories Protein

This model predicts calories based on Protein content. The regression equation is:

$$\text{Predicted Calories} = 86.67152 + 13.15175 \times \text{Protein}$$

Conclusion

By applying these models to new data, we can calculate the predicted calorie value for each record in the dataset. These predictions allow for a deeper understanding of the impact of various nutritional components on the total caloric content.