

Mental Health Predictor

A Data-Driven Approach to Boost Mental Health
Outcomes and Build Trust in Support Systems

Summary

Attributes

Correlations analyze how lifestyle choices, social support, and socio-economic factors influence mental health outcomes.



Outcome

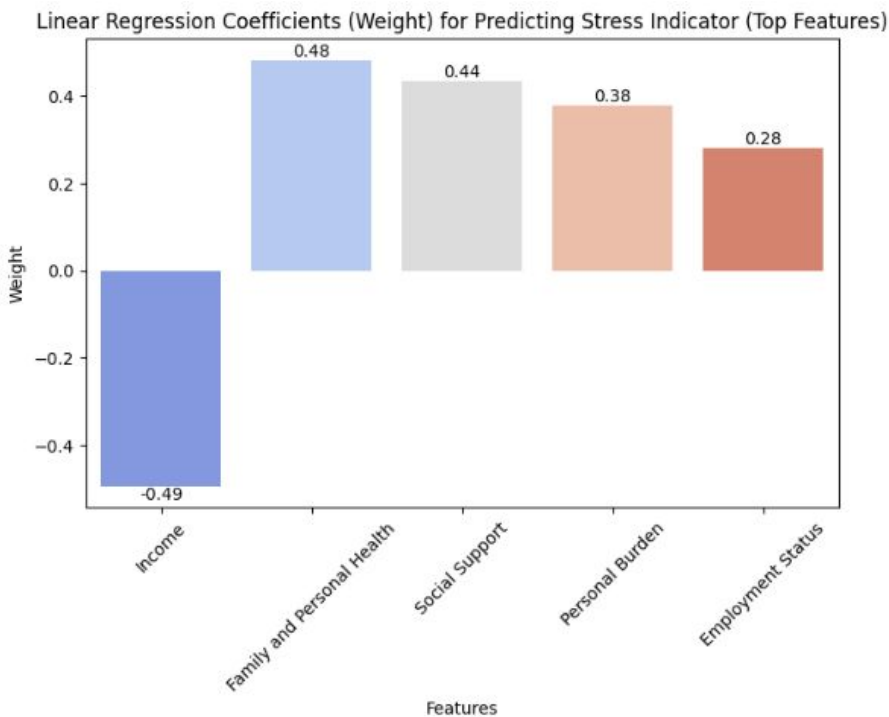
Our goal with clustering is to group individuals based on similar stress profiles to better understand the different stress experiences and tailor support accordingly.

Objective

Relationship between family burden, family health, social support and personal mental health, with a particular focus on understanding how these family-related stressors influence employees' workplace productivity and mental well-being.

The DataSet + Stress Indicator

Feature	Direction	Explanation
Income	Negative	Higher income is associated with lower stress levels.
Family and Personal Health	Positive	Higher family health burdens correlate with higher stress levels.
Social Support	Positive	Higher levels of social support are linked to increased stress levels.
Personal Burden	Positive	Higher personal burden is associated with higher stress levels.
Employment Status	Positive	Employed individuals tend to have slightly higher stress levels.



Motivation - Clusters

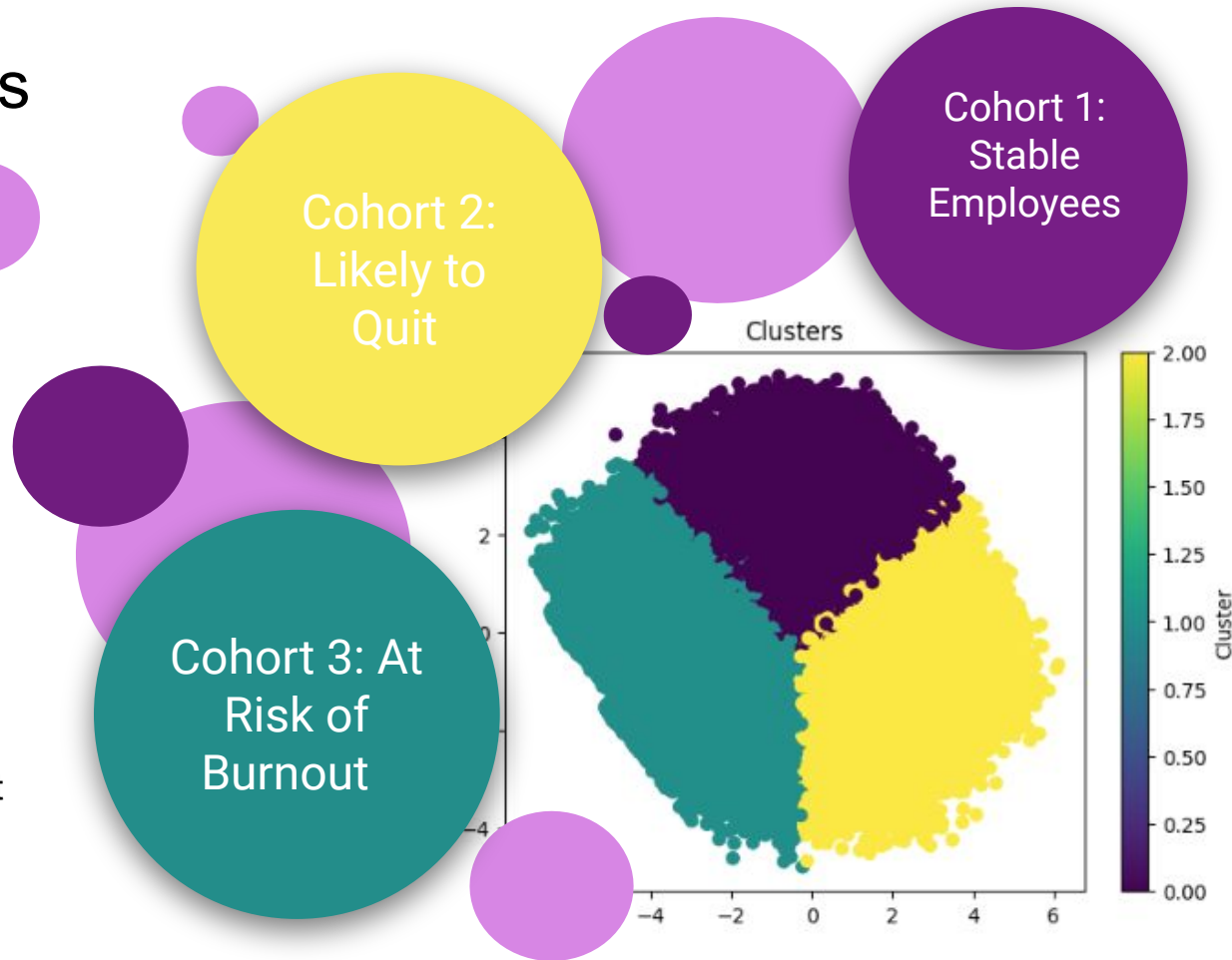
Work - Social Impact

Economic Impact:

Workplace Productivity Losses:

Depression accounts for approximately \$44 billion in losses to workplace productivity annually.

