

# Predicting Mental Health Illness In Tech Companies

STAT 4650 MACHINE LEARNING Prof. Dr. Yue Gao

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# Introduction

According to the 2021 OSMI Mental Health in Tech Survey

90%

of workers in the tech sector report having been diagnosed with a mental health disorder.

A study conducted by Mind Share Partners, SAP and Qualtrics proved that

200 million

Workdays **are lost** due to mental health conditions each year (**\$16.8 billion in employee productivity**).

60%

of employees **have never spoken to anyone at work** about their mental health status.



# Research Questions

Which predictors are more likely to create an impact on mental health illness or specific attitudes towards mental health in the workplace?

# Are employees more likely to discuss mental health issues with a potential employers based on certain demographics?

**Is availability of proper wellness programs in workplace is more likely to encourage employees to seek mental health treatments?**

# Are wellness programs more likely to impact the frequency and attitude of employers to discuss about mental health and seek help?

# Importance of the study

1

## **Cost savings for employers**

Identifying factors influencing employees' seeking mental health treatment allows targeted interventions by employers to promote mental health and prevent negative consequences.

2

## **Employee well-being**

To identify factors that influence employees' decision to seek treatment. The project can contribute to the well-being and overall mental health of tech employees

3

## **Social impact**

The study highlights the importance of providing resources and support for employees seeking mental health treatment and raising awareness among employers about their organizational responsibility.

# Importance of the study

4

## Legal and ethical considerations

Study findings inform policies that promote employees' mental health and well-being while fulfilling legal and ethical responsibilities.

5

## Reputation and brand image

Prioritizing mental health in the workplace enhances a company's reputation and brand image, attracting top talent and boosting customer and investor confidence.

6

## Organizational responsibility

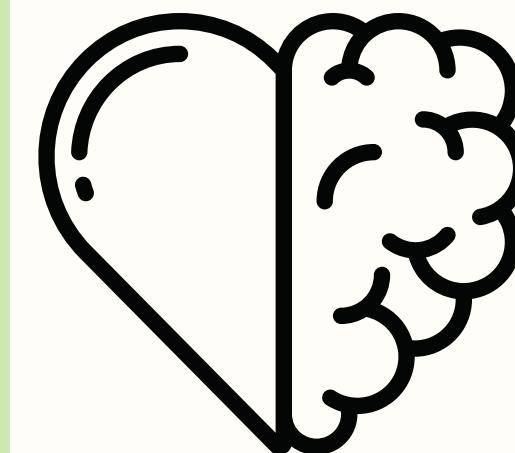
The study highlights the importance of providing resources and support for employees seeking mental health treatment, and raising awareness among employers about their organizational responsibility.

# Importance of the study

7

## **Employee engagement and loyalty**

Study findings inform strategies and interventions that foster employee engagement and loyalty, contributing to the organization's overall success by promoting mental health and well-being.



8

## **Employee empowerment**

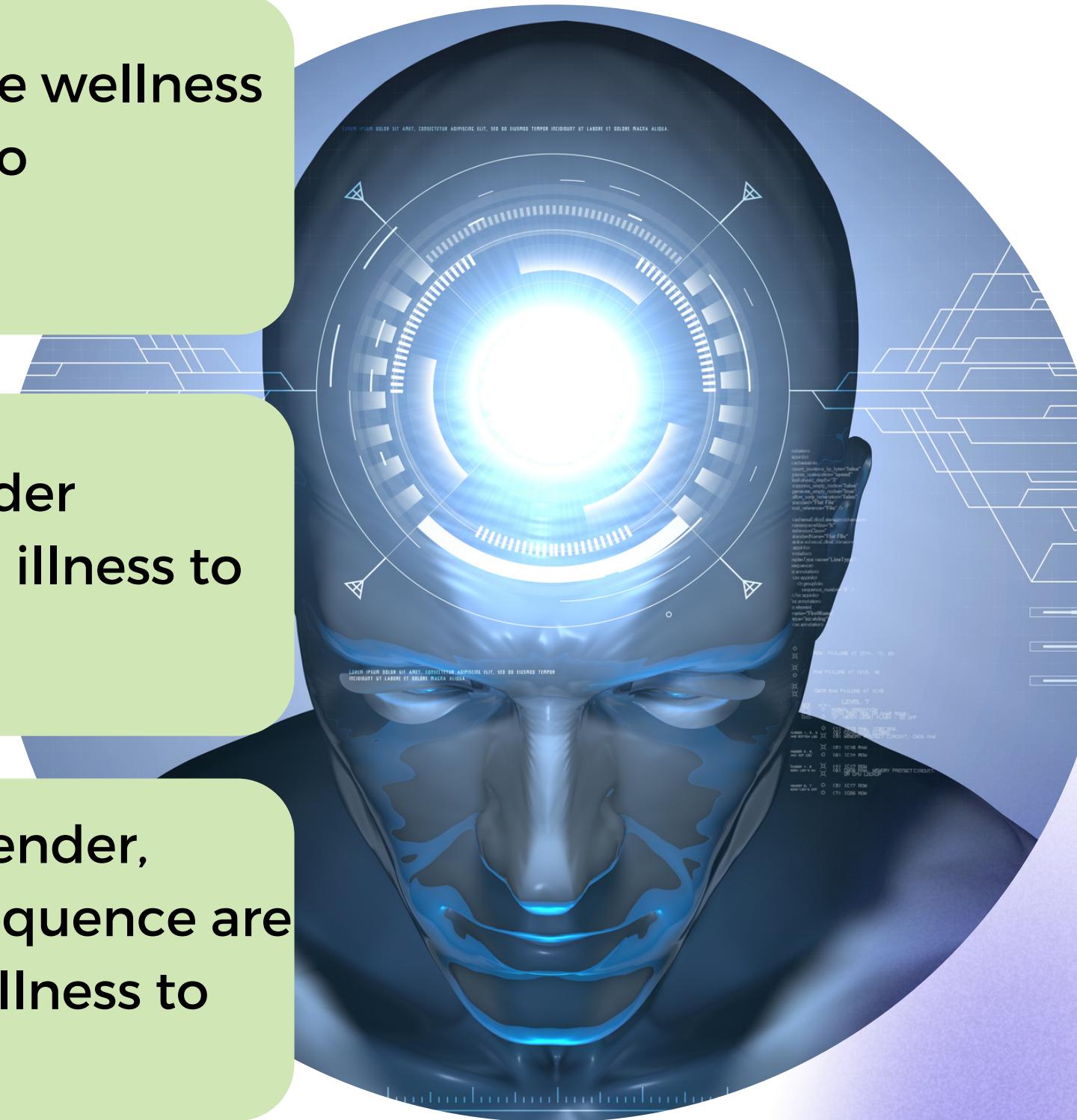
The study raises awareness about mental health, reduces stigma, and promotes a culture of openness and support in the workplace, empowering employees to seek help when needed, leading to increased employee empowerment and resilience.

