

Factors Predicting Adolescent Depression and Anxiety

An analysis on the 2019 National Survey of Children's Health

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Outline

-
- Part 1** Background
 - Part 2** Classification Model
 - Part 3** Conclusions, Recommendations,
 and Next Steps

Content Warning

Part 1

Background

Notice Anything?

Depression



sad, anxious, empty mood

hopelessness

irritability

guilt, worthlessness, helplessness

loss of pleasure

fatigue

moving or talking slowly

feeling restless

difficulty concentrating, remembering, or making decisions

sleep problems

appetite and weight changes

thoughts of death or suicide

Anxiety



feeling restless, wound-up, or on-edge

being easily fatigued

difficulty concentrating; mind going blank

irritability

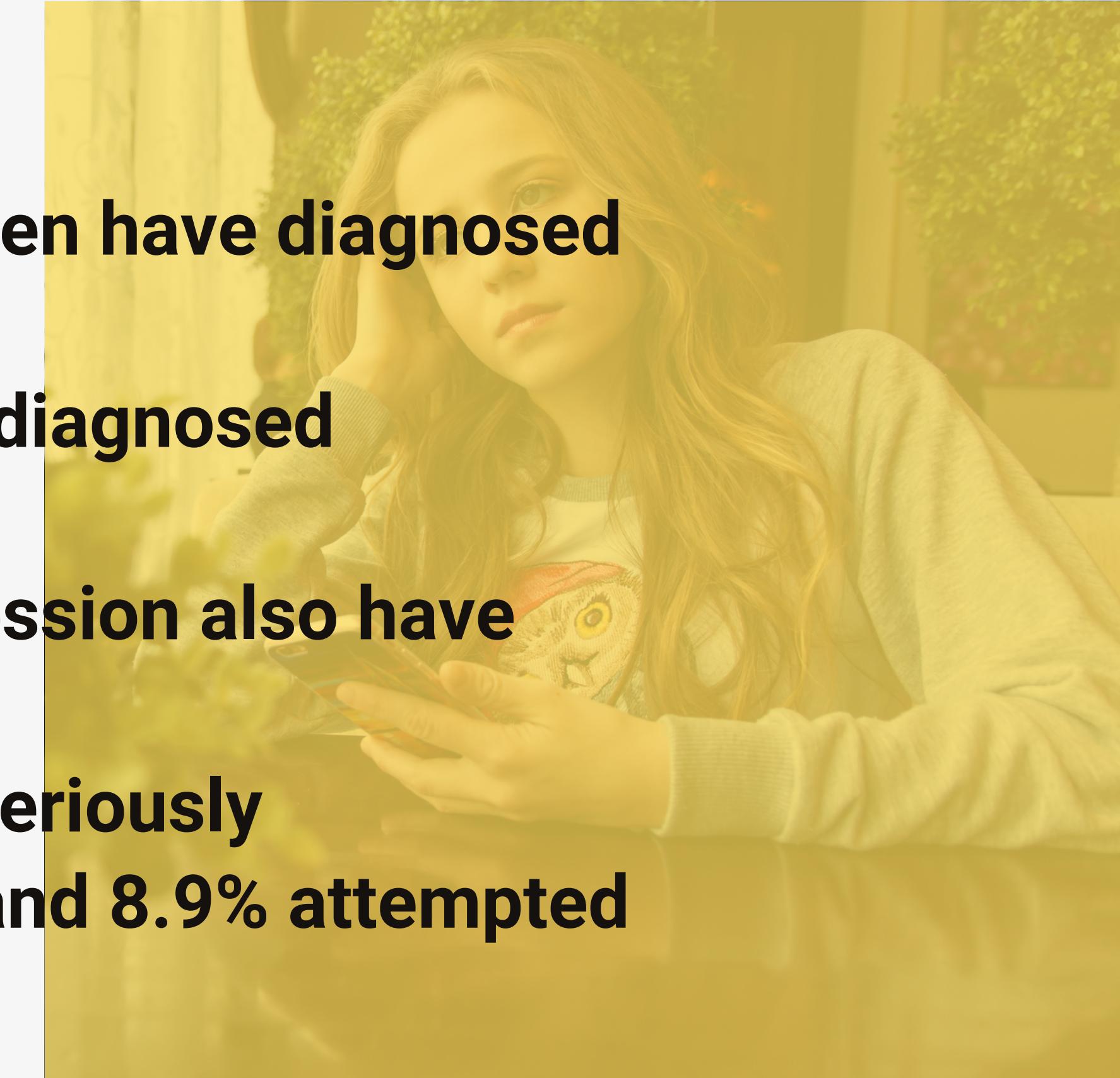
muscle tension

difficulty controlling feelings of worry

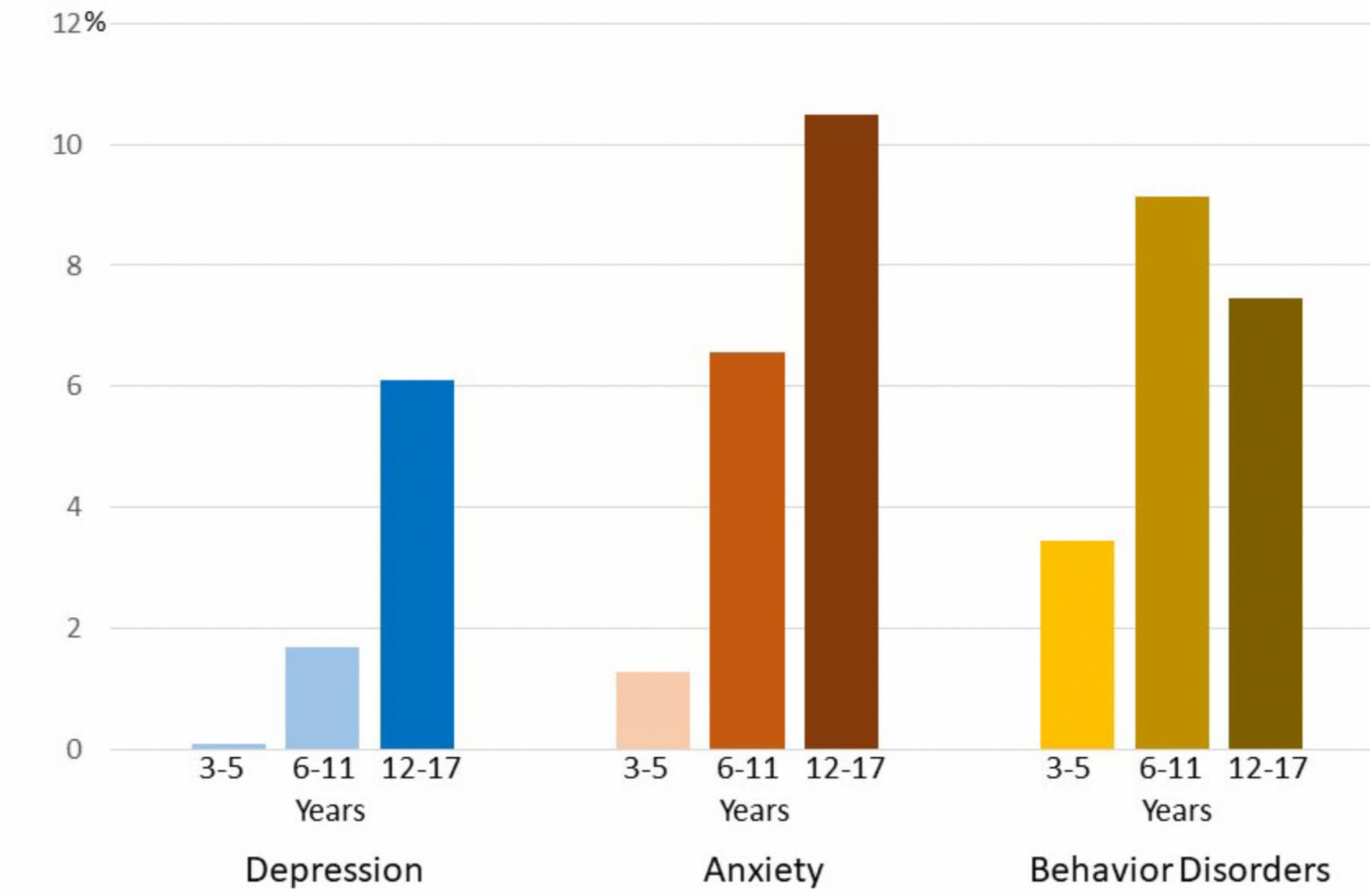
sleep problems

Why Teens?