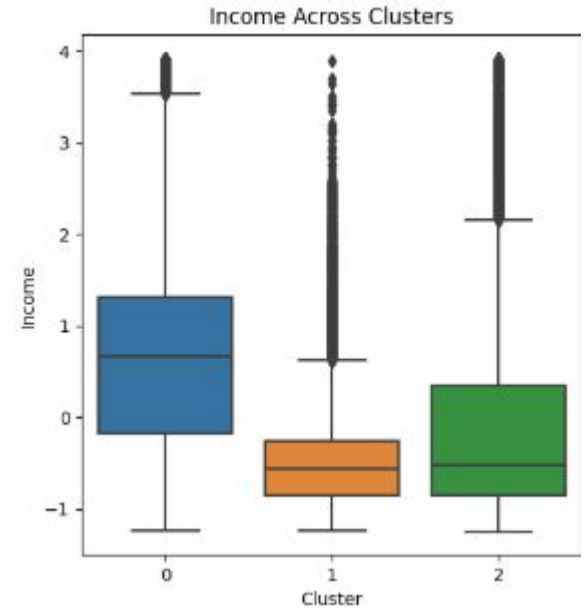
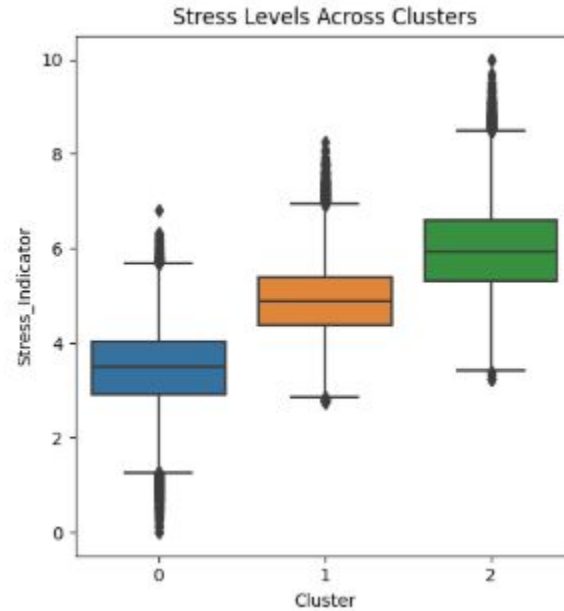
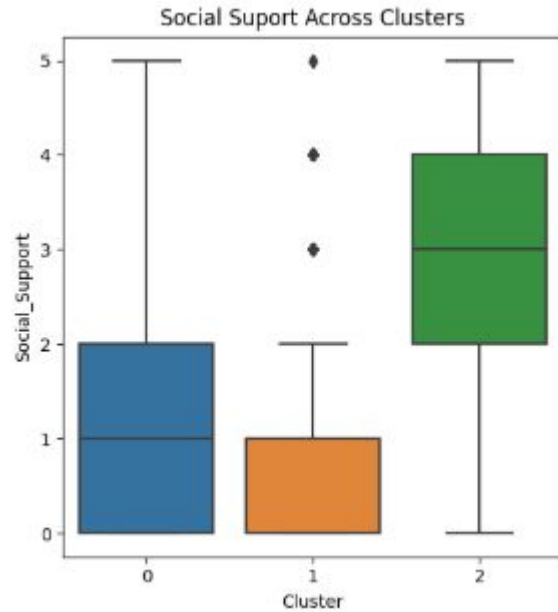
Comprehensive Treatment: Combining medication and therapy can lead to substantial expenses over time. For instance, a complete course of treatment involving 20-30 therapy sessions may cost between \$6,000 and \$15,000.



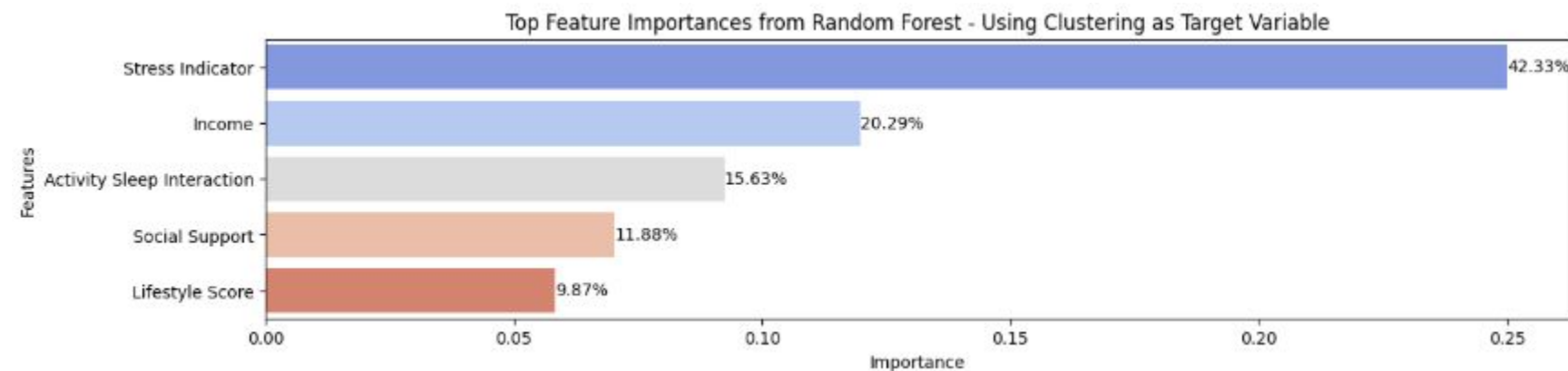
Cohort Analysis Summary

Cohort ID	Number of Employees	Key Characteristics & Actions
Cohort 1: Stable Employees	125,410	Low Stress, Moderate Activity, High Income: These employees experience low stress levels due to higher income and moderate personal burdens. To maintain their well-being and retain them: - Promote well-being through physical activity programs, wellness initiatives, and maintaining work-life balance. - Mentorship and peer support systems to continue fostering a sense of community and job satisfaction.
Cohort 2: Likely to Quit	161,413	High Stress, Low Income, Low Support: Employees in this cohort are likely experiencing high stress due to low income and low social support. To retain these employees, companies should focus on: - Financial wellness programs such as salary reviews, financial planning workshops, and employee assistance programs. - Mental health resources such as counseling services and stress management workshops. - Regular check-ins to ensure these employees feel supported and have access to necessary resources.
Cohort 3: At Risk of Burnout	126,945	High Stress, High Support, Moderate Income: This cohort faces stress due to significant personal burdens, even though they have strong social support. Actions for this group include: - Work-life balance initiatives, such as flexible working hours and remote work options. - Childcare and eldercare assistance to alleviate personal burdens. - Mental health and stress management programs to help manage stress and prevent burnout.