# Hypothesis

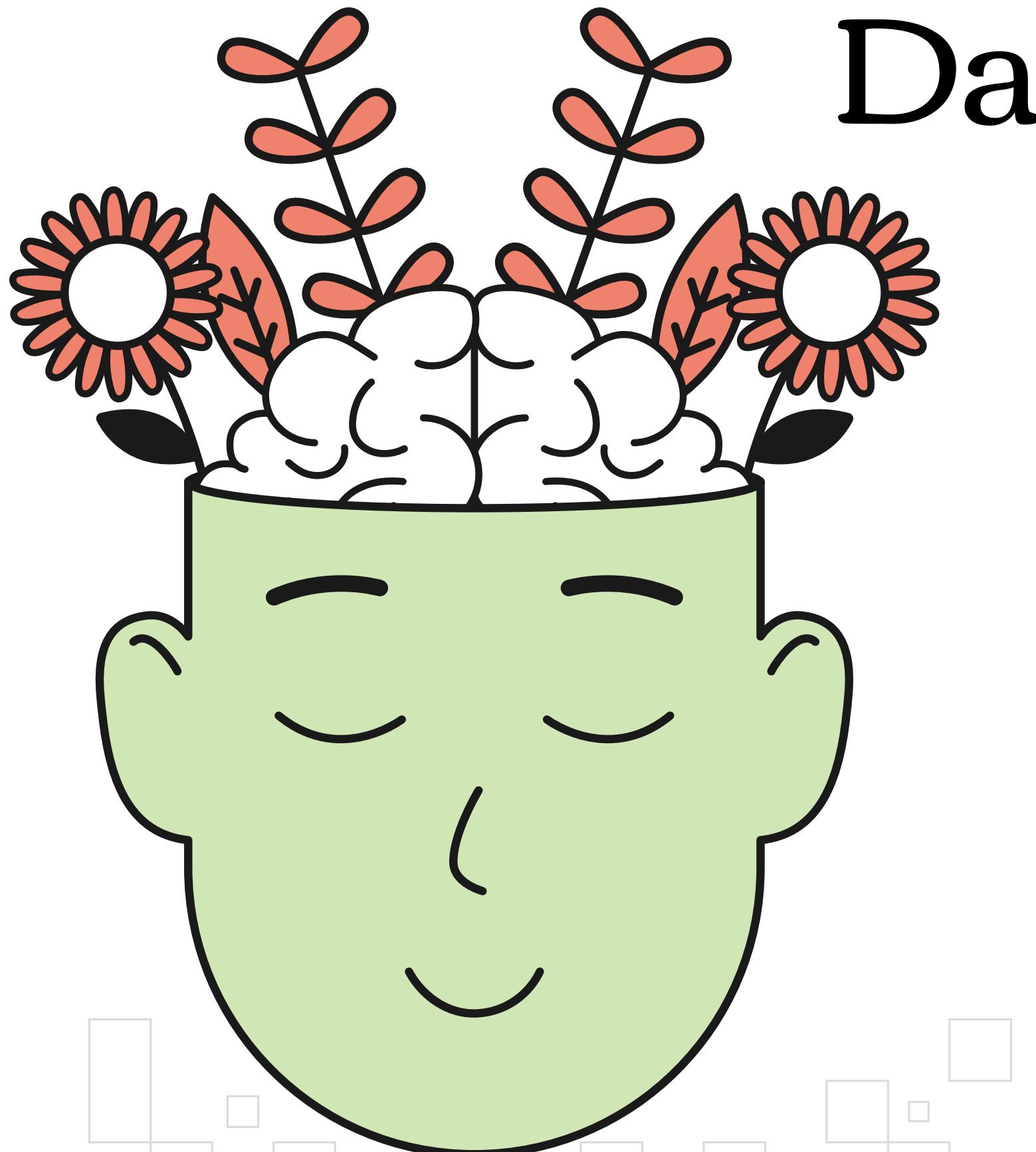
**H1:** Employees who are part of a company with comprehensive wellness and mental health care programs are more likely to be open to accepting a mental health condition and seeking treatment

**H2:** There is negative and significant correlation between Gender (Male) and the willingness of an employee with mental health illness to seek treatment.

**H3:** work\_interfere, family\_history, care\_options, coworkers, Gender, anonymity, benefits, seek\_help, wellness\_program, obs\_consequence are the strongest predictors for an employee with mental health illness to seek treatment.



# Data structure



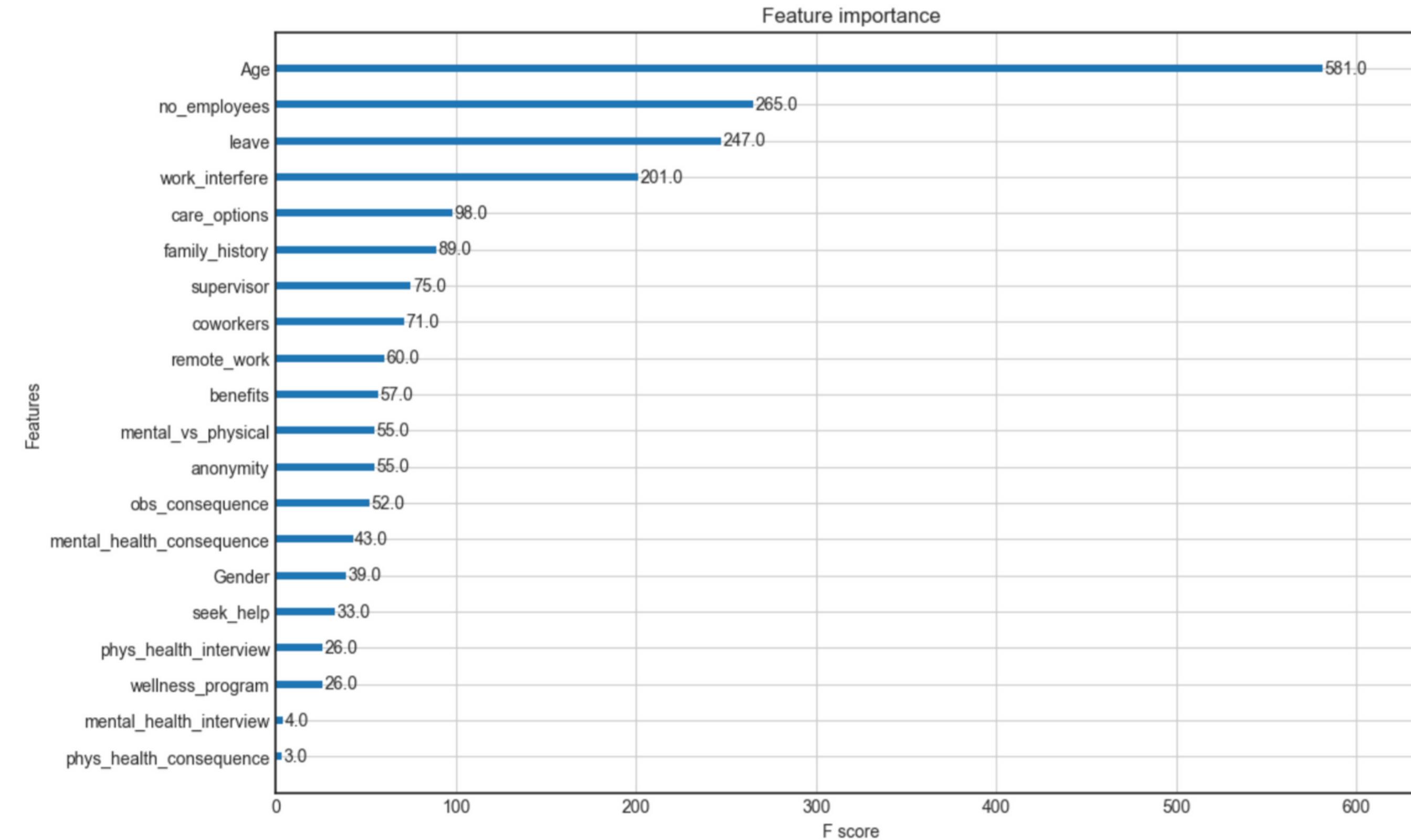
- The study is the record of **1259** employees in a tech company
- The dataset consists of **27** independent variables
- **Treatment = Target Variable**

