

# Mental Health and Adverse Childhood Experiences: A Relational Investigation

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Group 14

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Professor Afriyie  
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# Research Questions

## Adverse Childhood Experiences

- Adverse Childhood Experiences (ACEs) are traumatic events that occur when an individual is aged 0-17 years old

## Research Questions:

- How do distinct clusters or patterns of ACEs predict mental health outcomes?
- Which specific ACEs are the strongest predictors of adult depressive disorders?
- To what extent can mental health disorders be accurately predicted from ACEs?

# Data

## Data Overview

- Data originates from the CDC Behavioral Risk Factor Surveillance System survey
- Administered via telephone interview
- Combined data from the years 2019, 2021, and 2023

## Data Cleaning

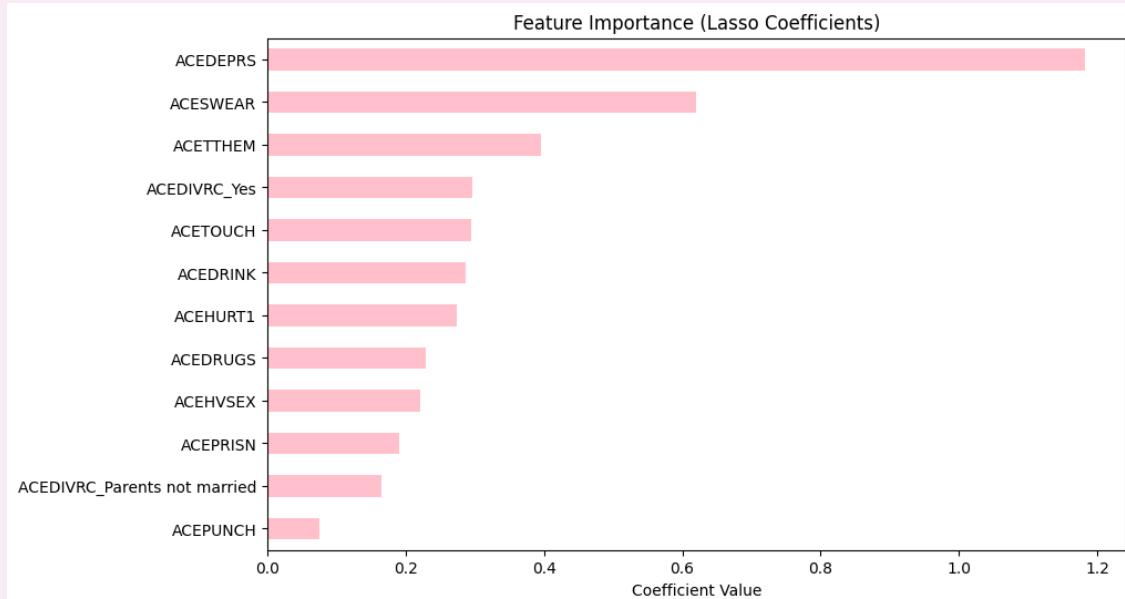
- Narrowed data down to 1,264,973 rows and 18 Columns
- Used replace map to convert numeric to a more informative numeric type
- Converted 'Yes' and 'No' to 0 and 1
- Dropped rows with missing values