Key Features across Clusters



Feature Importance



Actionable Insights	Description
1. Wellness and Stress Management Programs	Implement programs focused on physical and mental well-being to reduce stress levels across all groups.
2. Flexible Work Arrangements	Offer flexible work options (e.g., remote work, flexible hours) to help employees manage stress and balance personal responsibilities.
3. Employee Support Systems	Build strong support networks through mentorship, counseling, and regular check-ins to ensure employees feel supported in all clusters.

Final Recommendations

- **Child Care Assistance:** Providing financial support for childcare or access to on-site childcare services.
- **Time Off for Family Events:** Offer time off for personal or family events, such as children's school activities, or the ability to take care of family emergencies without penalty.
- **Training and Education:** Providing opportunities for career advancement, such as funding for courses, certifications, or conferences.
- **Employee Assistance Programs (EAPs):** Offering counseling services for personal and family issues can help alleviate stress.
- **Financial Planning Assistance:** Offering financial literacy programs to help employees manage their finances better, particularly if they have a large family to support.
- **Flexible Sick Leave:** Offering more flexible or extended sick leave for employees who need time to care for sick family members.
- **Mental Health Days:** Allowing employees to take mental health days to recharge without needing to provide detailed reasons.

Real-Life Applications

By applying clustering techniques, we were able to predict which cohort an individual might belong. This powerful analysis allows companies to pinpoint the specific challenges different employee groups face, enabling them to implement tailored strategies that drive employee well-being, reduce turnover, and improve productivity. Our predictions directly match our analysis, demonstrating how actionable insights can be effectively used to support employees and create a more engaged workforce.

Income	Stress Indicator	Social Support	Family Personal Health	Personal Burden	Cohort 1	Cohort 2	Cohort 3	Predicted Cohort (Cluster)
-0.600	6.168	3	3	-3	0.3	0.70	0	Cohort 2: Likely to Quit
1.838	3.235	1	1	-2	1	0	0	Cohort 1: Stable Employees
-1.035	5.457	0	3	-2	0	0	1	Cohort 3: At Risk of Burnout

Conclusion

This analysis highlights how **different people stress levels** are **influenced by factors such as income, personal burden, social support, and family health**. By **grouping** people into distinct **clusters**, we identified patterns that can help target **interventions to reduce stress and improve overall well-being**.

The actionable insights, including wellness programs, flexible work arrangements, and improved support systems, can be applied across various employee groups to create a healthier, more productive workforce.

Recommendations for Future Analyses:

Unpaid Leave and Work-Life Balance: Including data on unpaid leave options and other employee benefits can help us understand how work-life balance initiatives affect stress levels. Companies can better assess if providing unpaid leave impacts stress management and overall employee satisfaction.

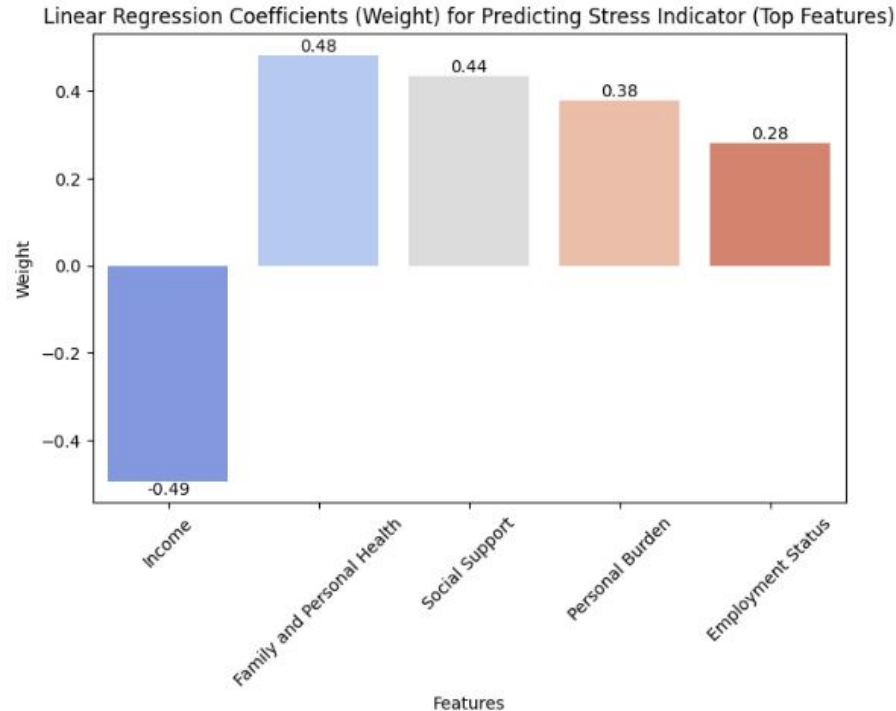
Geographical Data Analysis: Incorporating geographical data would allow us to explore how different locations influence stress levels. We could analyze factors like climate, population density, proximity to parks and recreational activities, and local socio-economic conditions. This would give us valuable insights into how geographic factors affect employee well-being and stress.

Stress Level Verification & Surveys: Integrating direct stress level verification, such as employee surveys or mental health assessments, could enhance the accuracy of our findings. Applied surveys can provide real-time feedback and allow companies to adjust wellness programs based on employees' actual stress levels and personal experiences.