"Employees are open to seeking treatment"

# Feature Selection

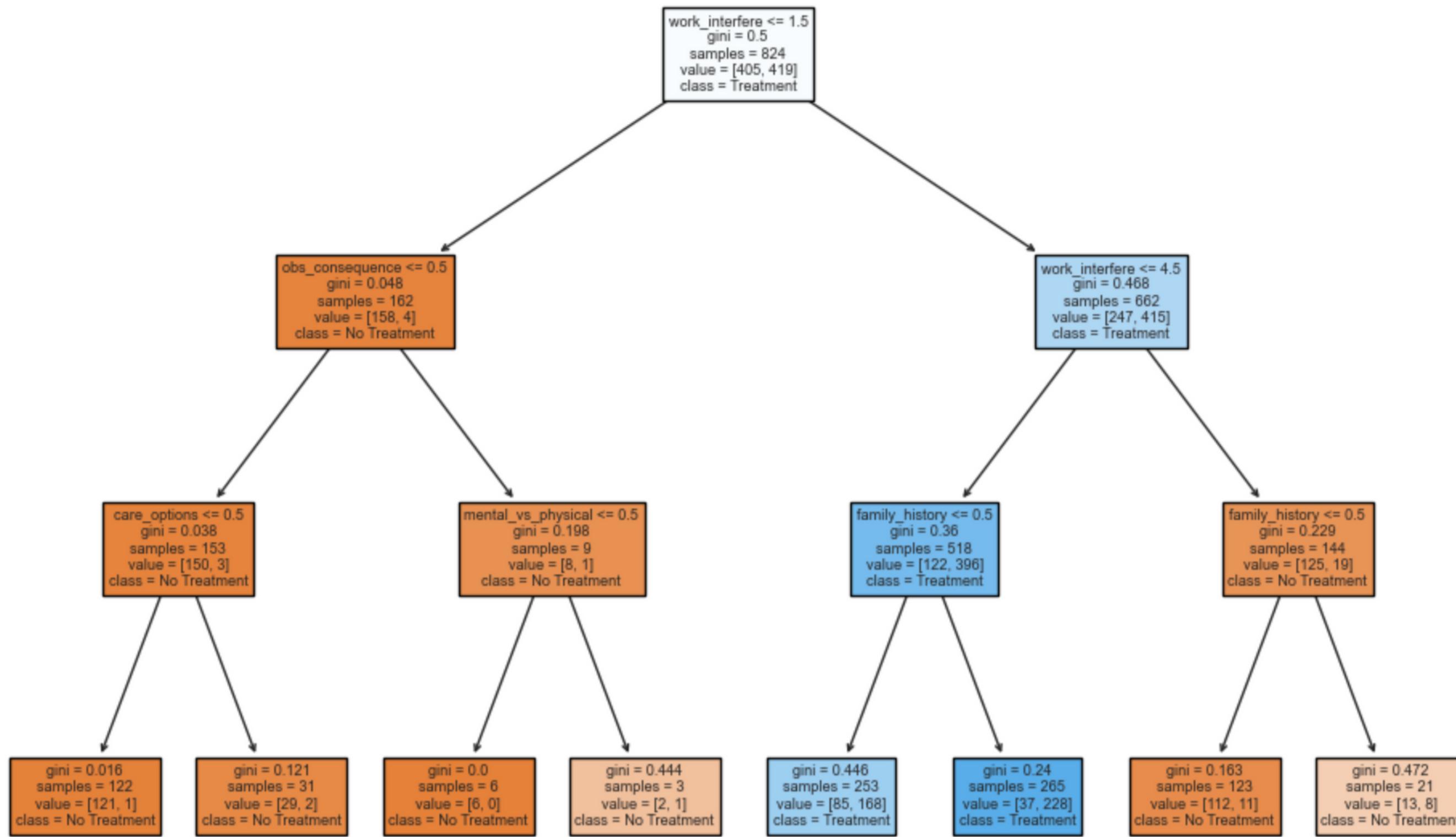


# Feature Importance



**Fig: XGBost - Relative Influence