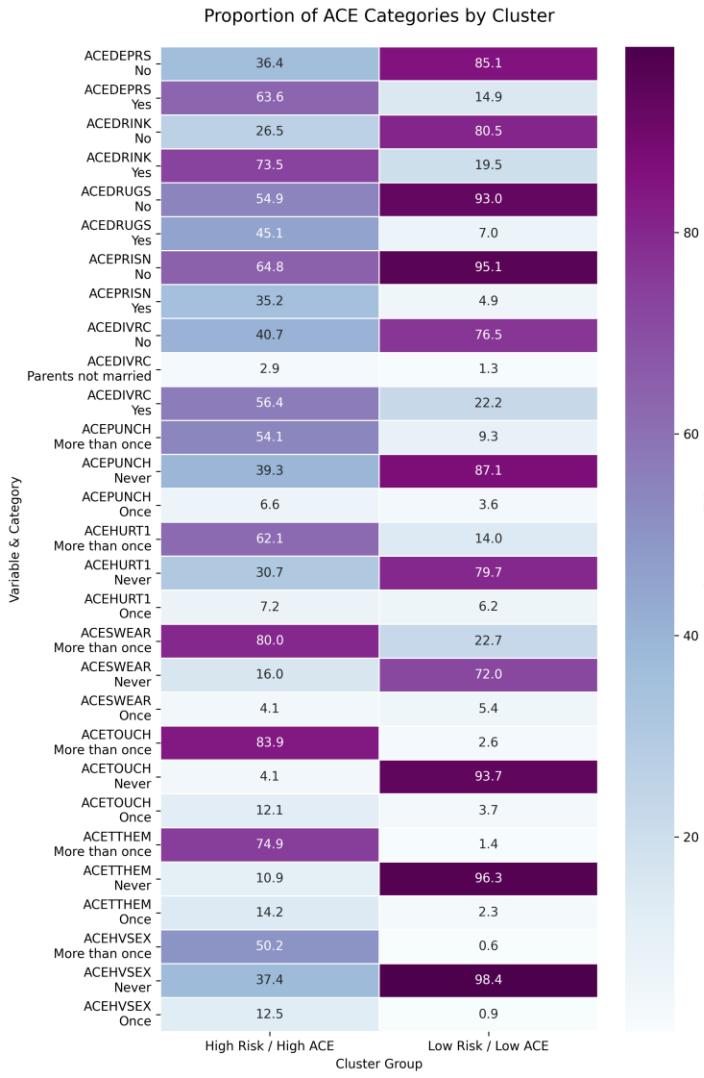
# Lasso Regression

**Question:** Which specific ACEs are the strongest predictors of adult depressive disorders?

**Objective:** Find most influential predictors for the number of days someone was depressed

**Target Variable:** MENTLTH – how many days in the past 30 days was your mental health not good?





# Hierarchical Cluster Analysis

**Question:** How do distinct clusters or patterns of ACEs predict mental health outcomes?

**Method:** Gower Distance with Average Linkage

**Sample:** N: 10,000

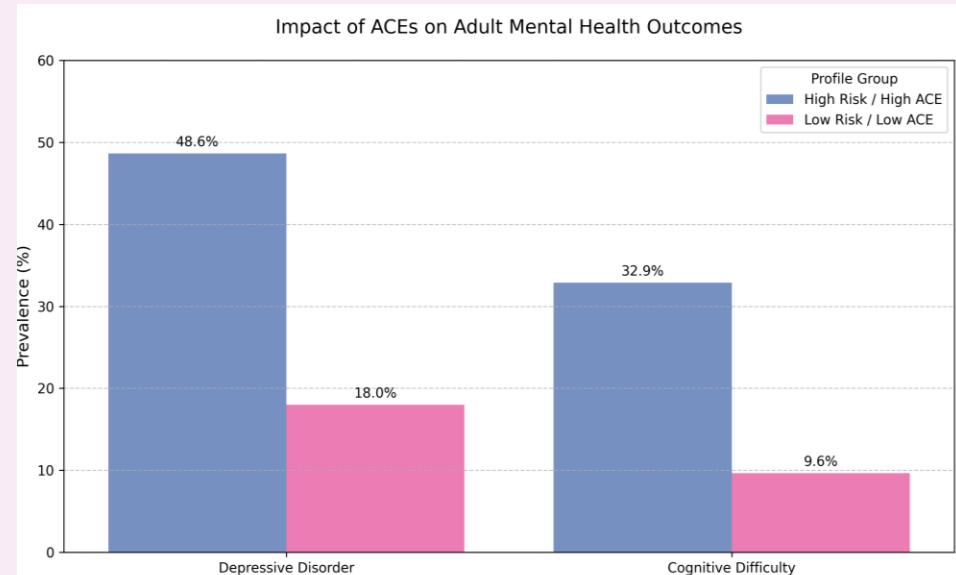
**Result:** Two distinct profiles identified.

- **Cluster 1 (5%):** High/Multi-Type Exposure
- **Cluster 0 (95%):** Low/Baseline Exposure.



