



Using Machine Learning for Identifying Nutritional Correlates of Cognition among Middle Aged and Older Latinos

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INTRODUCTION

- Latinos are the **fastest-growing** demographic group in the United States.
- Health inequities and chronic disease co-occurrence place them at a **higher risk** for **dementia**.
- Focusing on **individualized** dietary change may improve adherence to brain-protective nutrition.

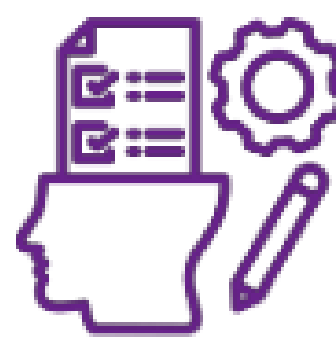
PURPOSE

- To develop a proof-of-concept machine learning model that identifies **nutritional correlates** of cognition among Latinos in the United States.

METHODS



Participants (N = 61, mean age = 59 yrs., 24% male) self-identified as Latino in Illinois, USA.



Global Cognition Composite Z-score calculated from: Stroop, Story Recall, Digit Symbol Modalities, Trail Making, and Digit Span tests.



Food Frequency Questionnaire (Block 2005) and demographic surveys were administered.



Nutrition Quest was used to yield a high-dimensional nutrient dataset.

Top 10 nutrients identified through Elastic Net modeling. Selected variables adjusted for demographic covariates.

SHAP permutations used to calculate individualized nutrient scores.

Machine learning can help identify nutritional correlates of cognition for future personalized intervention.

RESULTS

Figure 1: Adjusted Model Coefficients.

Thiamine ($\beta = 0.676$), **Arachidonic Acid** ($\beta = 0.317$), and **Cystine** ($\beta = -0.892$), were significant machine learning-selected features ($p < .05$) after adjusting for age, sex, body mass index, physical activity, education, and sleep duration.