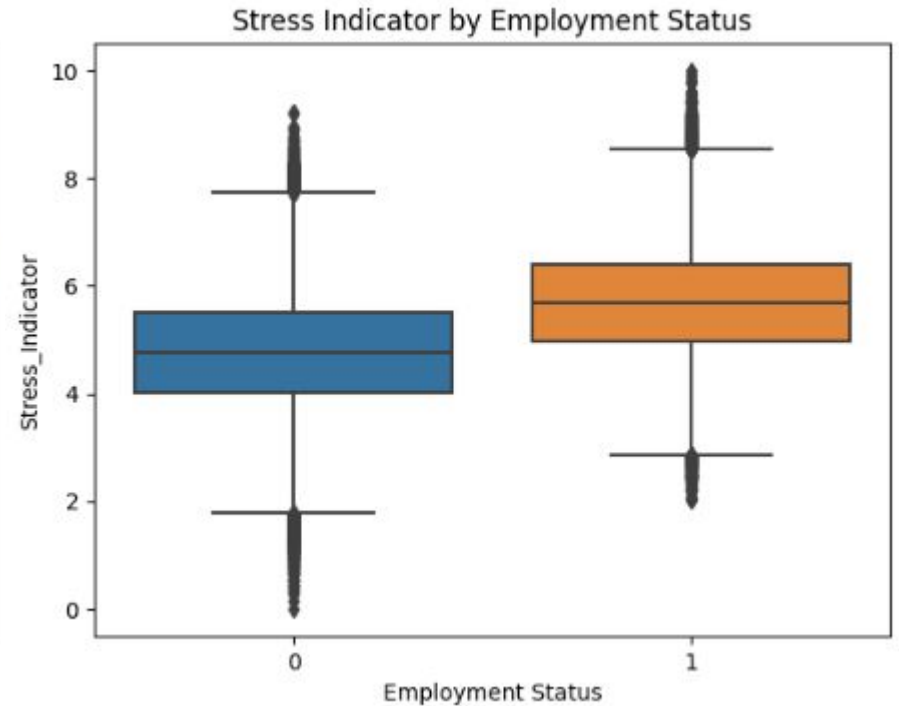
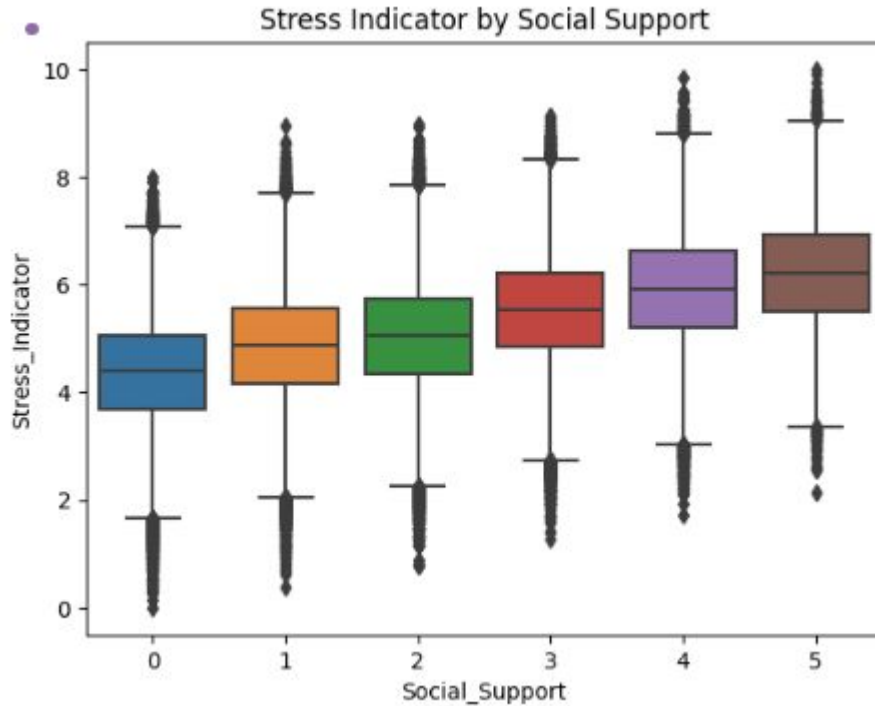
Thank you

Appendix

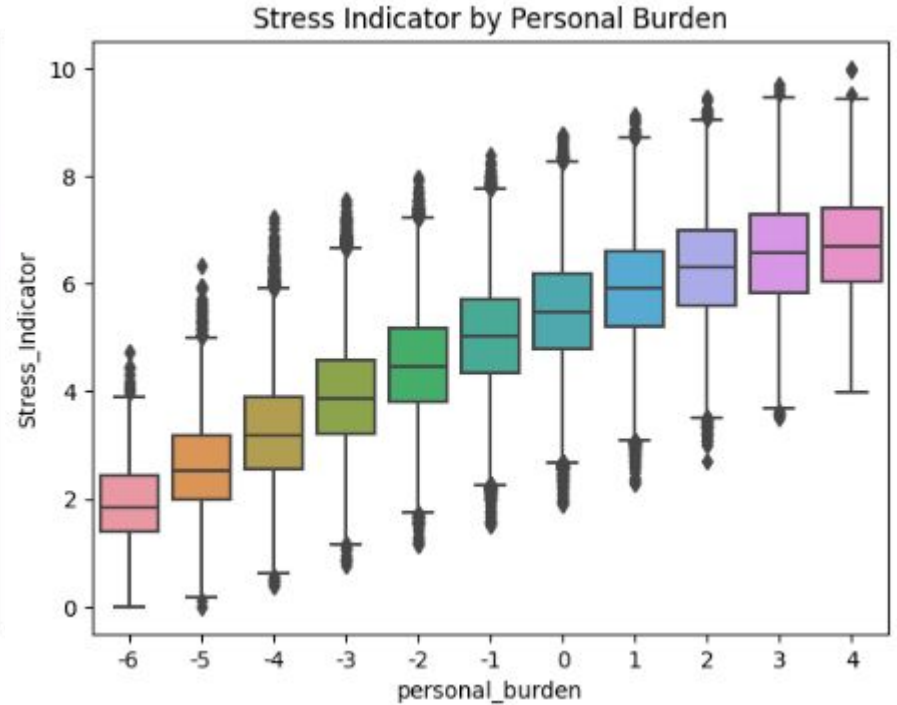
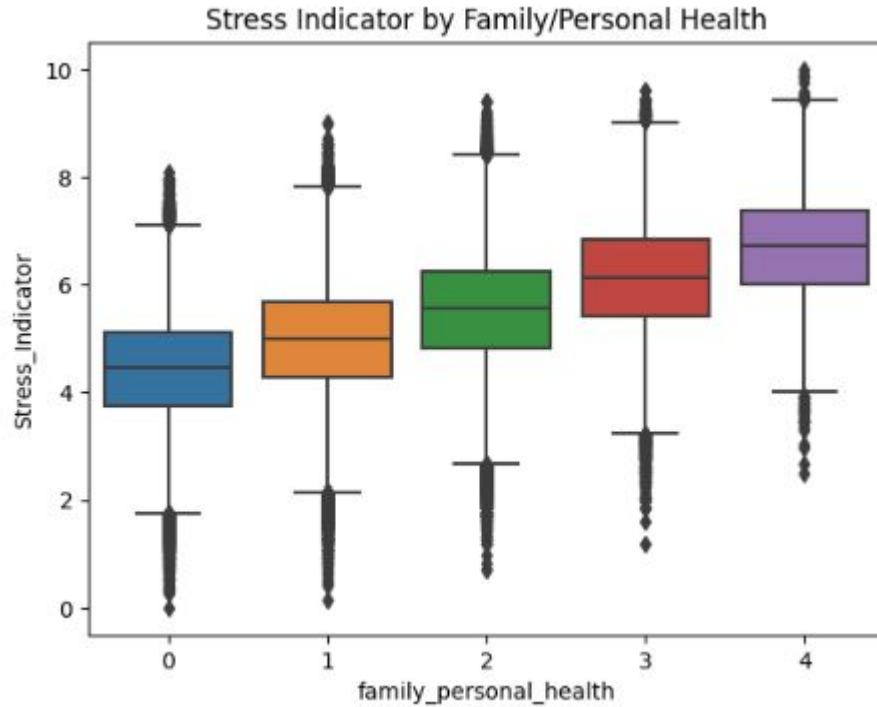
Linear Regression Coefficients (Weight) for Predicting Stress Indicator (Top Features)



