Assessing the Effectiveness of Screening Tools in Detecting At-Risk Mental Health Patients

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Background

- Patients leaving emergency care are at **risk** for mental health issues
- Emotional impacts **increase** the risk for mental health issues during recovery
- Screening tools often **miss** cultural differences such as
  - Identity
  - Language
  - Stigma related to certain words
  - Understanding the weight of certain questions

Problem Statement

- Aim to investigate how socioeconomic factors **influence** the **examination results** across different categories and identities
- Understand the prevalence of cases related to:
  - Socioeconomic background
  - Race/Ethnicity
  - Language
  - Gender

Introduction to Our Data

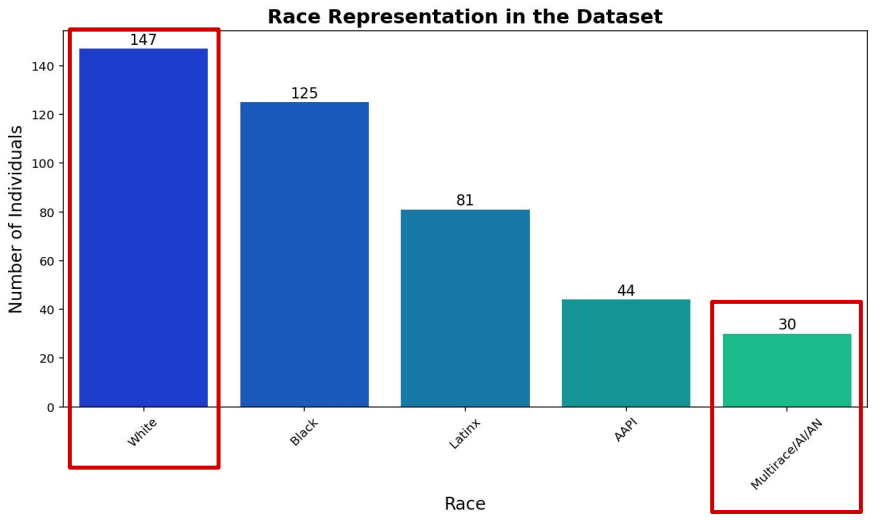
- The Hospital Mental Health Risk Screen Data (HMHRS)
- They used their **own** personalized screening process
- Most of this data was collected using self-reported methods:
  - Mail
  - Onsite Questionnaires
  - Paper-and-pencil interviews
- Some data was left unfilled (blank)

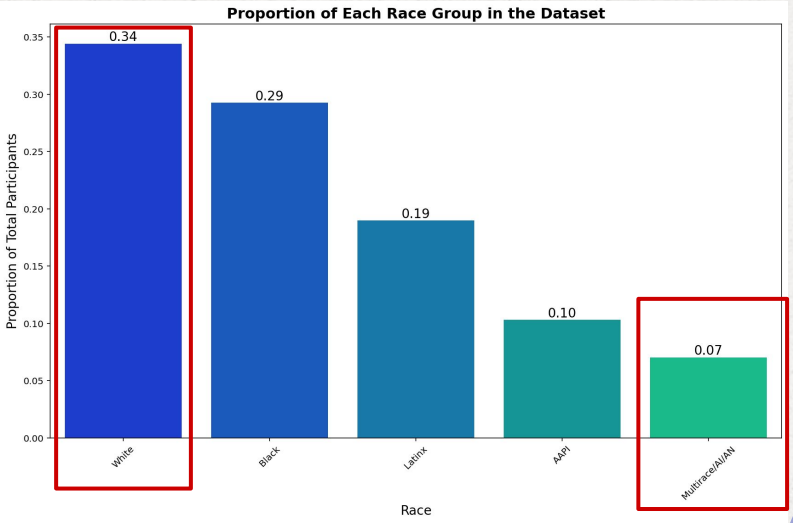
Data Science Approaches

- **Bar Chart** → Helps identify the distribution of different ethnic groups and genders
- **Line Chart** → Allows us to compare the highest and lowest points in our data
- **Linear Regression Graph(s)** → Shows a relationship between a specific mental health symptom and the person's socioeconomic status