- Approximately 4.4 million children have diagnosed Anxiety
- Approximately 1.9 million have diagnosed Depression
- About 3 in 4 children with Depression also have Anxiety (73.8%)
- 18.8% of high school students seriously considered attempting suicide and 8.9% attempted suicide



Depression, Anxiety, Behavior Disorders, by Age



Ghandour et al. 2018

National Survey of Children's Health

- Administered by the Census Bureau
- Produces national and state-level data on the physical and emotional health of children 0 - 17 years old in the United States.
- Provides estimates for 19 Title V Maternal and Child Health Services Block Grant National Outcome and Performance Measures

Our goal has two parts:

1. Determine predictive factors of adolescent depression and anxiety from the NSCH19
2. Assess the usefulness of the NSCH19 in determining these factors

Part 2

Modeling

DATA CLEANING OBSTACLES

1

443 QUESTIONS IN THE SURVEY

2

IMBALANCED DATA

3

NULL VALUES

DATA CLEANING OBSTACLES

1

443 QUESTIONS IN THE SURVEY

DATA CLEANING OBSTACLES

2

IMBALANCED DATA

DATA CLEANING OBSTACLES

3

NULL VALUES

Logistic Regression (ElasticNet)

- Feature Importances/Interpretability
- Regularization

MODEL EVALUATION

1

Recall

2

Precision

3

ROC/AUC

Actual

No Dep/Anx

1938

Dep/Anx

95

277

420

No Dep/Anx

Dep/Anx

Predicted

Recall = .82

Precision = .60

ROC/AUC = .85

Actual

No Dep/Anx

.7

.3

Dep/Anx

.092

.91

No Dep/Anx

Dep/Anx

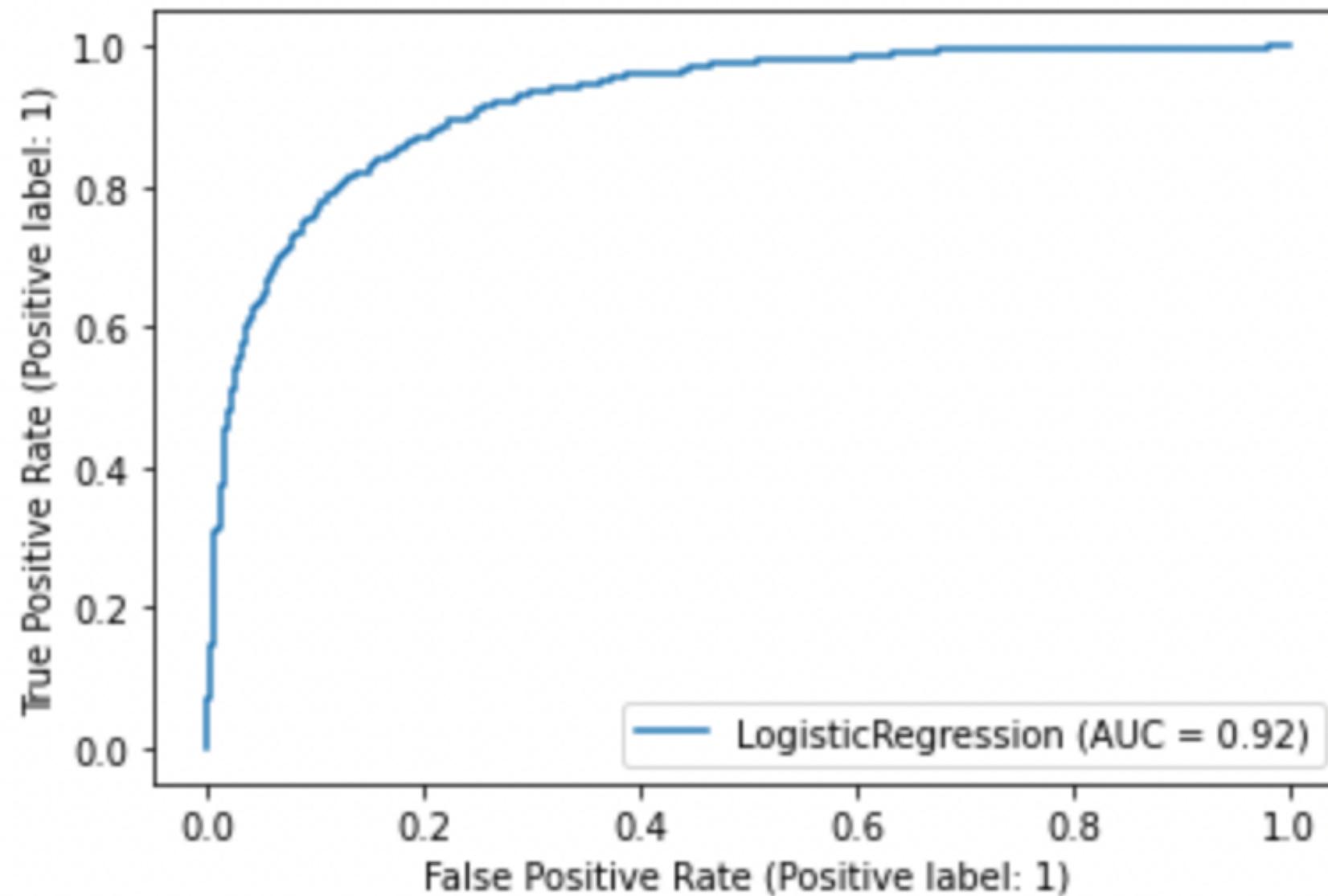
Predicted

Recall = .91

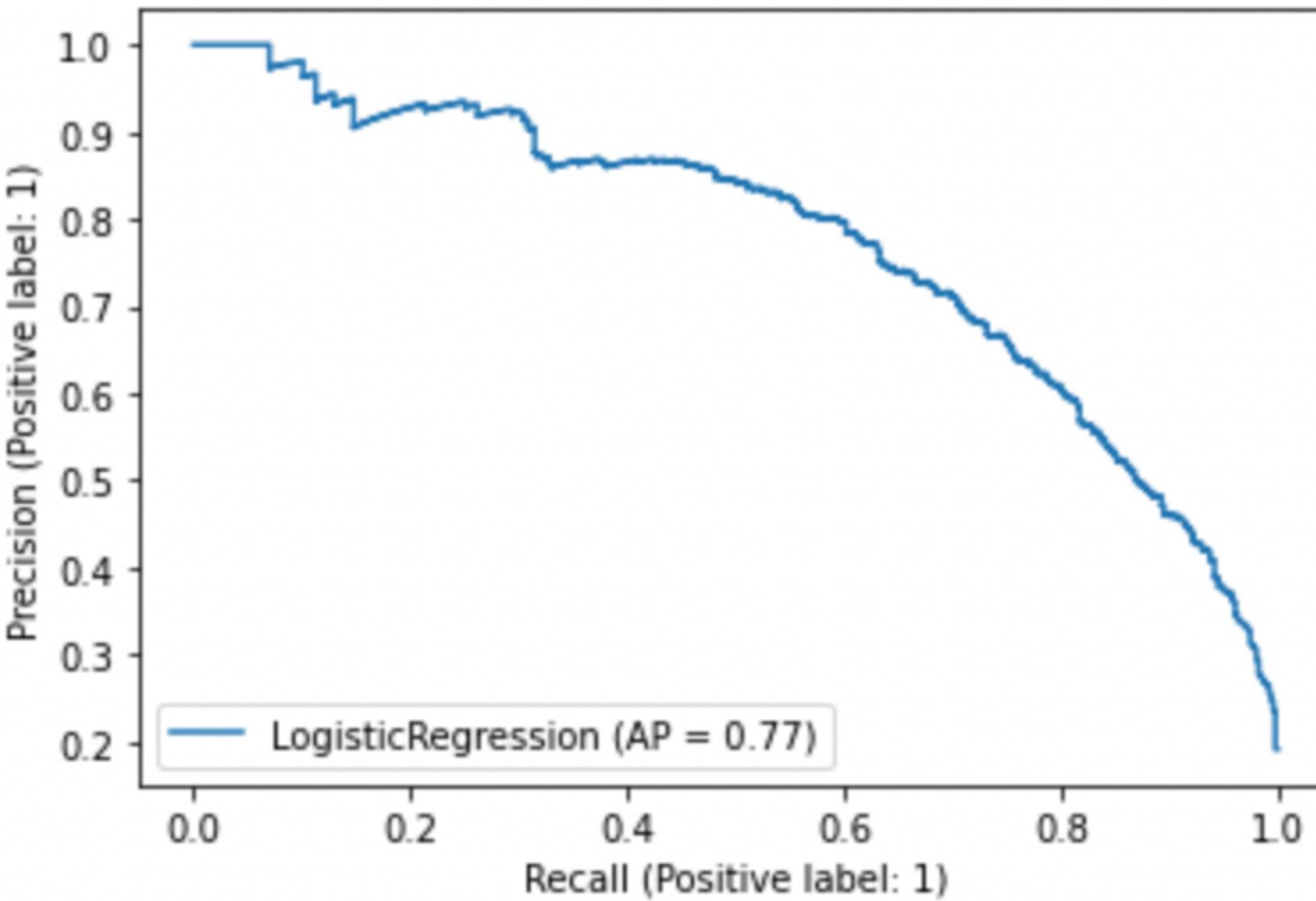
Precision = .42

ROC/AUC = .81

Model Performance



Model Performance



Factors Predicting Depression/Anxiety



Bullied



Sex (Female)



**Trouble
Staying Calm**



**Difficulty Running
Errands Alone**



Parent in Jail



Headaches



Race



**Difficulty
Making Friends**



**Parent Mental
Health**



**Ability
/Limitations**

RESEARCH

Here are a few studies that support our model findings.