# Hierarchical Cluster Analysis

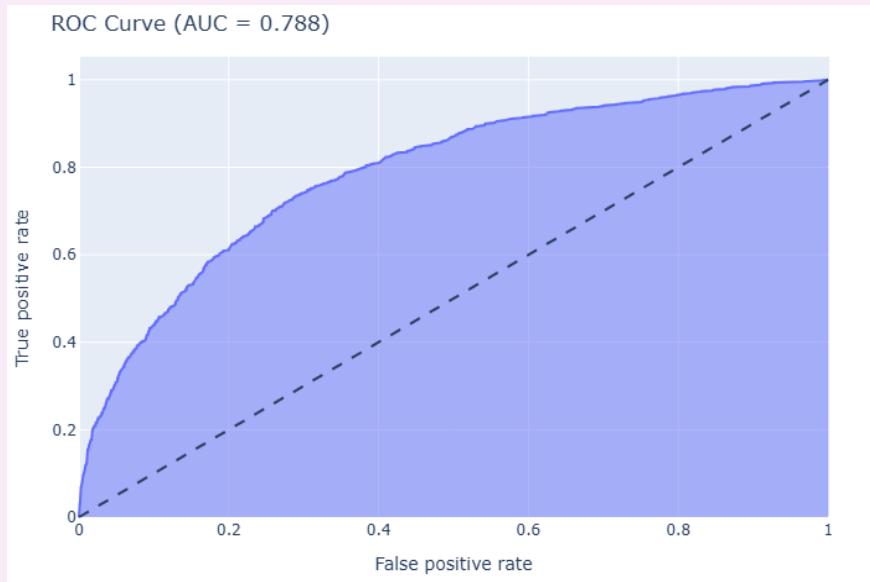
Key Metric	High ACE	Low ACE	Relative Impact
Sexual Abuse Prevalence	84%	3%	28x
Witnessed Domestic Violence more than once	54%	9%	6x
Depression Diagnosis	49%	18%	2.7%
Activity Limitation days/month	10.8	3.5	3.1x
Poor Mental Health days/month	9.3	4.9	1.9x