Results

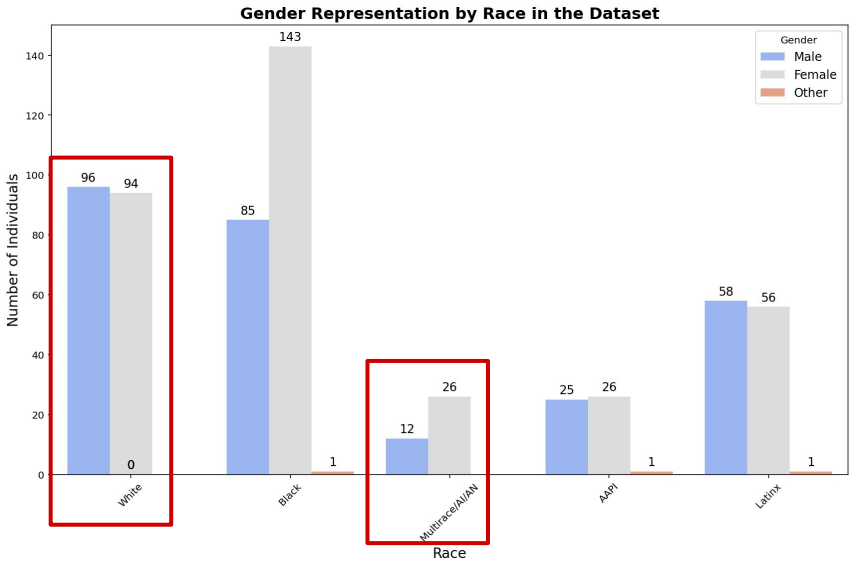
Which Race Was The Most and Least Represented in The Dataset?

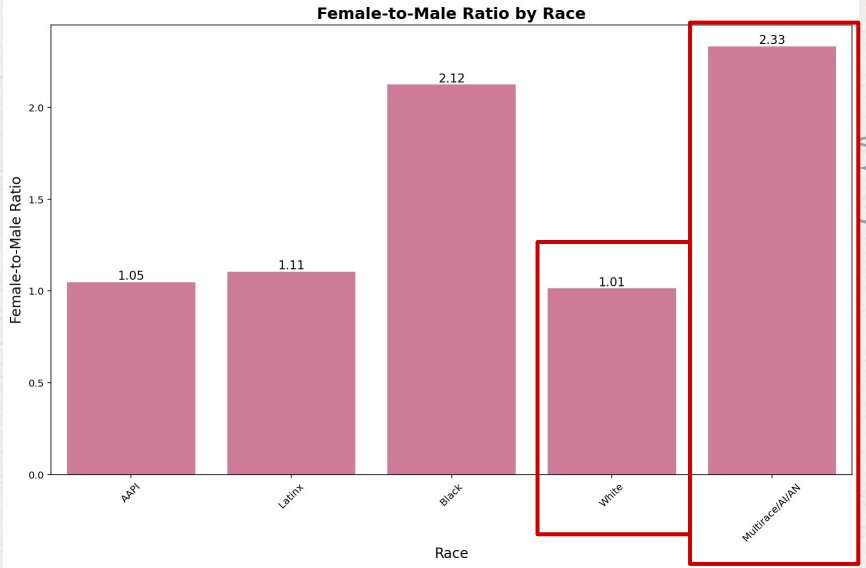




- “White” Race had the **highest** representation of **34%**
- “Multirace/AI/AN” Race had the **lowest** representation of **7%**