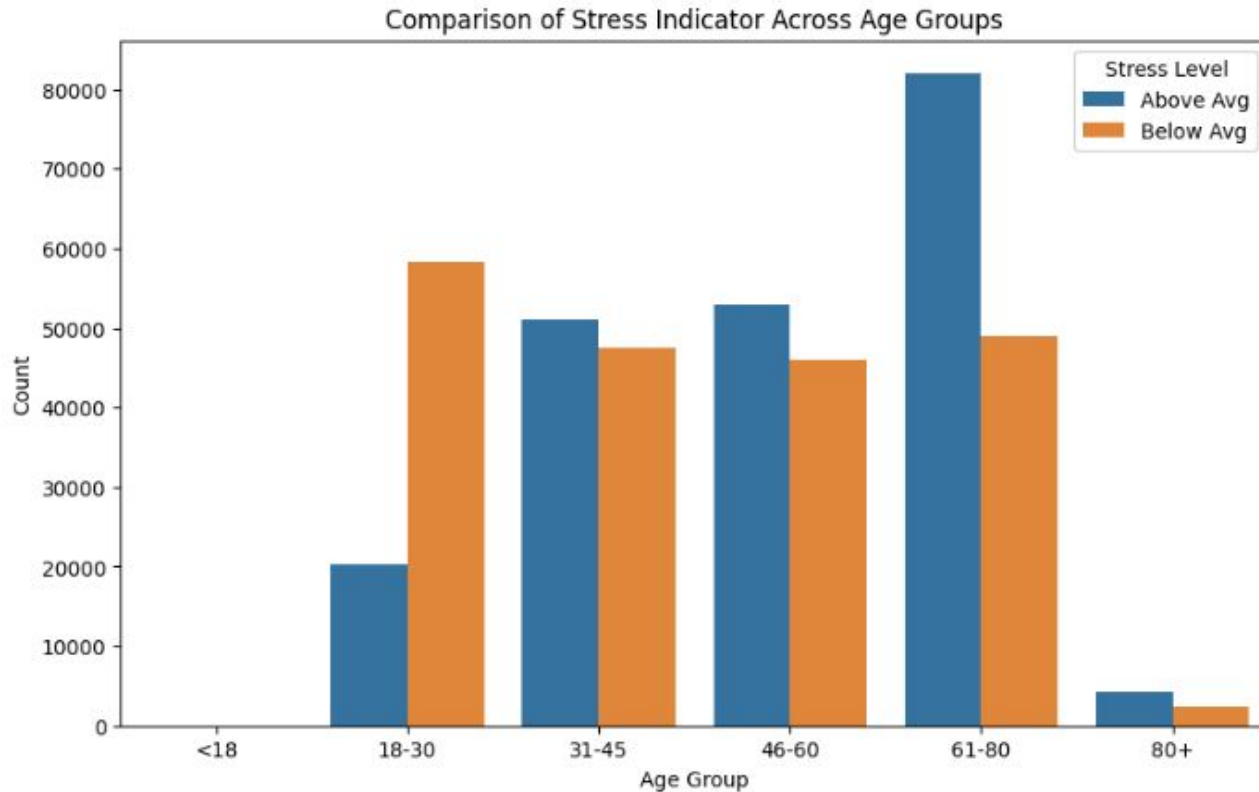
Stress Indicator by Social Support and Employment Status



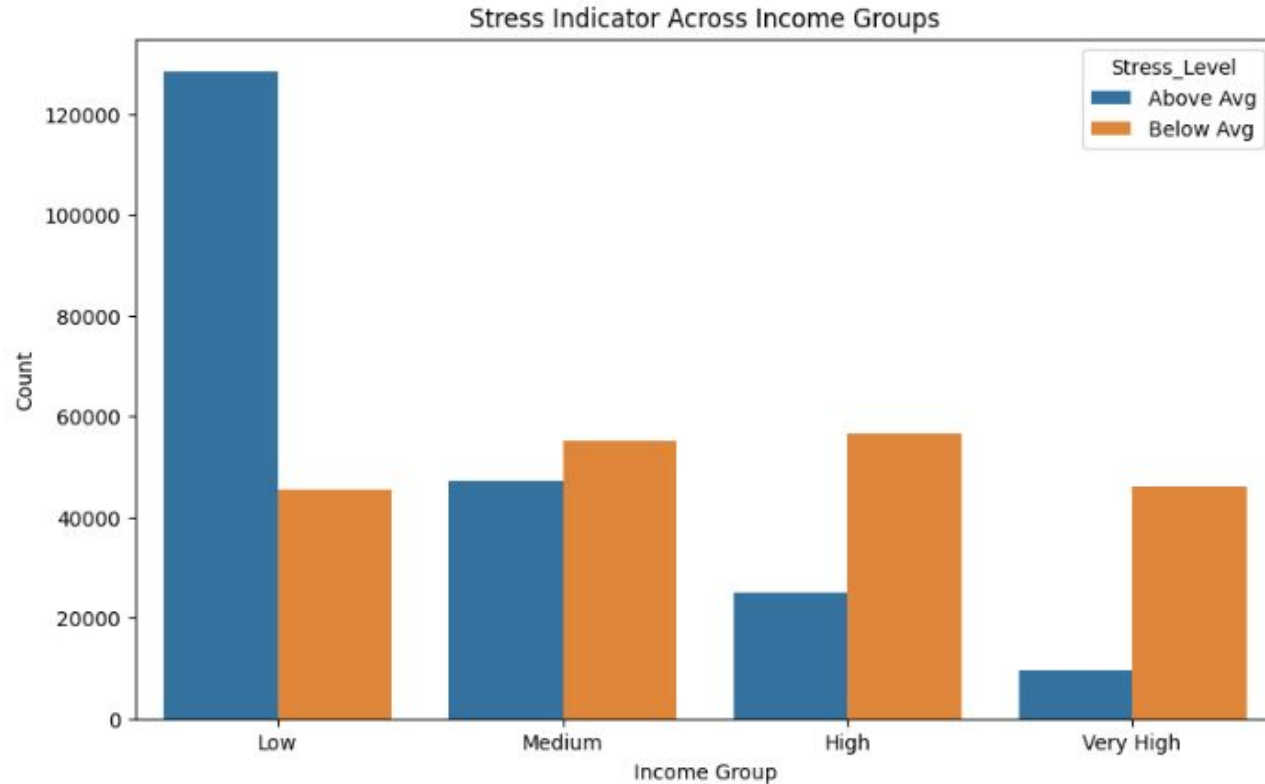
Stress Indicator by Family/Personal Health and Personal Burden