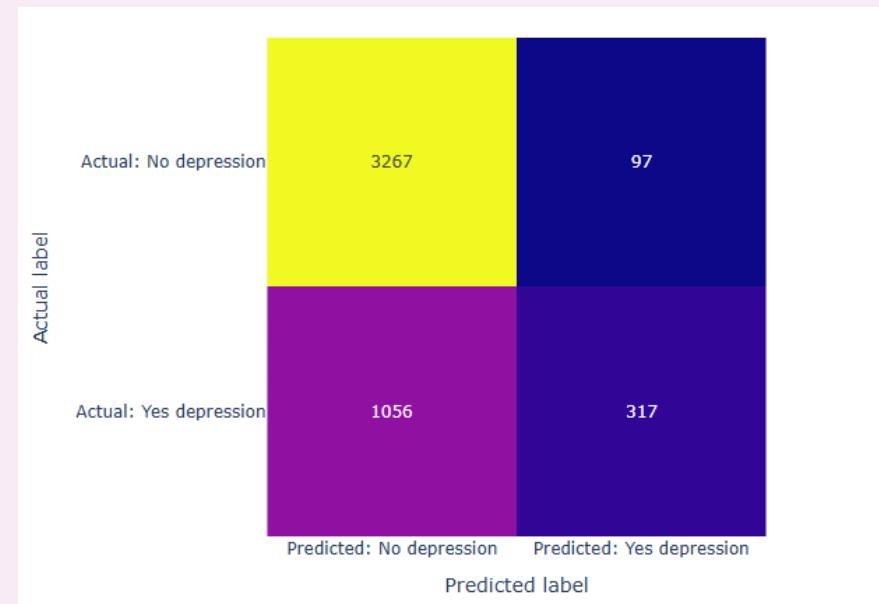
# Logistic Regression

**Question:** To what extent can mental health disorders be accurately predicted from ACEs?

**Target Variable:** ADDEPEV3 - Have you ever been told you have a depressive disorder?



**Threshold:** 0.70  
**Accuracy:** 0.788  
**Log Loss:** 0.491

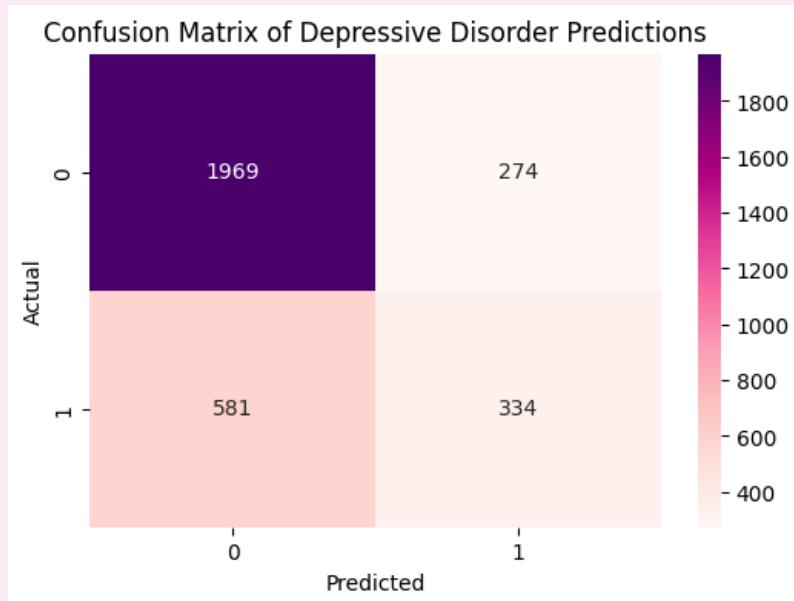


# K-Nearest Neighbor

**Question:** To what extent can mental health disorders be accurately predicted from ACEs?

**Objective:** Classify individuals into having had or not had a depressive disorder

**Target Variable:** ADDEPEV3 - Have you ever been told you have a depressive disorder?



**K = 11**

**Outcome:** 0 = No diagnosis ,  
1 = Has been diagnosed

**Accuracy:** 0.729

**Balanced Accuracy:** 0.621

**AUC:** 0.708

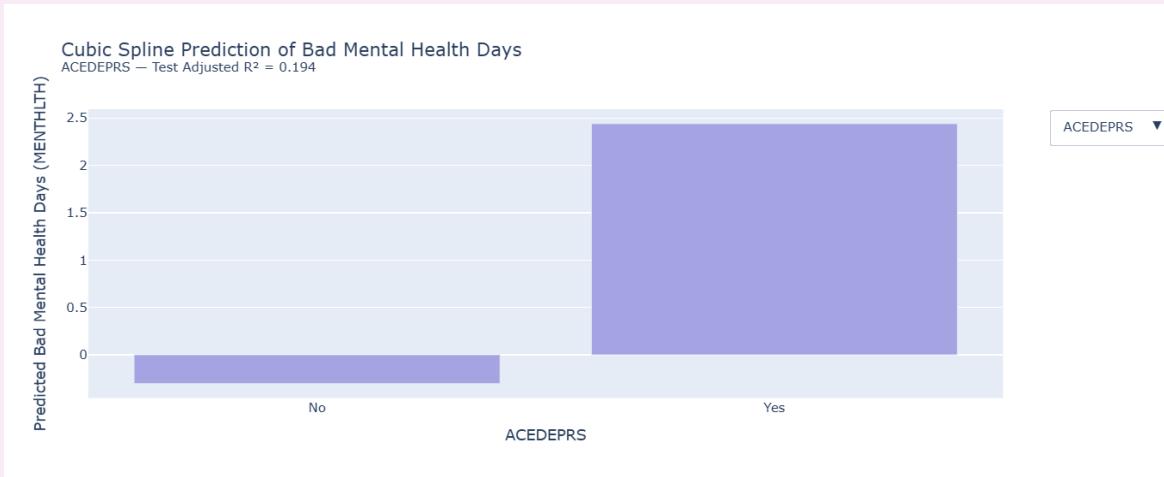
# Multiple Linear Regression

**Question:** To what extent can mental health disorders be accurately predicted from ACEs?

**Objective:** Predict the number of days an individual has depression in the past 30 days

**Target Variable:** MENTHLTH – how many days in the past 30 days was your mental health not good?

- Only data from 2019 & 2023



**ACEDPRS**

**Predicted Values:**

No = -0.0304 (0 days)

Yes = 2.4398 (~2.4 days)

# Conclusion

## Main Takeaways

- Able to predict mental health with ~72% accuracy
- Strongest Predictors:
  - Living with someone depressed
  - Living with someone who swore at you
  - Divorced Parents

## Next Steps

- Explore different K clusters for HAC to explore combination clusters within ACEs
- Incorporate more lifestyle variables into the models
  - Chronic Health Conditions
  - Age Groupings
  - Physical Activity

# Thank you! Any Questions?

We want to specifically thank Professor Johnson and Professor Afriyie!