Plot**

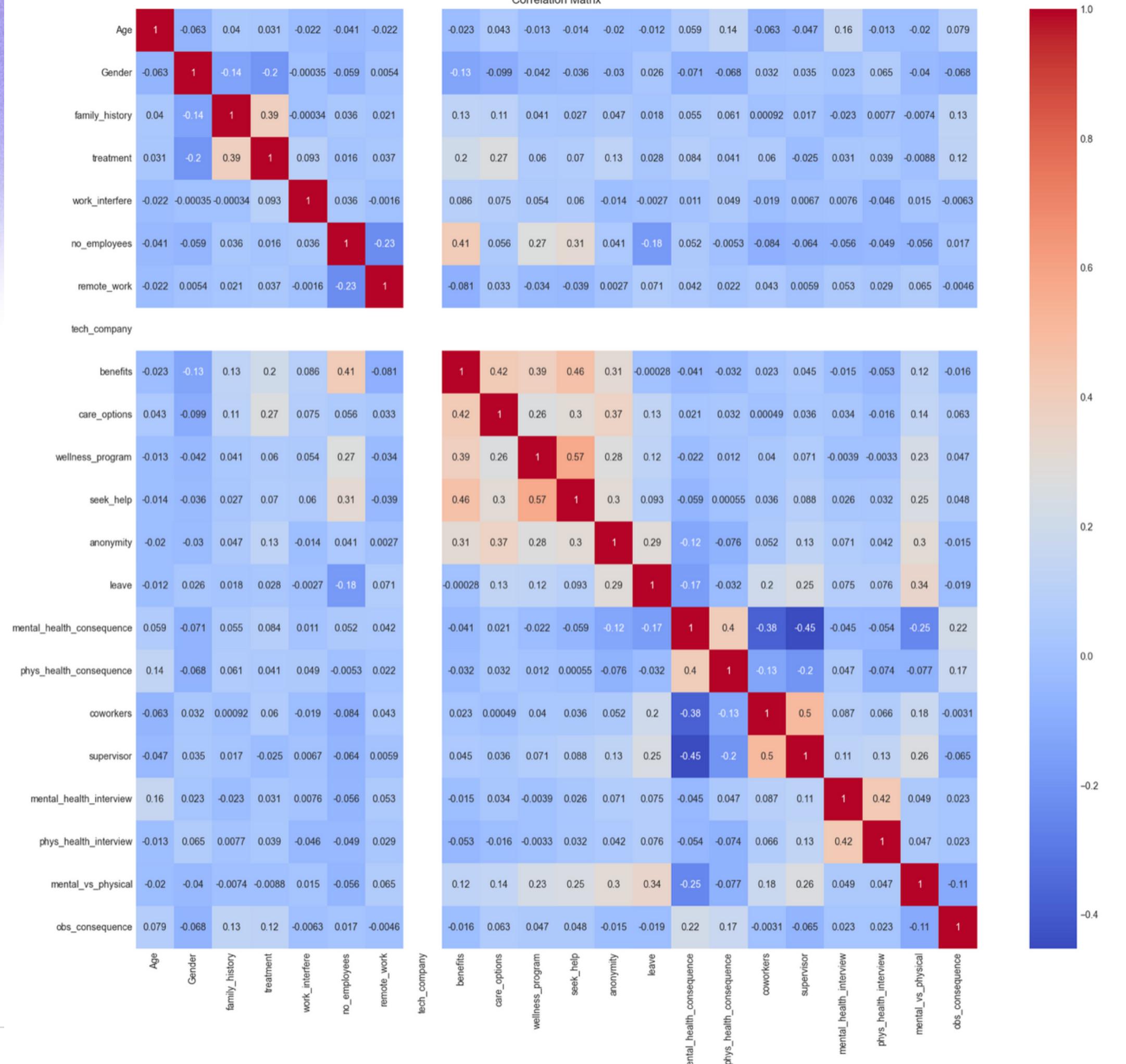
# Classification Tree



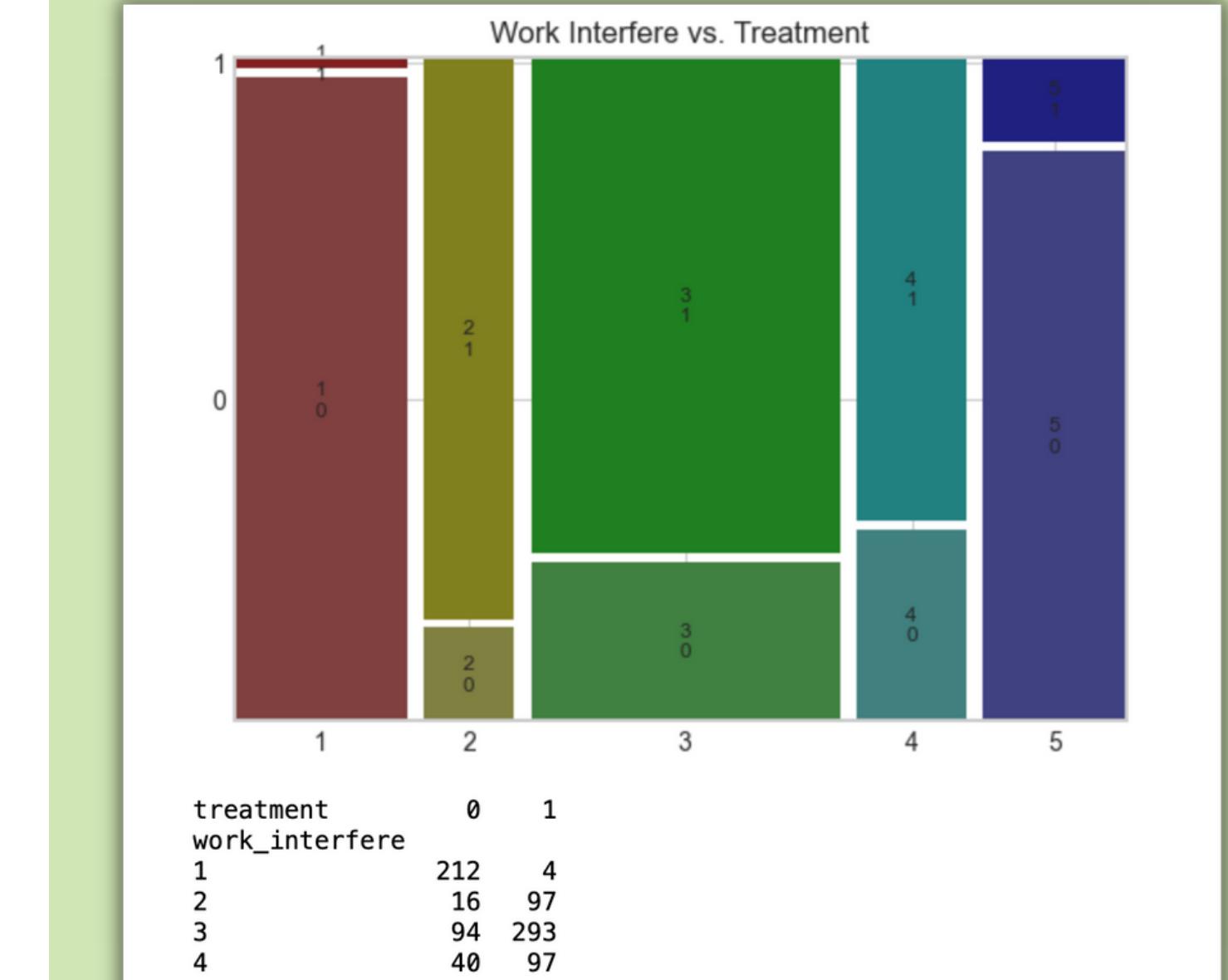
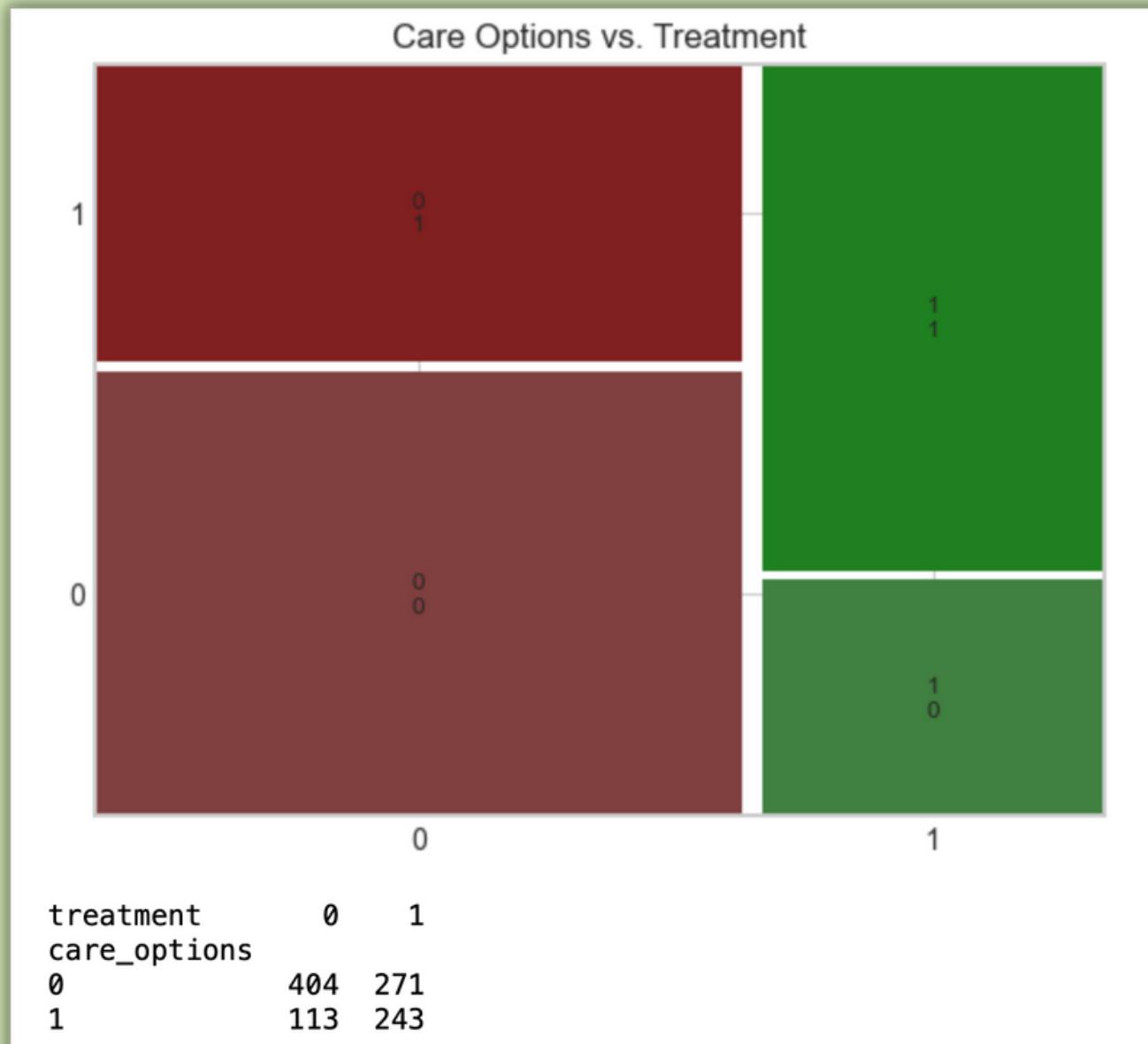