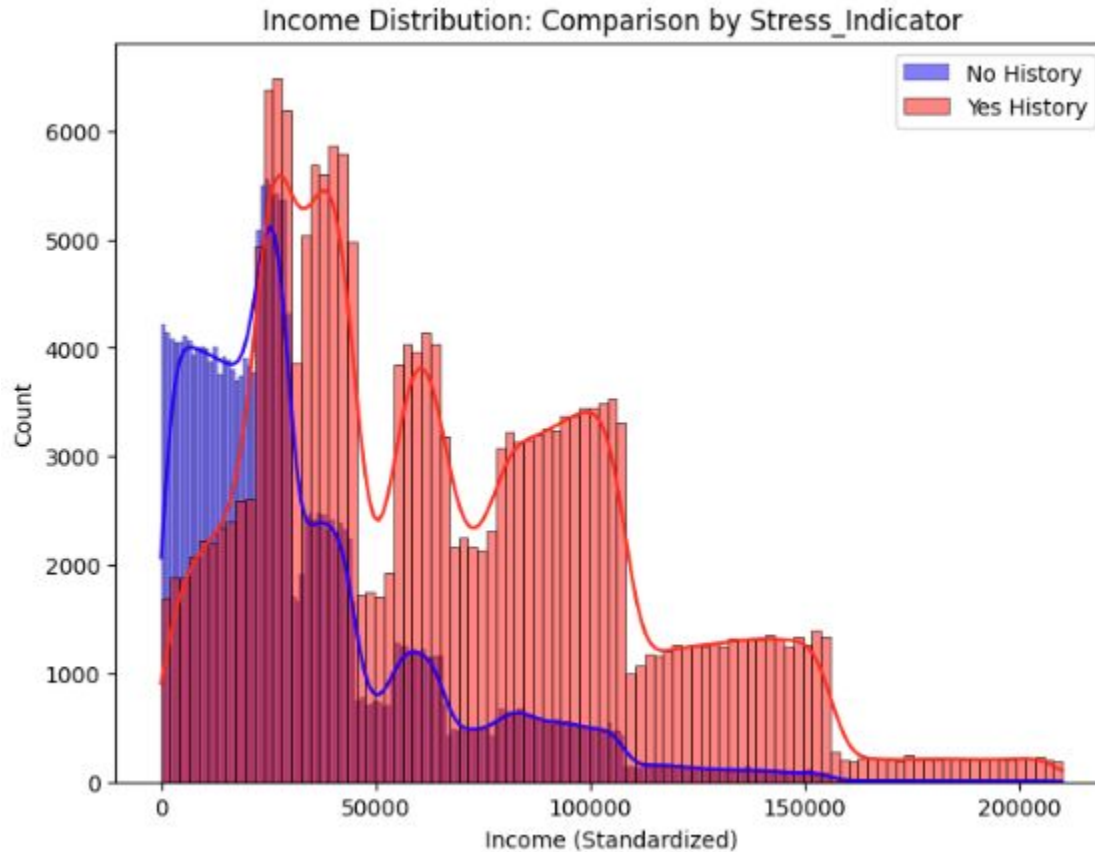
Comparison of Stress Indicator Across Age Groups