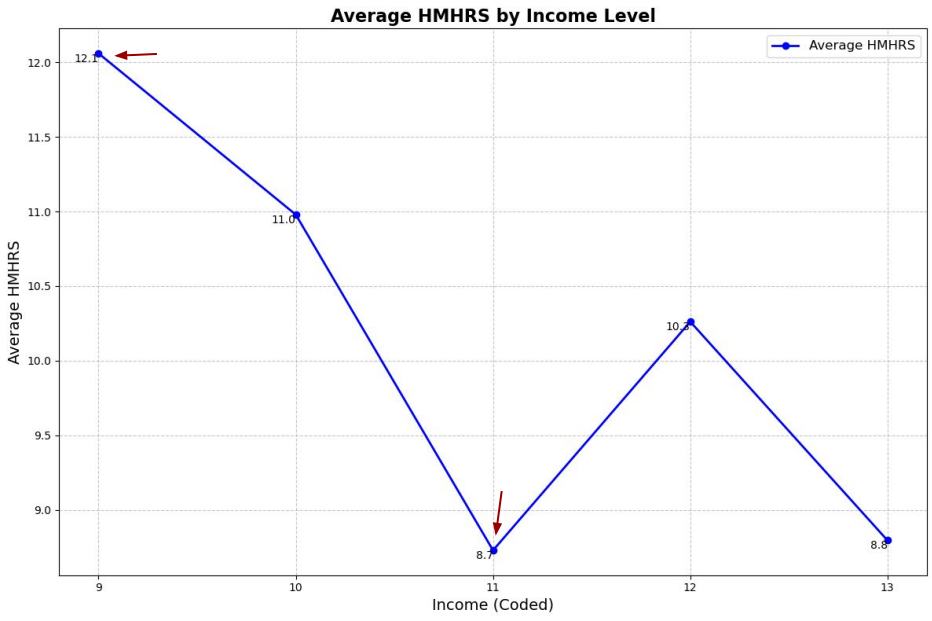
Which Race Had The Most and Least Male/Representation in The Exam?





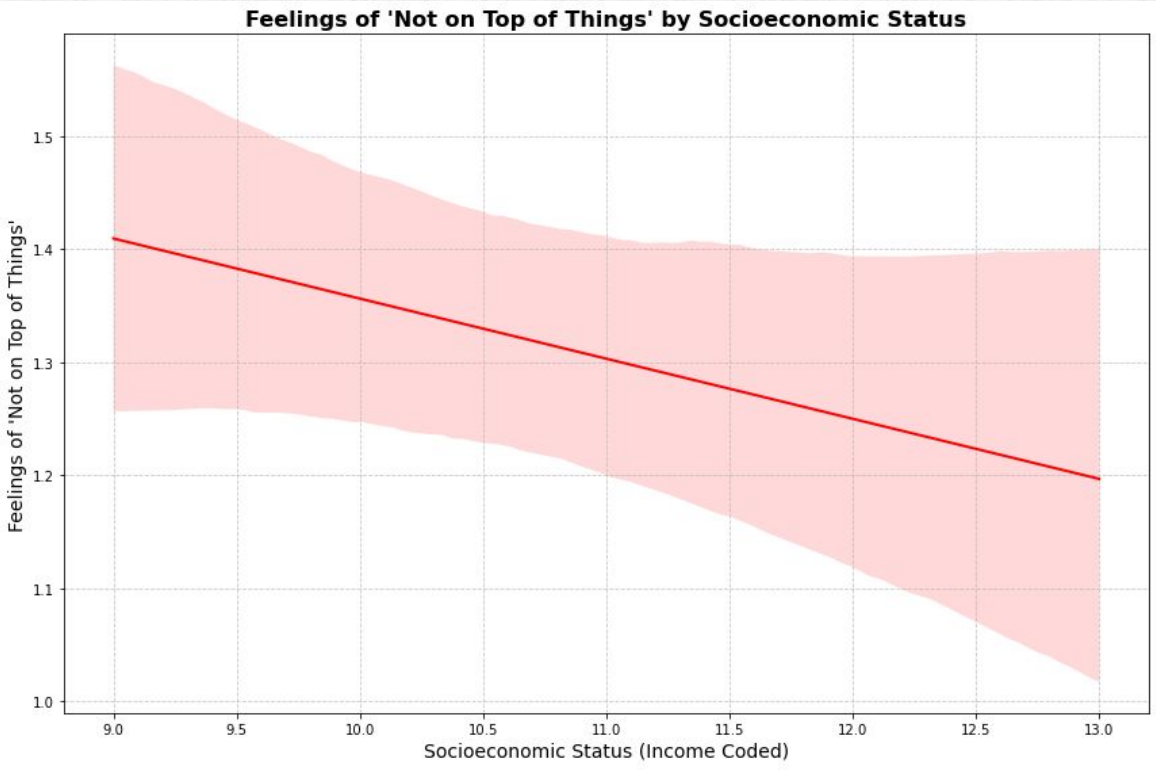
- **Largest** gender disparity was among those who identifies as “Multirace/AI/AN” with a **2.33:1** ratio
- **Lowest** gender difference was among those who identified as “White” with a **1.01:1** ratio

How Can Income Play a Factor in Test Participation/Performance?