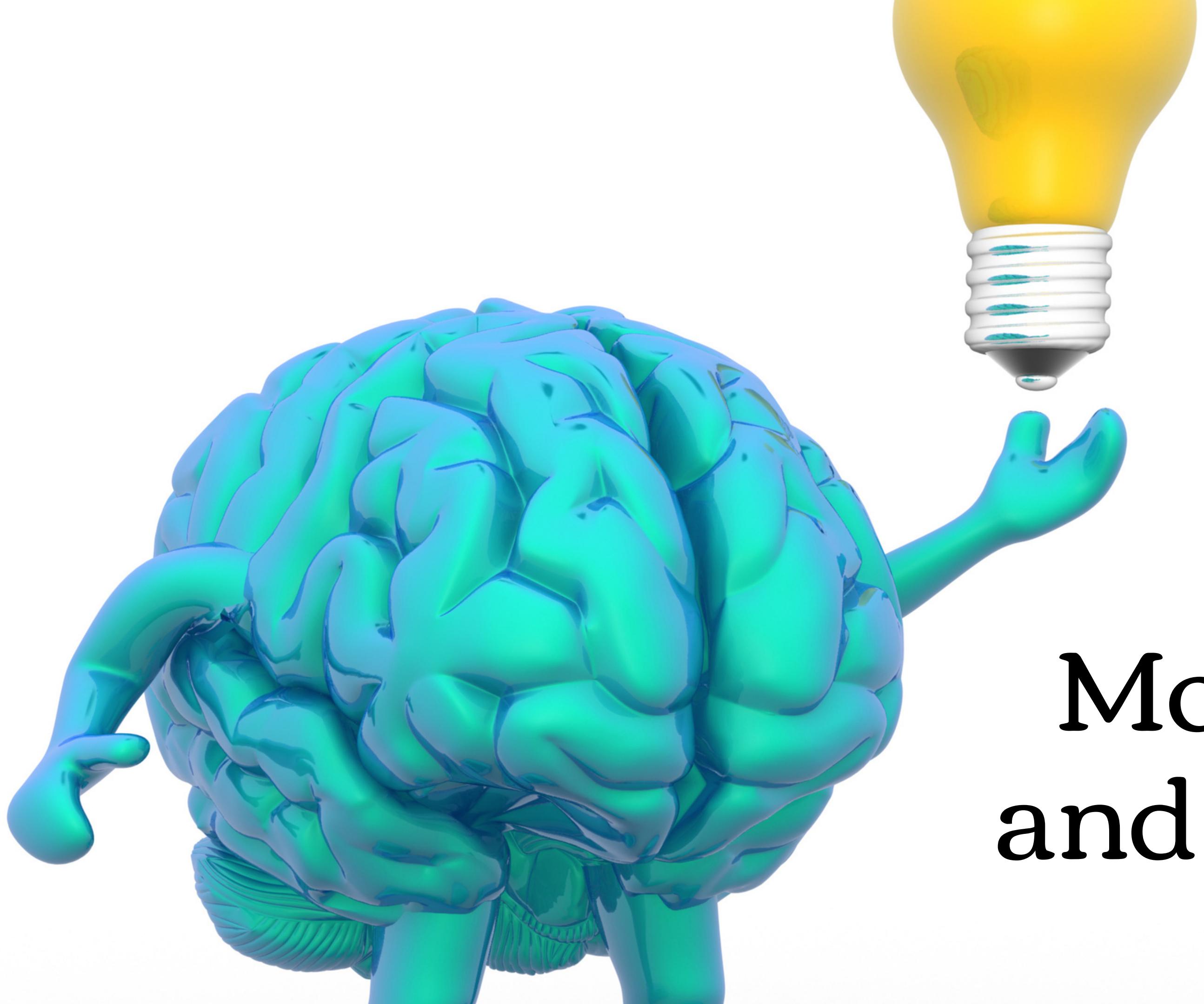
# Exploratory Analysis

# Correlation Heat Map



# Care Option and Work Interfere





**Modeling  
and Results**

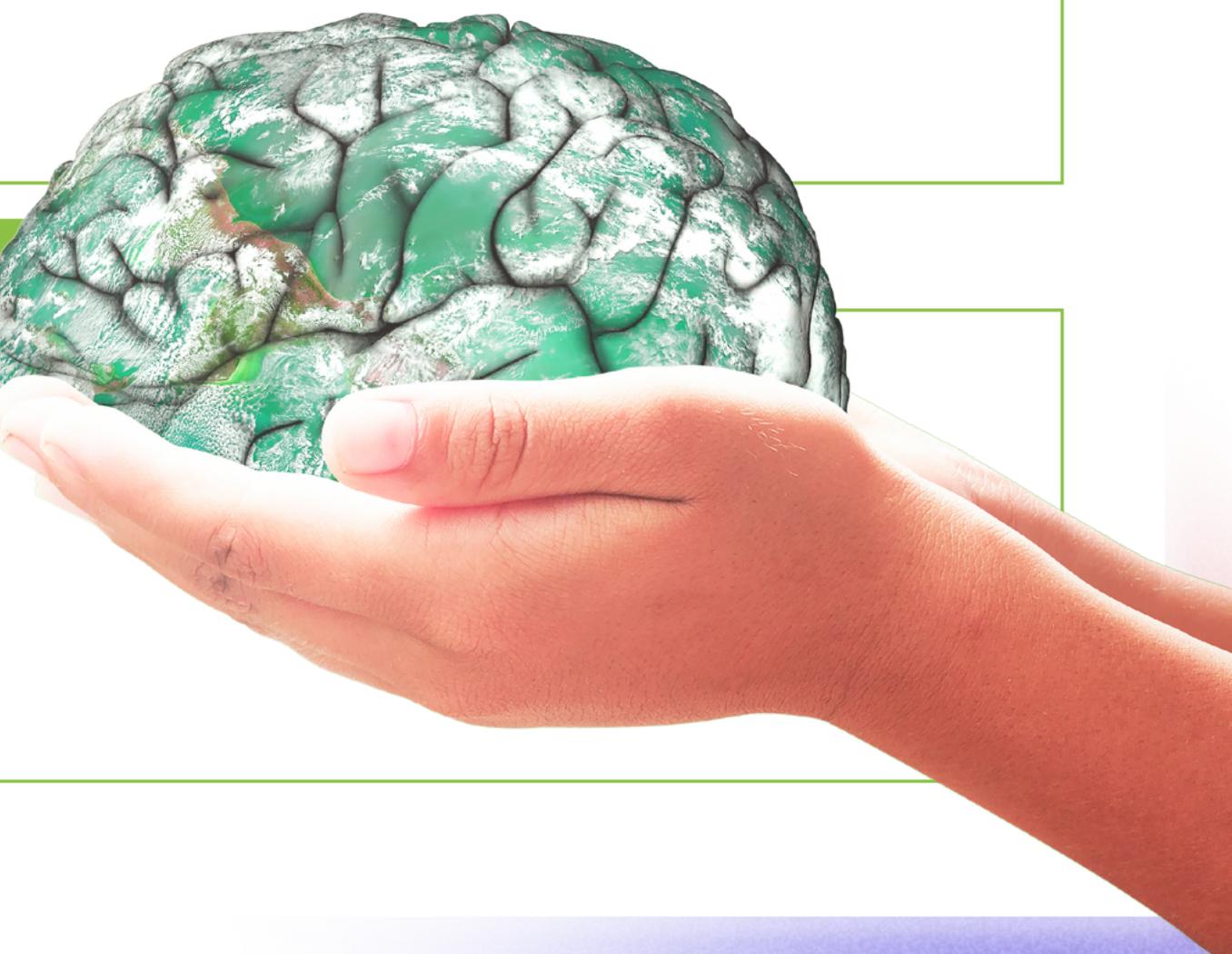
# MODELING

## Models:

- Logistic regression