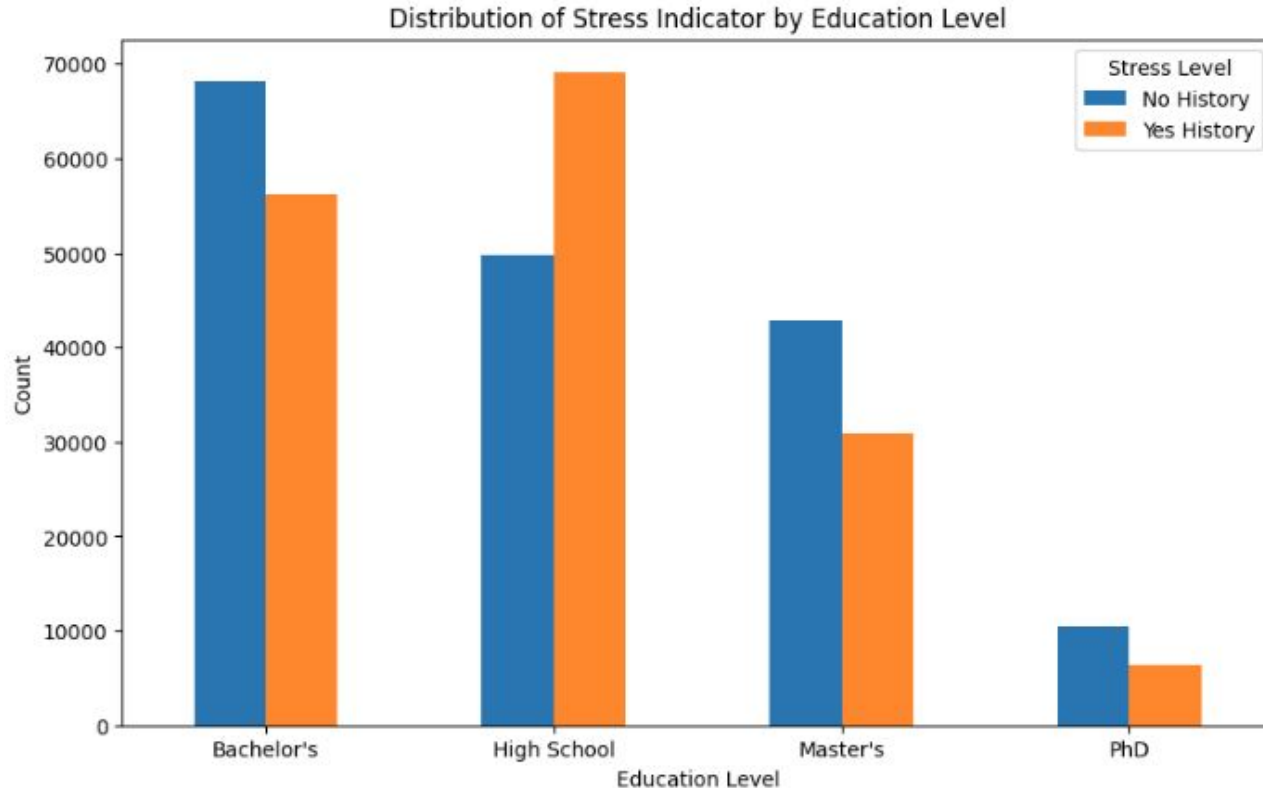
Stress Indicator Across Income Groups



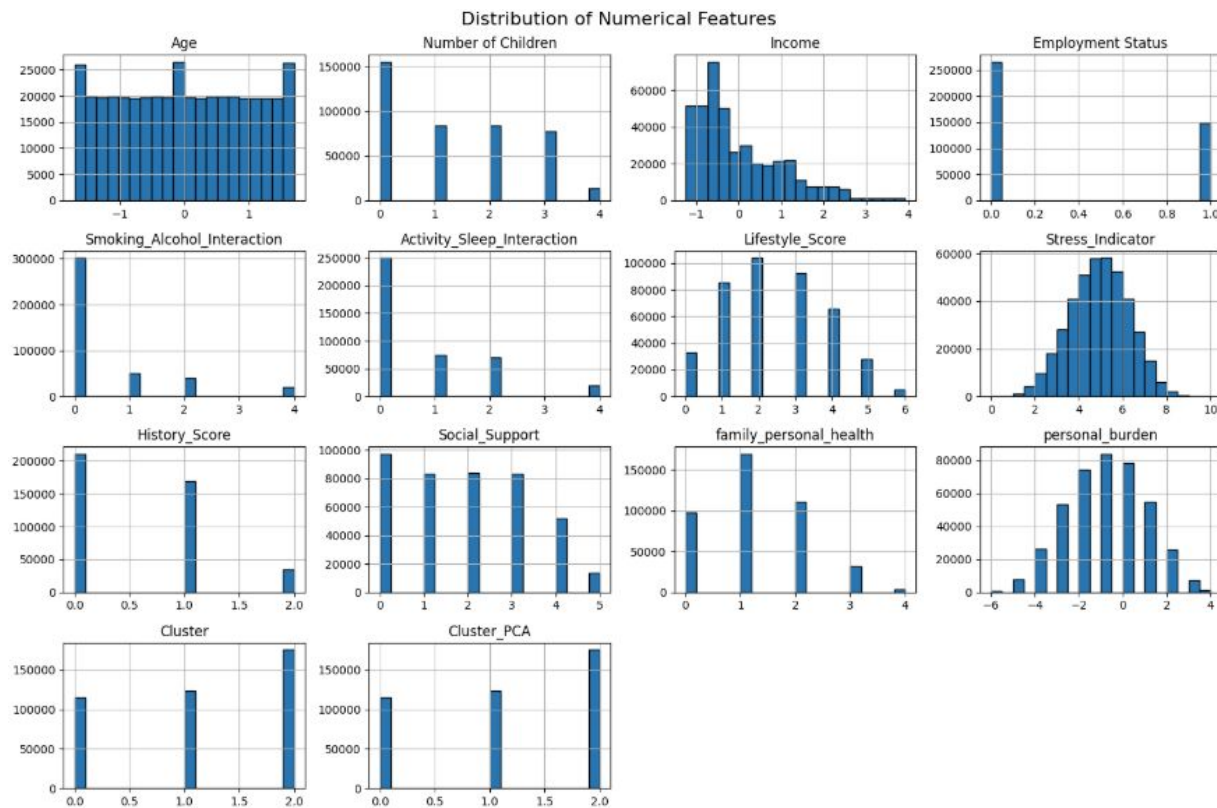
Income Distribution: Comparison by Stress_Indicator



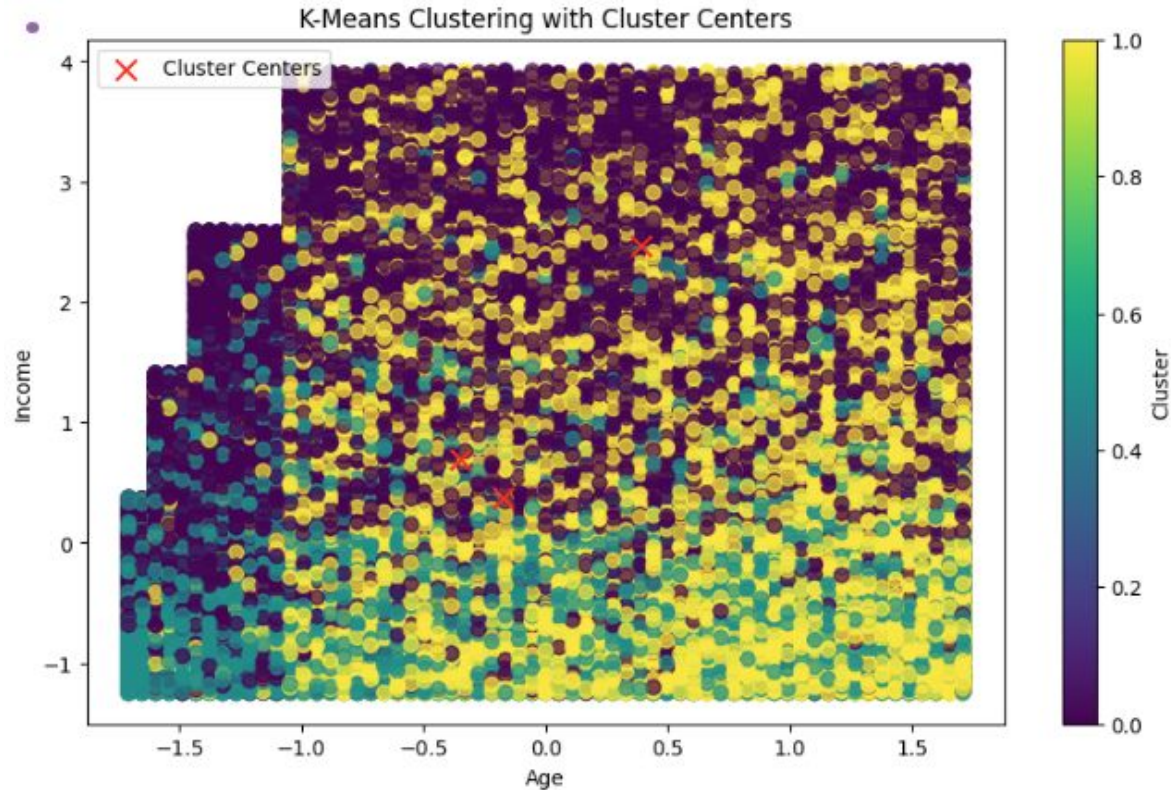
Distribution of Stress Indicator by Education Level