The Association Between Major Depression and Headache

Pine, Cohen, and
Brook 1996

Offspring of depressed parents: 20 years later

Weissman, Myrna M
et al. 2006

Sex differences and adolescent depression.

Allgood-Merten,
Lewinsohn, and Hops
1990

Racial differences in adolescent distress: Differential effects of the family and community for blacks and whites

Wickrama, Noh, and
Bryant 2005

DISCLAIMERS

We have a very imbalanced data set.

- Let's look at our misclassified observations

Our questions do not include specific symptom profiles related to Depression and Anxiety

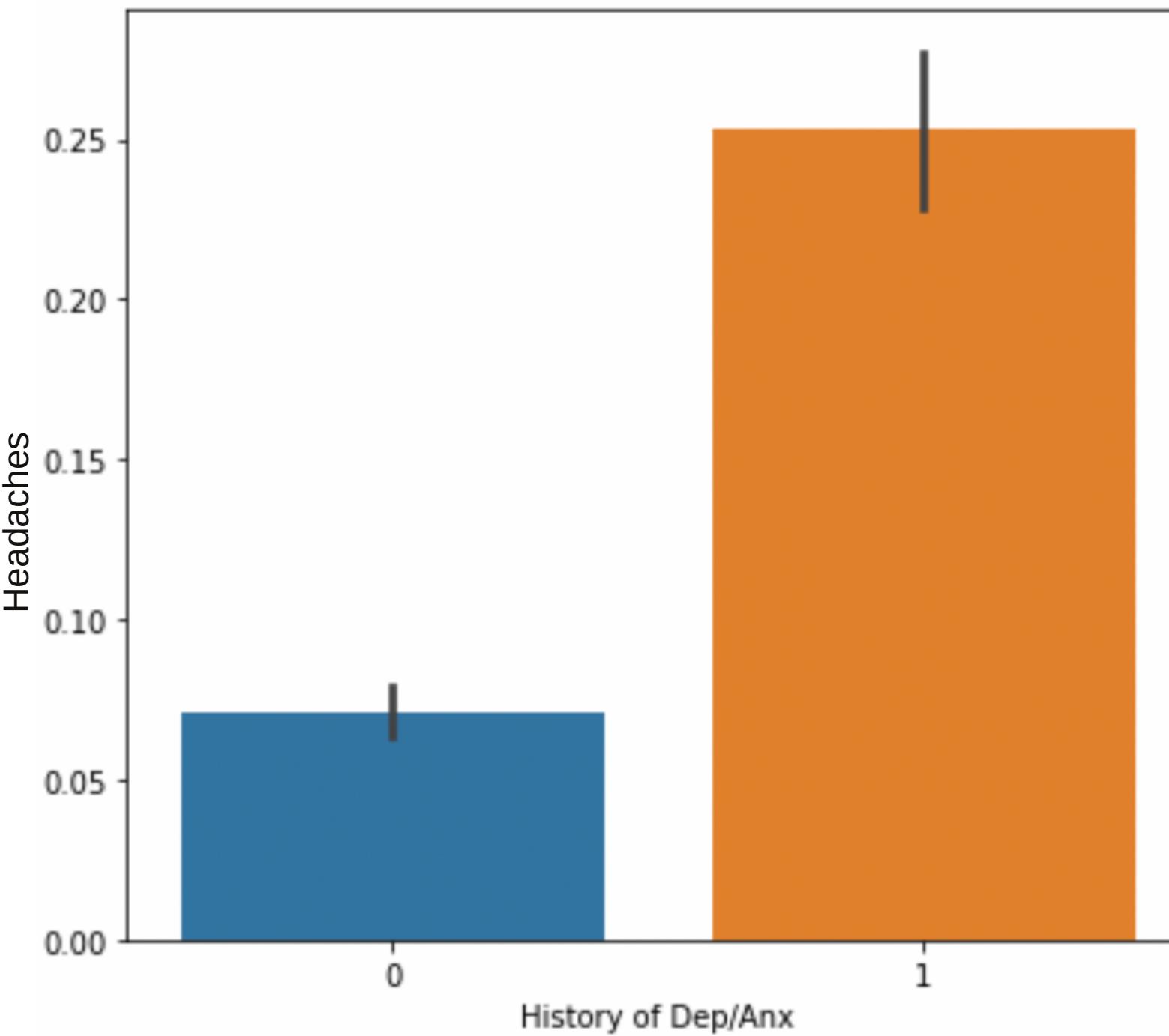
- The goal of our study was to find non-symptom predictors

Frequent or severe headaches, including migraine?