Adjusted $R^2 = 42\%$

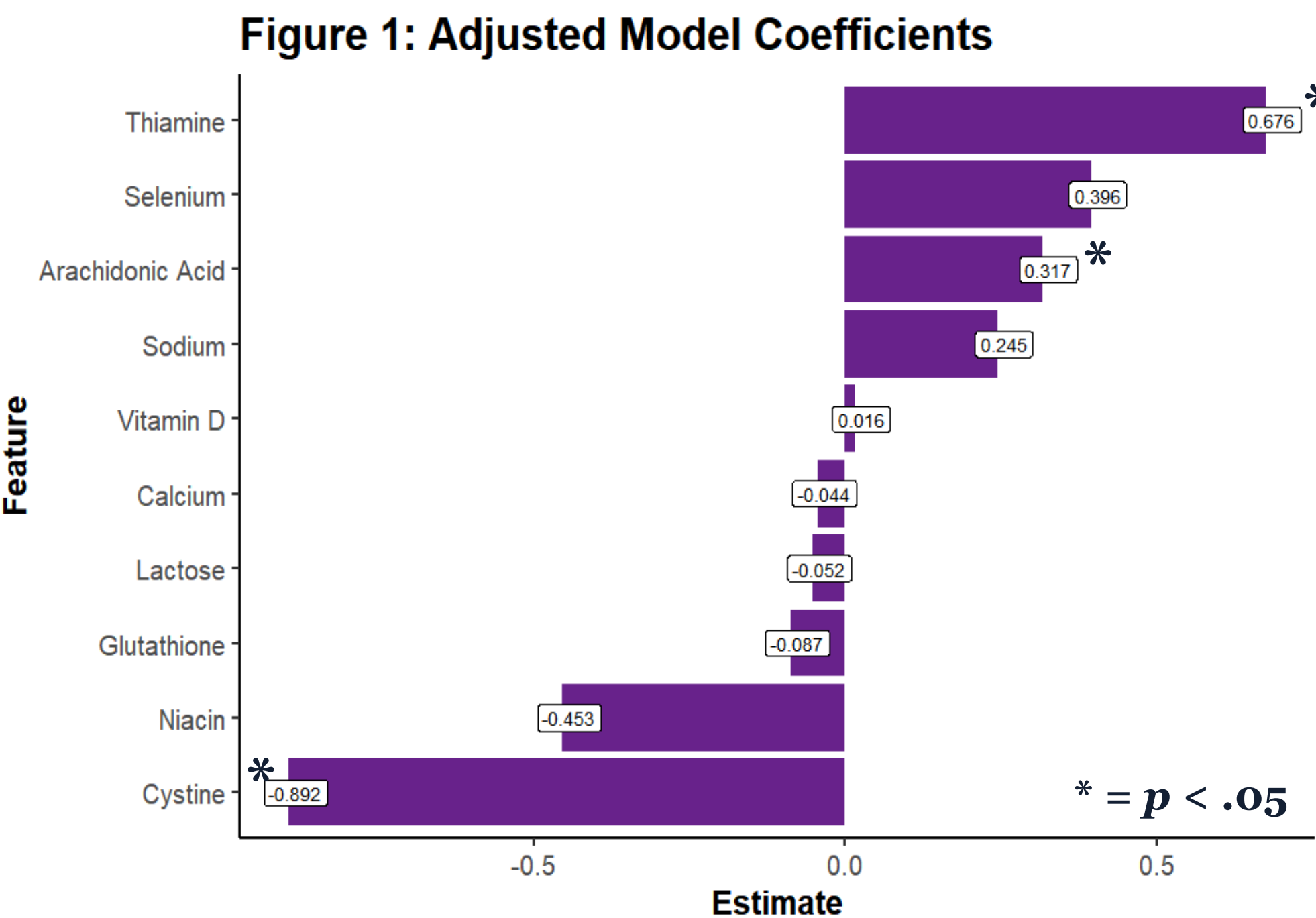


Figure 2: Individualized Nutrient Contribution Scores by Participant

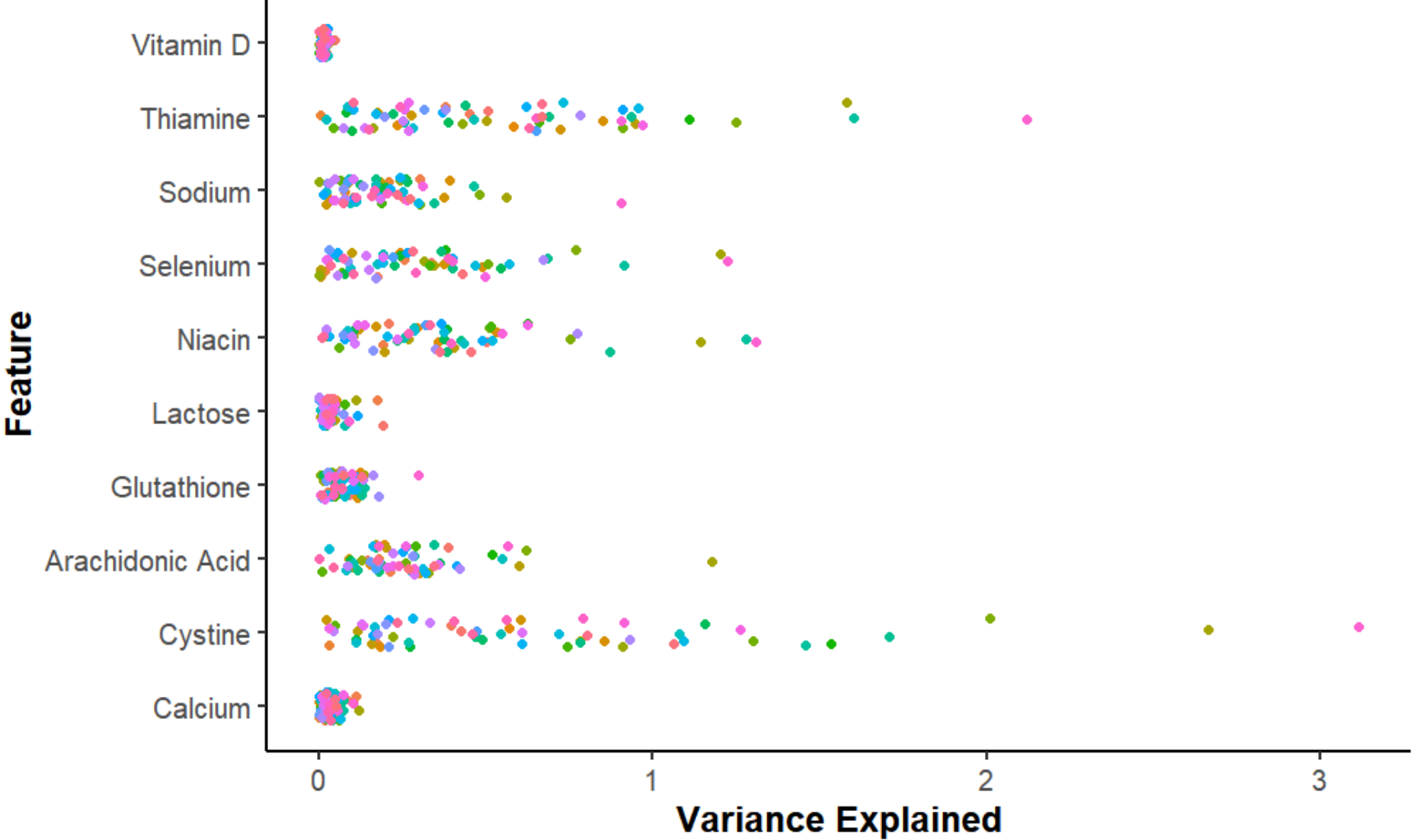


Figure 2: Individualized nutrient scores based on SHAP algorithm.

Each point reflects the **theoretical absolute effect** of a given nutrient for a given participant's cognitive performance. Each participant is one color.

Simulations with larger datasets can help increase clinical utility and **individualized** dietary intervention.

Table 1: Participant Characteristics

Characteristic	%(n = 61) or Mean $\pm$ SD
Female (%)	76% (46)
High School Diploma (%)	40% (24)
Sleep at Least 7 hrs (%)	45% (27)
Age (yrs)	58.56 $\pm$ 8.59
Body Mass Index (kg/m ²)	31.30 $\pm$ 4.98
Moderate-to-Vigorous Physical Activity (min/day)	15.45 $\pm$ 13.42
Cognition Z-Score	0.00 $\pm$ 0.55

Table 2: Elastic Net Parameters

Alpha	.95
Lambda	0
Cross-validation R^2	9%

CONCLUSION

- Machine learning can **help identify key nutrients** for cognition **within currently-consumed** foods among Latinos.
- Fully-powered studies may be used to test **machine learning-derived recommendations** in clinical context for improving cognition.

CONTACT INFORMATION

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