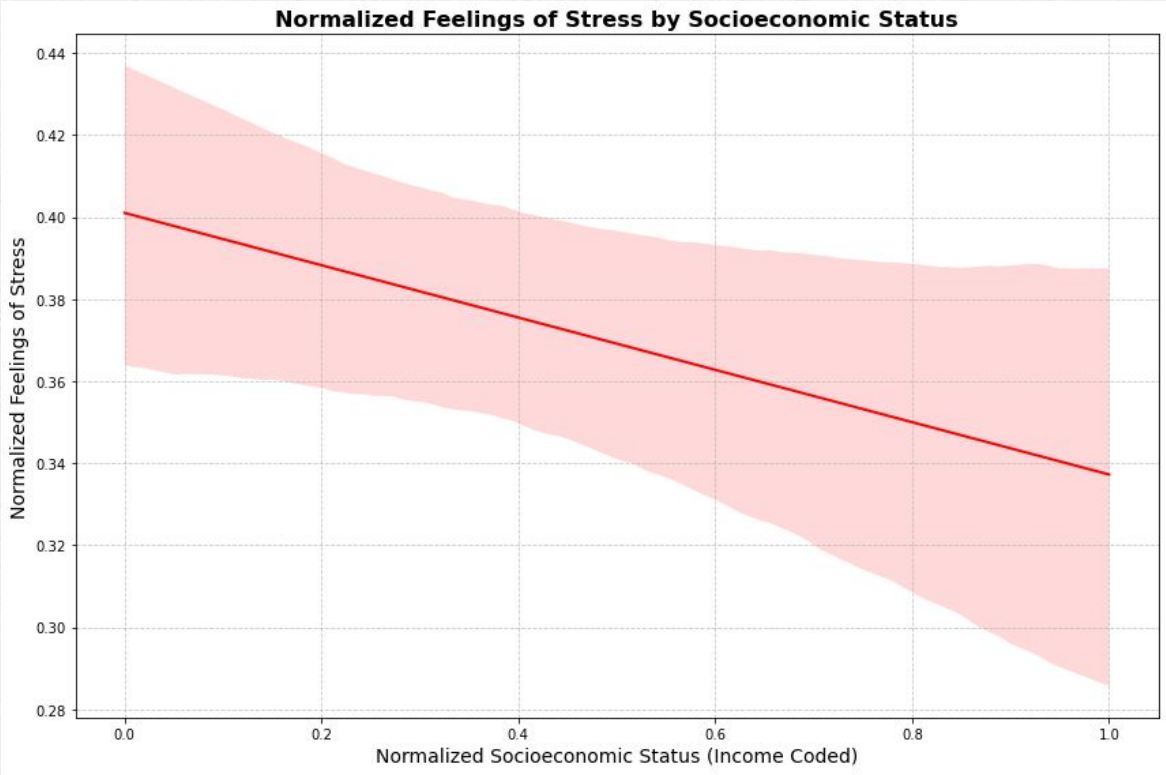


- **Lowest** income group (<$25,000) has **highest** HMHRS Score, **12.1**
- **Middle-income** group ($50,000-$74,999) scores **8.7**, has the **lowest** HMHRS Score
- Scores **decrease** as income rises to $74,999, **increase** up to $99,999, then **fall again** above $100,000.
- Mental health risks **do not** align linearly with income, reflecting **complicated** socio-economic interactions.