0 = No

1 = Yes, not currently

2 = Currently



History of Depression or Anxiety?

0 = No

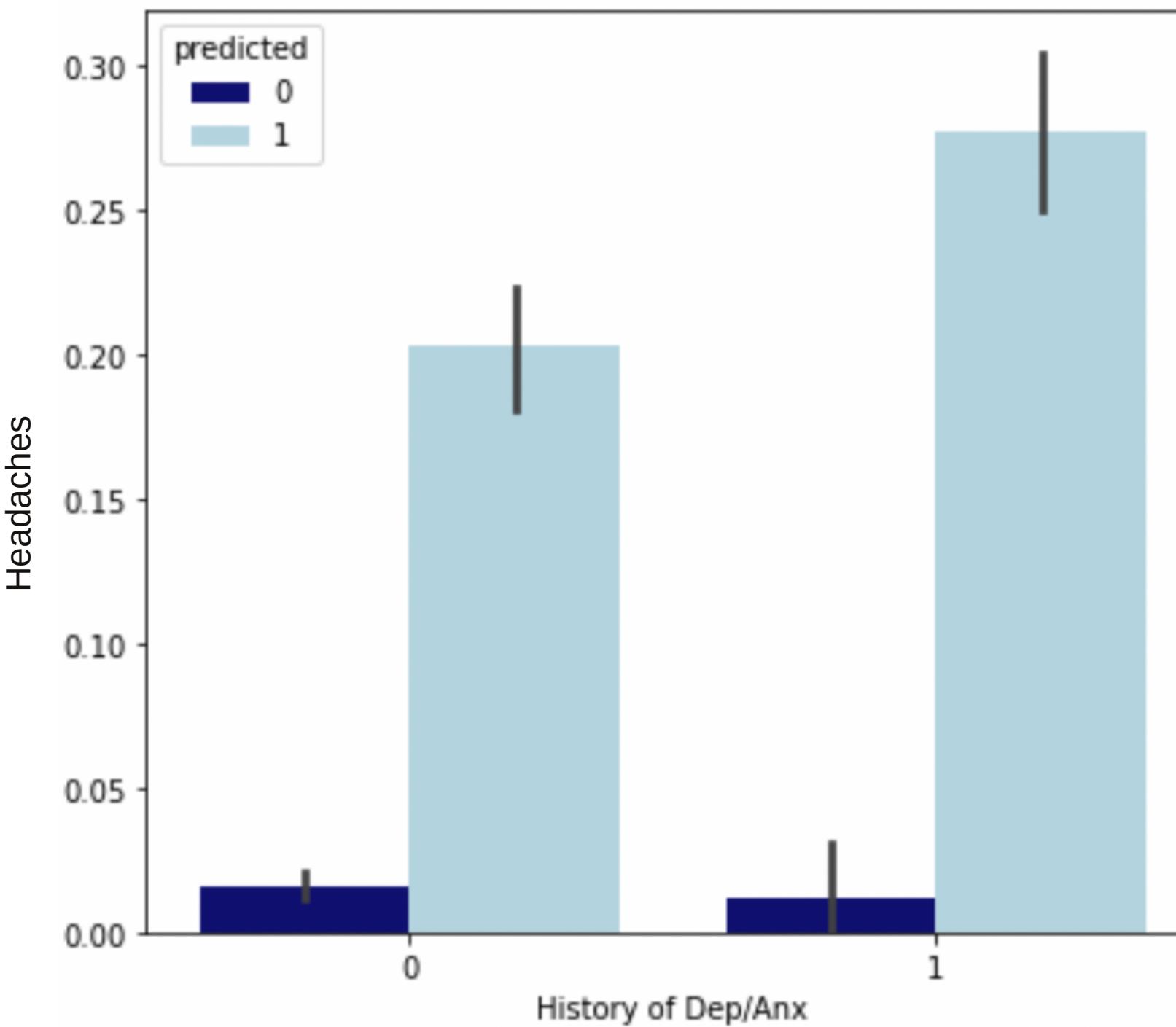
1 = Yes

Frequent or severe headaches, including migraine?