- Random Forest
- KNN
- XGBoost

## Software

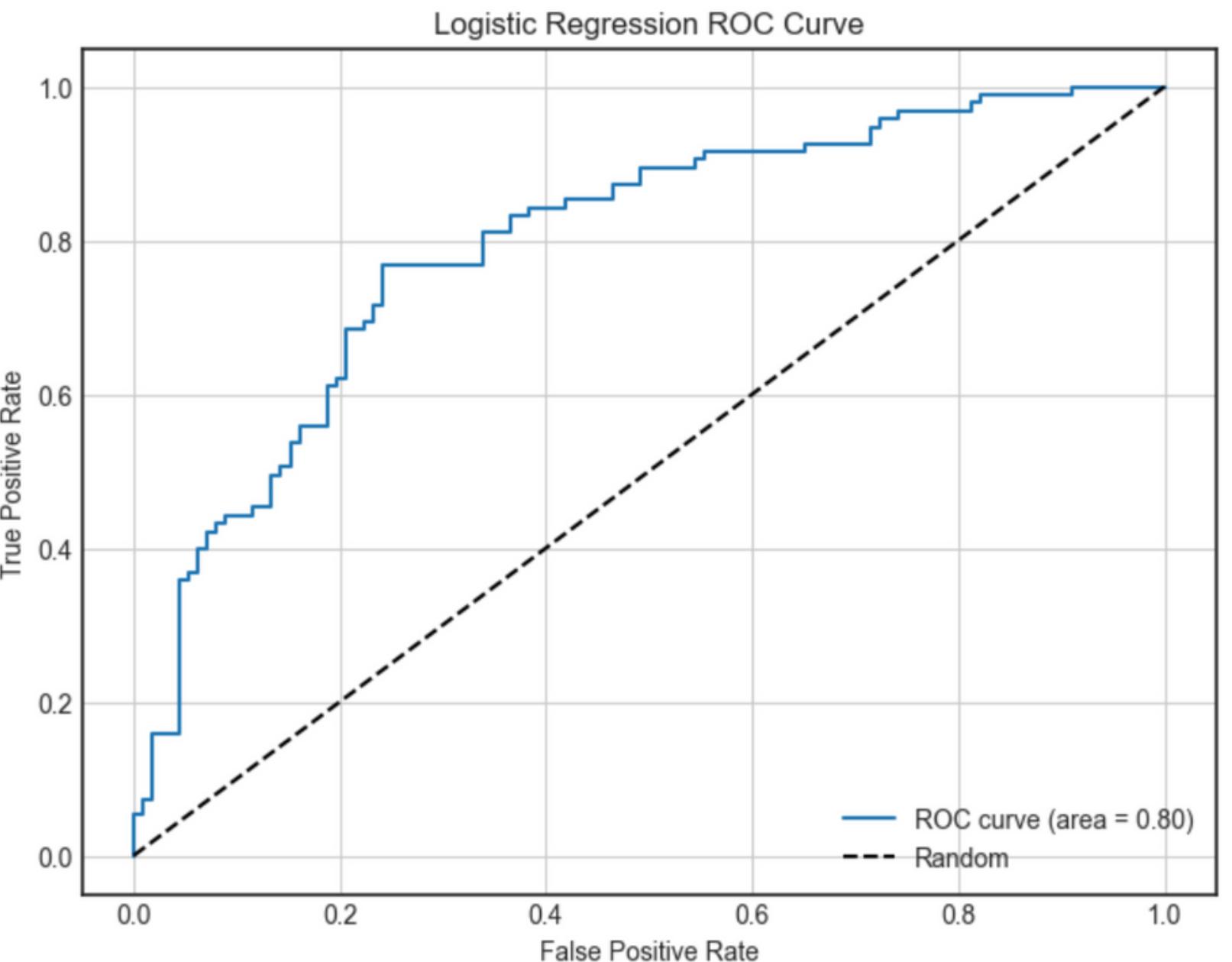
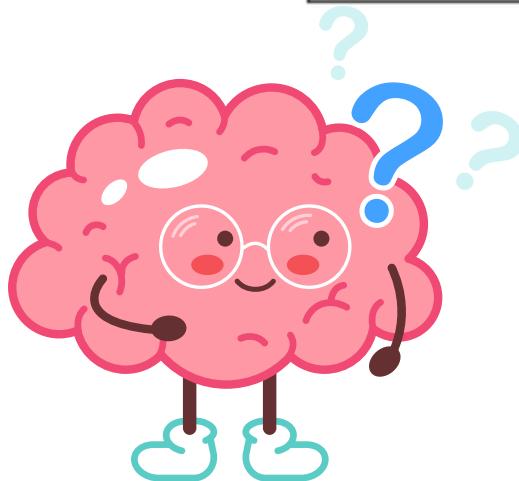
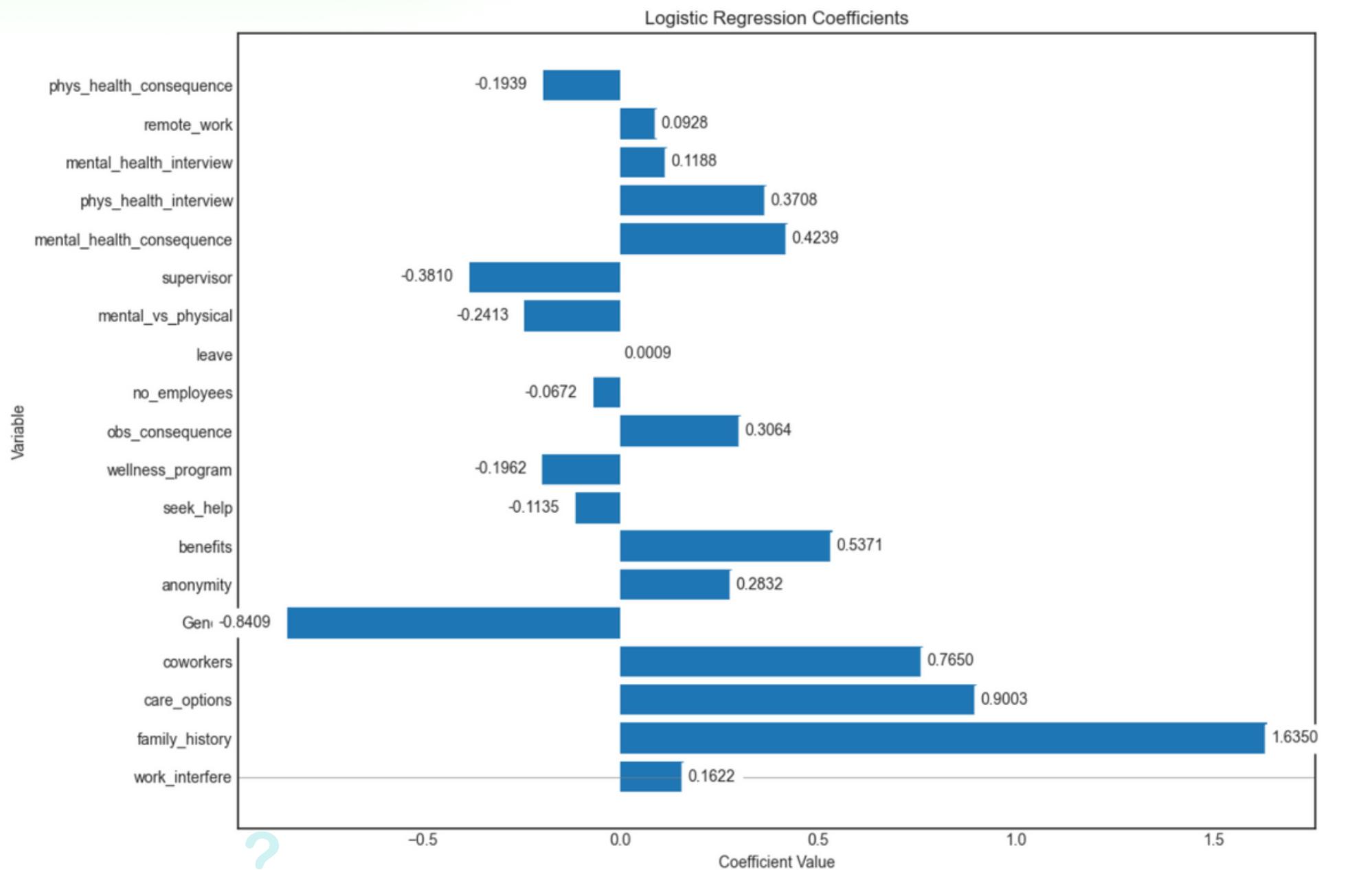
- Python
- R studio
- MS Excel: for data handling and sorting