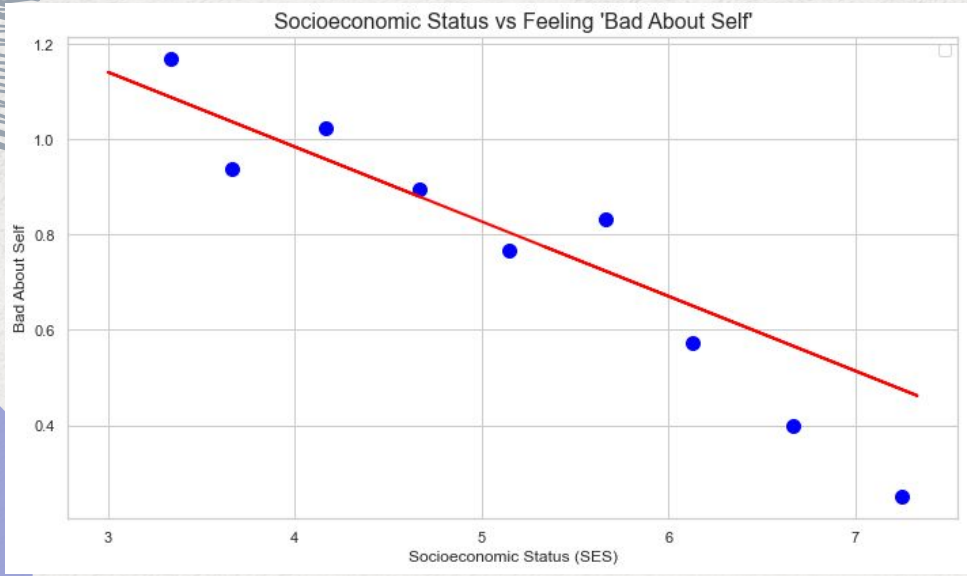
How Does the Feeling of “Not Being on Top of Things” Vary by Socioeconomic Status?



How Does the Feeling of “Stressed” Vary by Socioeconomic Status?



How Does the Feeling of “Bad About Self” Vary by Socioeconomic Status?



- A **negative** relationship between Socioeconomic Status (SES) and the feeling of "Bad About Self."
- **Higher** SES (income, education, work status) is associated with lower feelings of being "Bad About Self."
- Individuals with **better** economic resources and educational background tend to have higher self-esteem.
- Implication: Addressing **socioeconomic inequalities** could significantly improve mental health outcomes and self-esteem for disadvantaged groups.

Similarities in Regression Plots

- **Downward Slopes** → All three feelings; "Not on Top of Things," "Stressed," and "Bad About Self" showed higher SES leads to fewer negative emotions.
- **SES Impact** → Improvements in income, education, and work status consistently reduce feelings of stress, overwhelm, and low self-esteem.
- **Consistent Trends** → The negative correlation holds across all three emotions, suggesting a similar effect of SES on mental health.
- **Better Mental Health with Higher SES** → The data implies that improving socioeconomic conditions can reduce psychological distress.

Conclusion

- The data set used was **diverse** and encompassed individuals from various **ethnic** and **socioeconomic** backgrounds.
- From our analysis, we identified a couple patterns among our data:
    - Most people from **higher socioeconomic** backgrounds do not tend to have high mental health scores
    - More **gender representation** is needed within racial groups, especially for those who identify as **Multiracial/AI/AN** and **Black**
    - Individuals from **lower socioeconomic** backgrounds tend to report lower self-esteem, higher stress, and more mental health symptoms and scores
- The limitation of this data was that the sample size was small and a sizable amount of people who filled out the survey did not do a follow up.

Futurework

After our projects results we hope to…

- **Analyze Additional Factors** → Study the impacts of education, marital status, and other types of feelings within HMHRS scores

- **Analyze A Different Dataset** → A dataset with a larger quantity of participants, equality diverse within ethnicity, economic, and gender

- **Create Our Own Survey to Analyze** → If there is no dataset that meets our needs for analyzation, we can start partnering with local mental health organizations and community outreach

Citations

Carlson EB. Performance replication of the Hospital Mental Health Risk Screen in 631 U.S. patients admitted through emergency care, 2021-2023. *Openicpsrorg*. Published online October 1, 2024. doi:https://doi.org/10.3886/E208549V1

Carlson EB, Barlow MR, Palmieri PA, et al. Performance replication of the Hospital Mental Health Risk Screen in ethnoracially diverse U.S. patients admitted through emergency care. *PloS one*. 2024;19(10). doi:https://doi.org/10.1371/journal.pone.0311256