0 = No

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2 = Currently



History of Depression or Anxiety?

0 = No

1 = Yes

Average Adult Mental Health

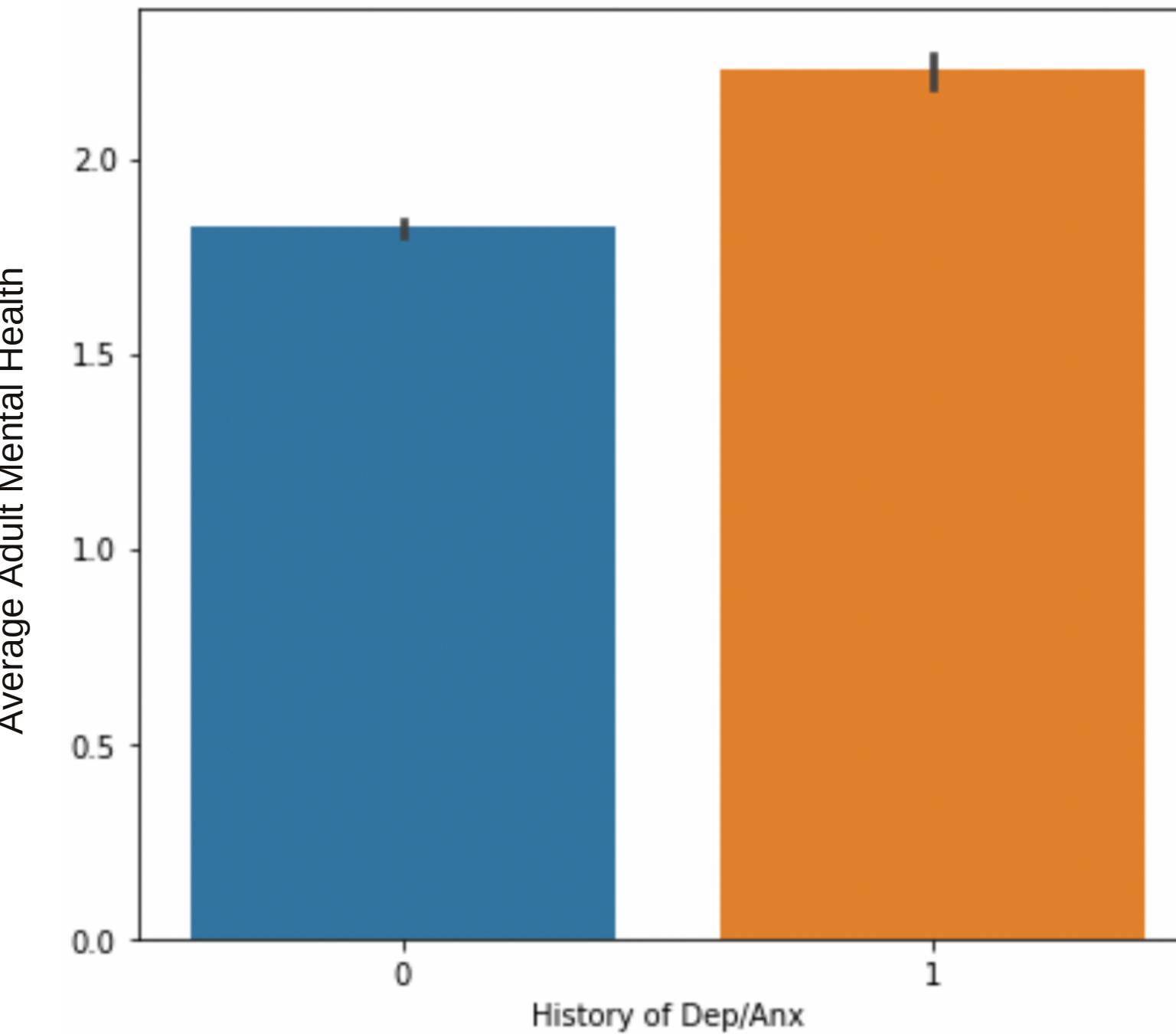
1 = Excellent

2 = Very Good

3 = Good

4 = Fair

5 = Poor



History of Depression or Anxiety?