# Model Accuracy

Model	Accuracy	Error Rate	Sensitivity	Specificity	F1-score
<b>Logistic Regression</b>	72.95%	27.05%	78%	75%	0.72
<b>KNN</b>	81.64%	18.35%	86%	77.6%	0.81
<b>RANDOM FOREST</b>	79.7%	16.42%	90%	77.6	0.83
<b>XGboost</b>	85.9%	14%	91.5%	81%	0.85

# Logistic Regression



# Conclusion

**Employees more likely to seek treatment if**

- They have a history of mental health illness in their family
- They are aware of the mental health care options provided by the employers
- They are willing to discuss mental health issues with a coworker
- Their identity is protected if they choose to seek treatment
- Their employers are providing mental health benefits
- They have observed negative consequences for coworkers with mental health conditions in their workplace
- It is easier to take leave for a mental health condition

**Employees less likely to seek treatment if**

- Their employer provide them with resources to learn more about mental health issues and how to seek help
- Their employer discussed mental health as part of an employee wellness program
- Think discussing a mental health issue with their employer would have negative consequences
- The employees are male
- They are part of smaller size companies (1-1000 employees)
- When they feel that their employer takes mental health as seriously as physical health

## PRACTICAL IMPLICATIONS

### Targeted resources and support:

- For employees with a family history of mental health illness, such as offering **counseling services or support groups**.



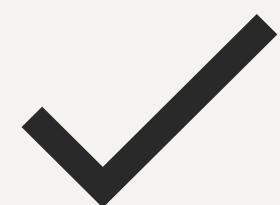
### Employers can focus on improving visibility and accessibility:

- **Regular communication channels:** emails, intranet portals, or posters in common areas.
- Employers can also **conduct training sessions or workshops** to educate employees about the benefits of seeking mental health care and how to access available resources.



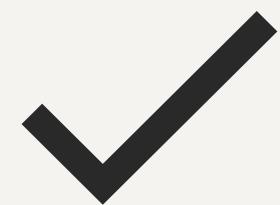
### Hiring an **on-site psychologist or mental health professional**:

- Available on-site or through telehealth services for employees to seek confidential and non-disclosed mental health support.



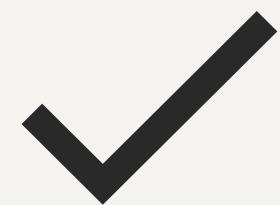
### Creating tailored wellness benefits for male employees:

- Design wellness programs that specifically cater to the unique needs of male employees.
- Offering **workshops or seminars** on topics such as stress management, work-life balance, and communication skills