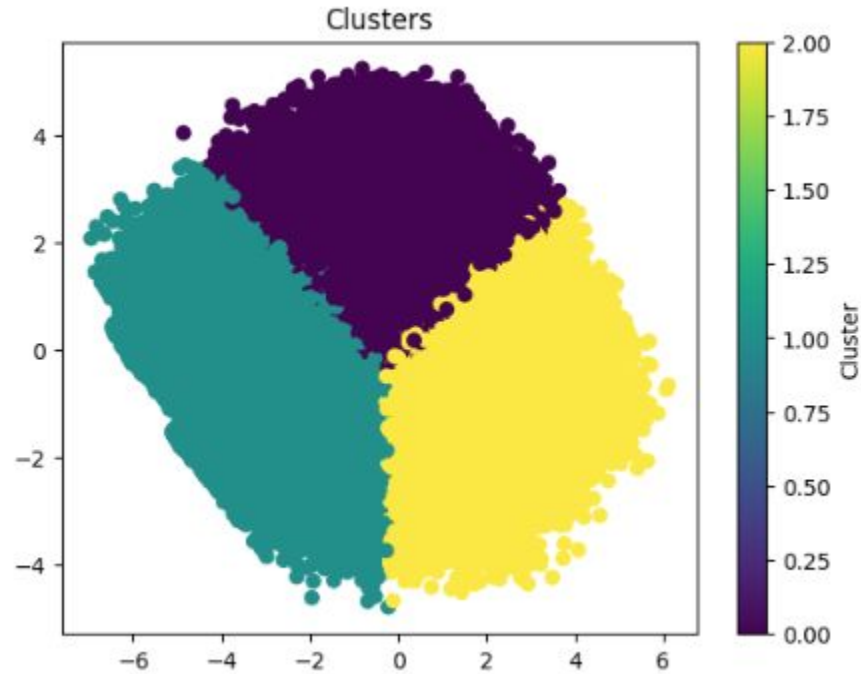
Distribution of Numerical Features



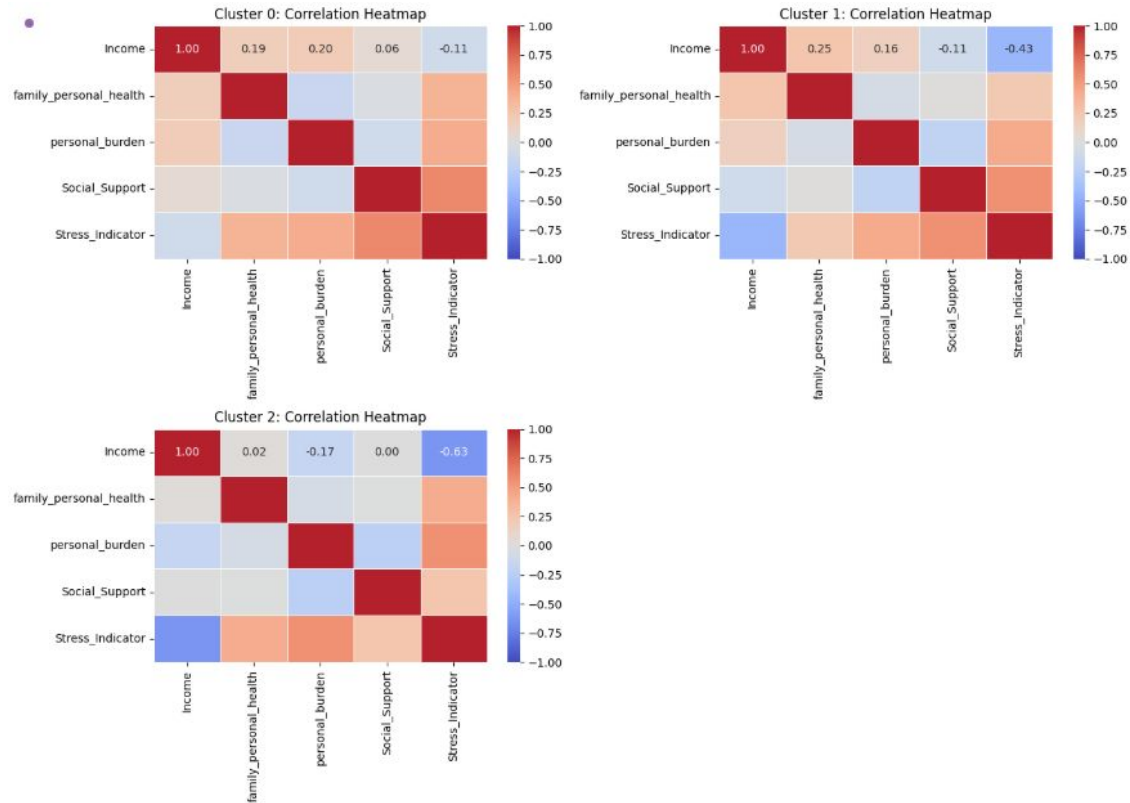
K-Means Clustering with Cluster Centers



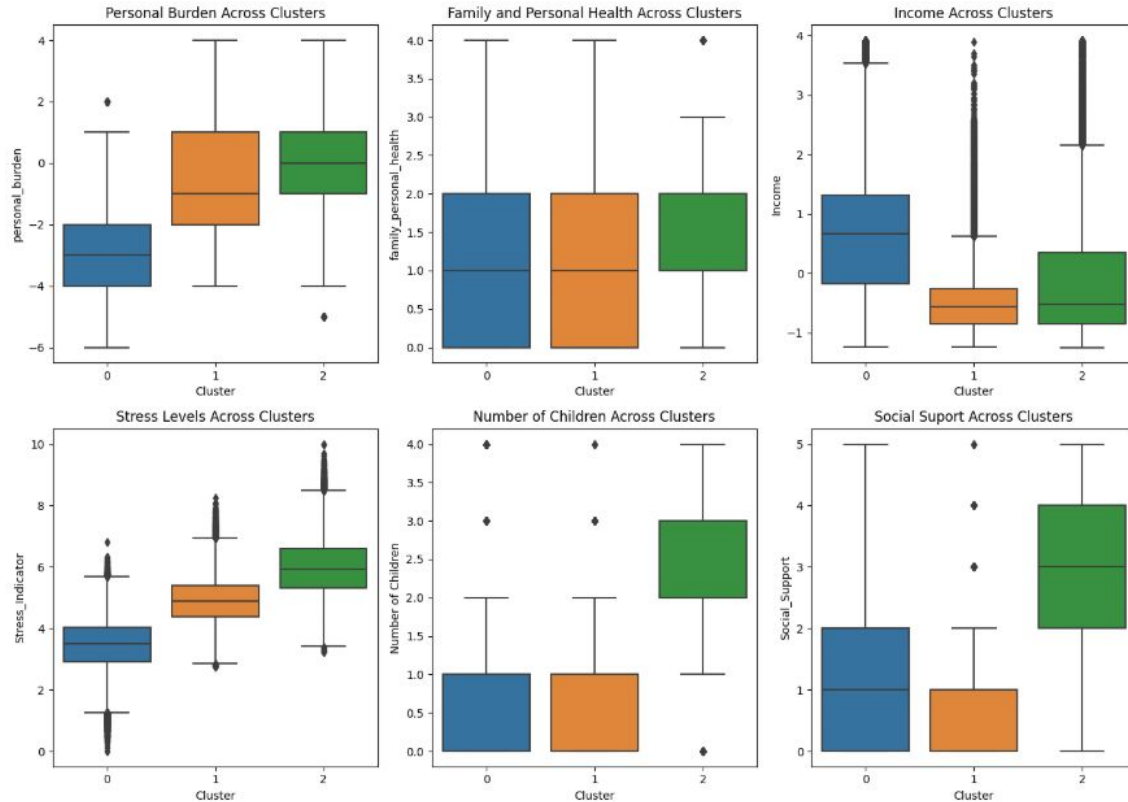
PCA-transformed data for clustering



Correlation Heatmap - Cluster 0,1 and 2



Visualizing key features across clusters



Pair Plot for Family Burden, Health, Social Support, and Stress Indicator by Cluster