0 = No

1 = Yes

Average Adult Mental Health

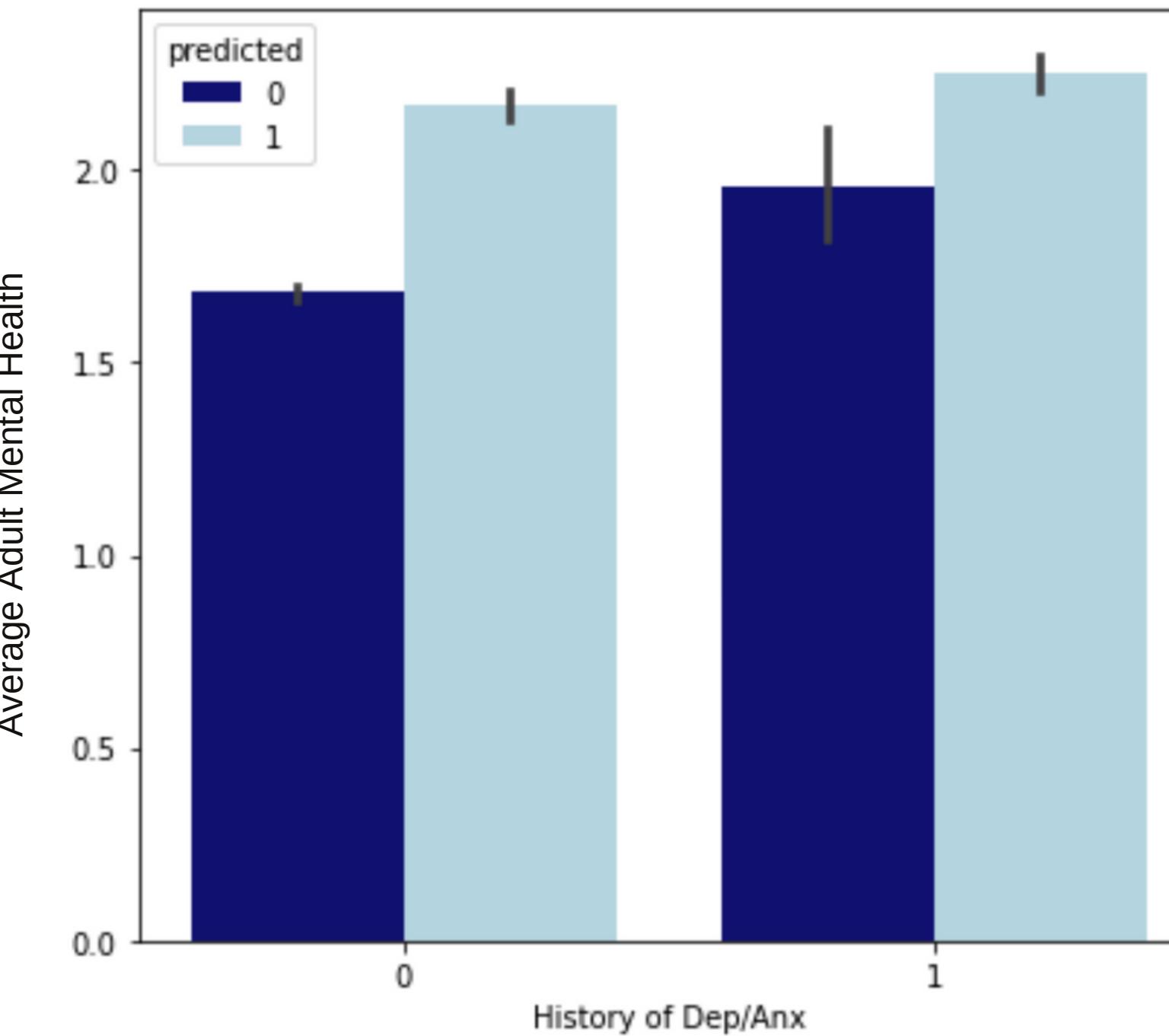
1 = Excellent

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History of Depression or Anxiety?

0 = No

1 = Yes

Part 3

Conclusions

Our goal has two parts:

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2. Assess the usefulness of the NSCH19 in determining these factors

IMPROVEMENTS AND ADJUSTMENTS

1

Amount of data

2

Feature selection/engineering

3

Imputation method

RECOMMENDATIONS

1

Questions on the NSCH

2

Experimental research into impact of non-symptom factors

3

Research on targeted interventions on these factors



Thank you!

A photograph of a classroom or lecture hall. Several students are visible, mostly from the side or back. In the foreground, a student with short brown hair is looking towards the front of the room. Behind them, other students are seated, some wearing glasses and casual clothing like jeans and a t-shirt with 'INDY' printed on it. The background shows more rows of desks and students.

QUESTIONS?