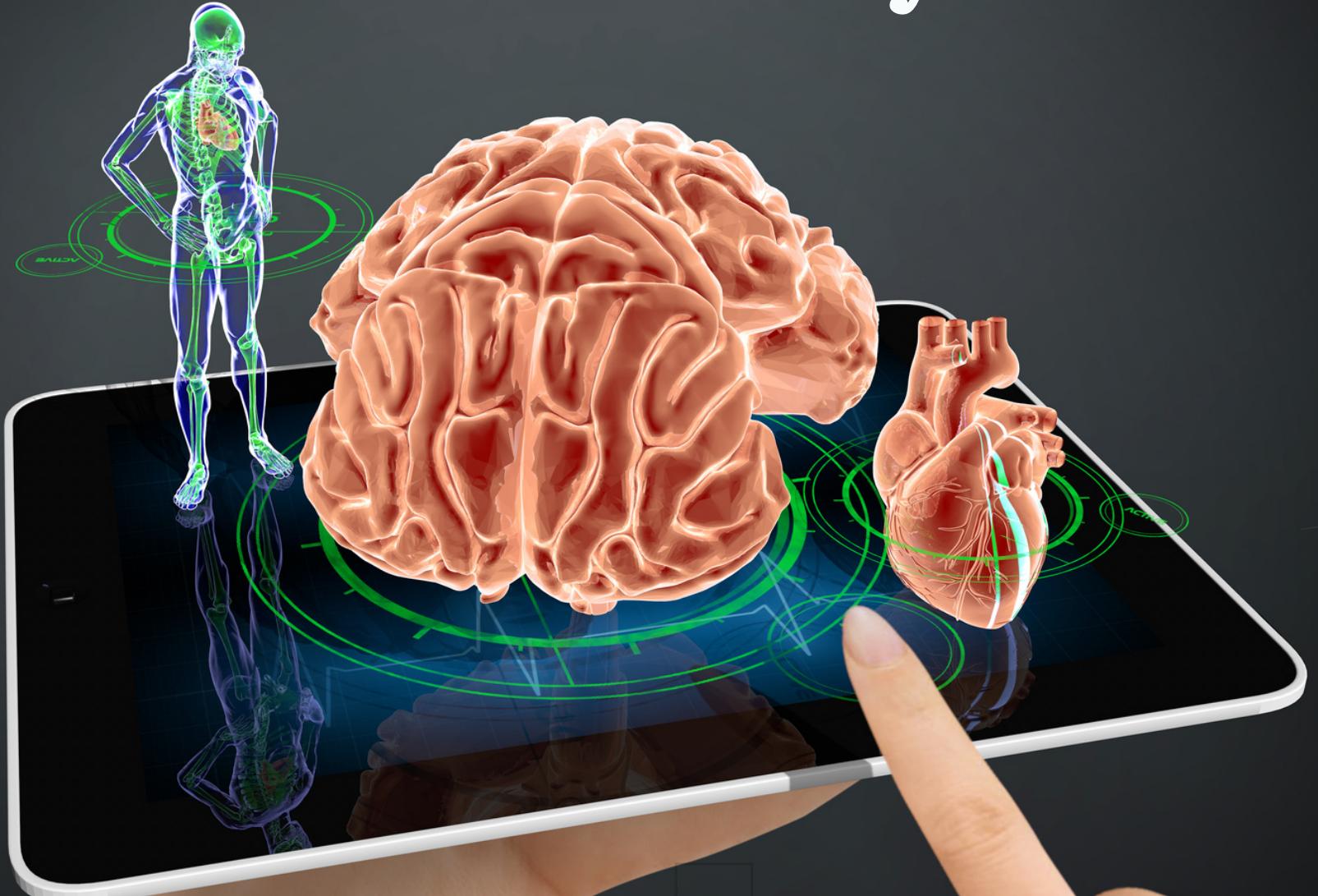


### Providing mental health training for managers and leaders:

- **Training programs for managers and leaders** on how to recognize and address mental health issues in the workplace.



# Limitations of the study



**Limited number of sample size**



**No restrictions in the survey form which led to null values**



**The dataset is old which limits the present relevancy**



**More than 50% were male in the dataset which is also a limitation in the tech industry**



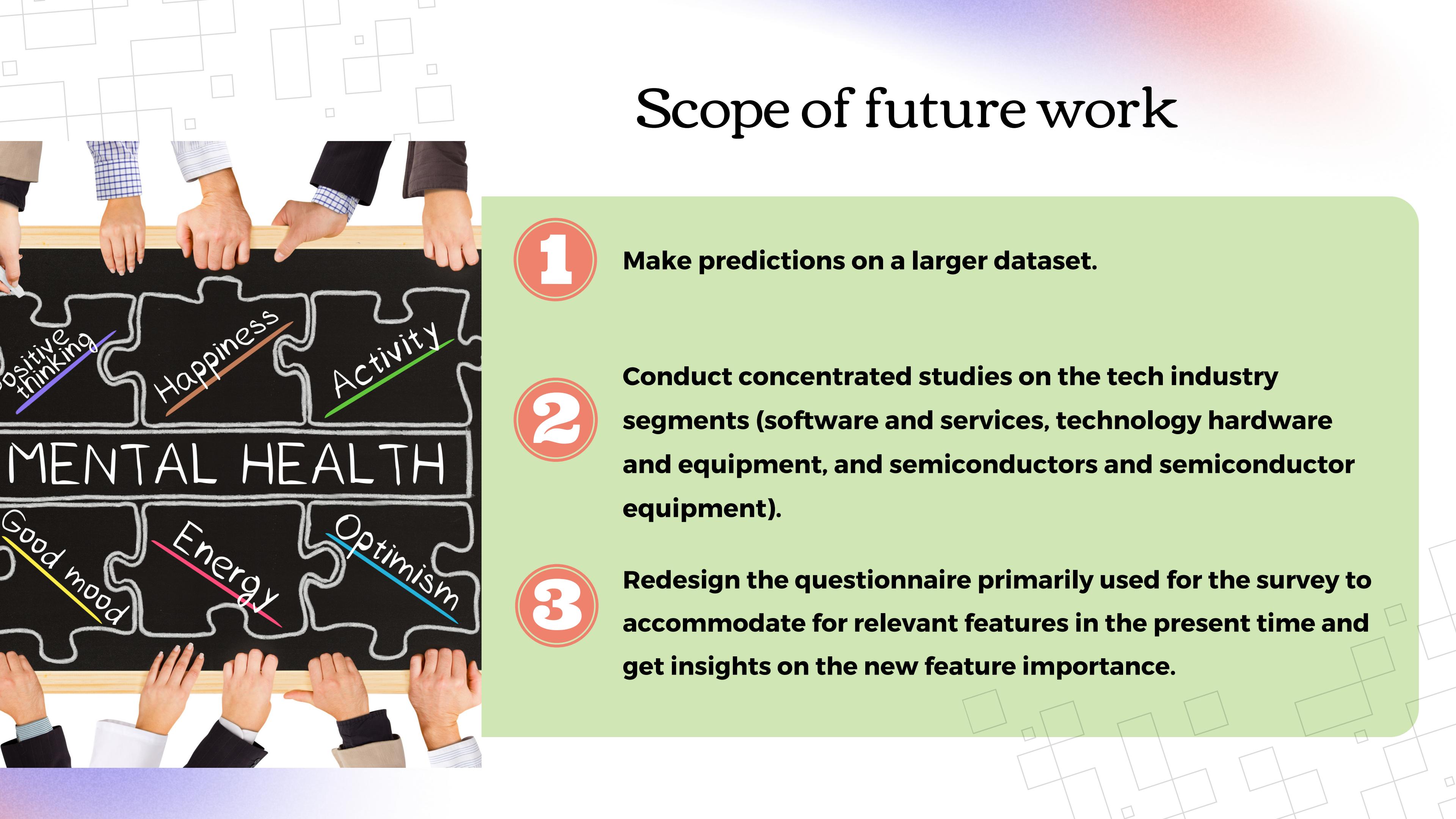
**Stigma and underreporting**



**Selection bias**



**Cross-cultural differences**



# Scope of future work

- 1 **Make predictions on a larger dataset.**
- 2 **Conduct concentrated studies on the tech industry segments (software and services, technology hardware and equipment, and semiconductors and semiconductor equipment).**
- 3 **Redesign the questionnaire primarily used for the survey to accommodate for relevant features in the present time and get insights on the new feature importance.**

# **THANK YOU!**

