SLEEP HELPS, STRESS DECIDES

THE REAL DRIVER OF STUDENT SUCCESS

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DATA & METHODOLOGY

DATA

Kaggle dataset of university students including variables for Sleep, CGPA, Pressure, Depression, City, Degree, and etc.

ANALYSIS

Descriptive statistics to identify the 'sweet spot,' followed by multiple linear regression to control for confounding variables

SCOPE

Focuses on demographic drivers of stress and the direct correlation between pressure levels and mental health risk

BUSINESS PROBLEM I: THE "SWEET SPOT"

Identifying the sleep duration that correlates with the best student outcomes.

SLEEP DURATION VS. OUTCOMES

Sleep Duration	Average CGPA (Scale 1-10)	Average Pressure (Scale 1-5)
Less than 5 hours	7.65	3.22 (Worst)
5 - 6 hours	7.65	3.10
7 - 8 hours	7.71 (Best)	3.11
More than 8 hours	7.68	3.19

Findings

- 7-8 hours: This group achieves the highest average CGPA (7.71) and has one of the lowest Academic Pressure scores (3.11). This confirms the "sweet spot" hypothesis.

- < 5 hours: Students in this group reports the highest academic pressure (3.22) and the lowest CGPA (7.65), indicating a direct negative impact on both wellbeing and grades.

REGRESSION ANALYSIS: DRIVERS OF CGPA

$$CGPA = 8.01 - 0.085 \, (\text{AcademicPressure}) + 0.056 \, (\text{Sleep(7–8h)}) - 0.013 \, (\text{StudyHours})$$

- ✓ **AcademicPressure is significant:** For every 1-point increase in pressure, CGPA drops by 0.085. The p value = 0.0003 mean this is highly statistically significant

- ✓ **Sleep(7–8h) is not significant:** While 7-8 hours is visually better, the regression suggests that sleep likely affects CGPA indirectly rather than directly.

- ✓ **Study Hours is not significant:** It suggests that for every extra hour of study, CGPA drops slightly. This is likely reverse causality, so we shouldn't rely too much on it

- ✓ **Model Fit:** Multiple R-squared: 0.009 (approx. 1%), which means this model explains only 1% of the variation in students' CGPA.

BUSINESS PROBLEM 2: PRESSURE AND DEPRESSION

Identifying whether or not there is a direct correlation between academic pressure and depression.

PRESSURE & DEPRESSION PROBABILITY

- Correlation: A Spearman correlation analysis shows a correlation of 0.45, indicating a moderately strong positive association, meaning that higher academic pressure is linked to higher depression rates.

Pressure Lvl 1	20%
Pressure Lvl 2	43%
Pressure Lvl 3	59%
Pressure Lvl 4	73%
Pressure Lvl 5	86%

Probability of Derpessioin
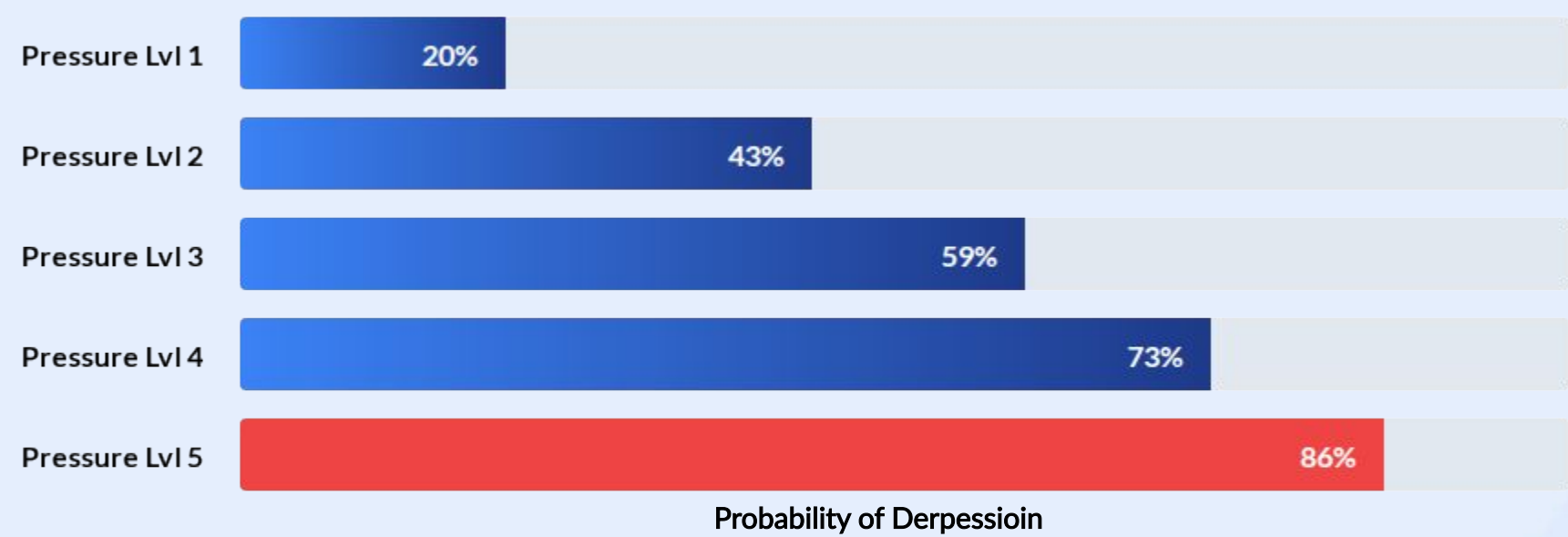
Risk escalates steadily. At max pressure, depression is almost guaranteed.

REGRESSION ANALYSIS: DRIVERS OF PRESSURE

> Academic Pressure = 2.39 + 1.29 (factor(Depression)1)

✓ **Depression is significant:** Students who report depression have Academic Pressure scores that are 1.29 points higher than those who do not report depression The p-value < 2e-16 mean this is highly statistically significant.

✓ **Model Fit:** R-squared = 0.2072 and Adjusted R-squared = 0.2068, which means depression explains around 21% of the variation in Academic Pressure, consisting of a strong effect for a single predictor.

✓ **Conclusion:** This indicates that mental health is a major driver of academic stress, far more influential than sleep duration or city.

BUSINESS PROBLEM 3: PRESSURE VS. CITIES & DEGREES

Identifying the relation between pressure and location and type of degree earned.

DEMOGRAPHICS & STRESS DRIVERS

Average Academic Pressure per City
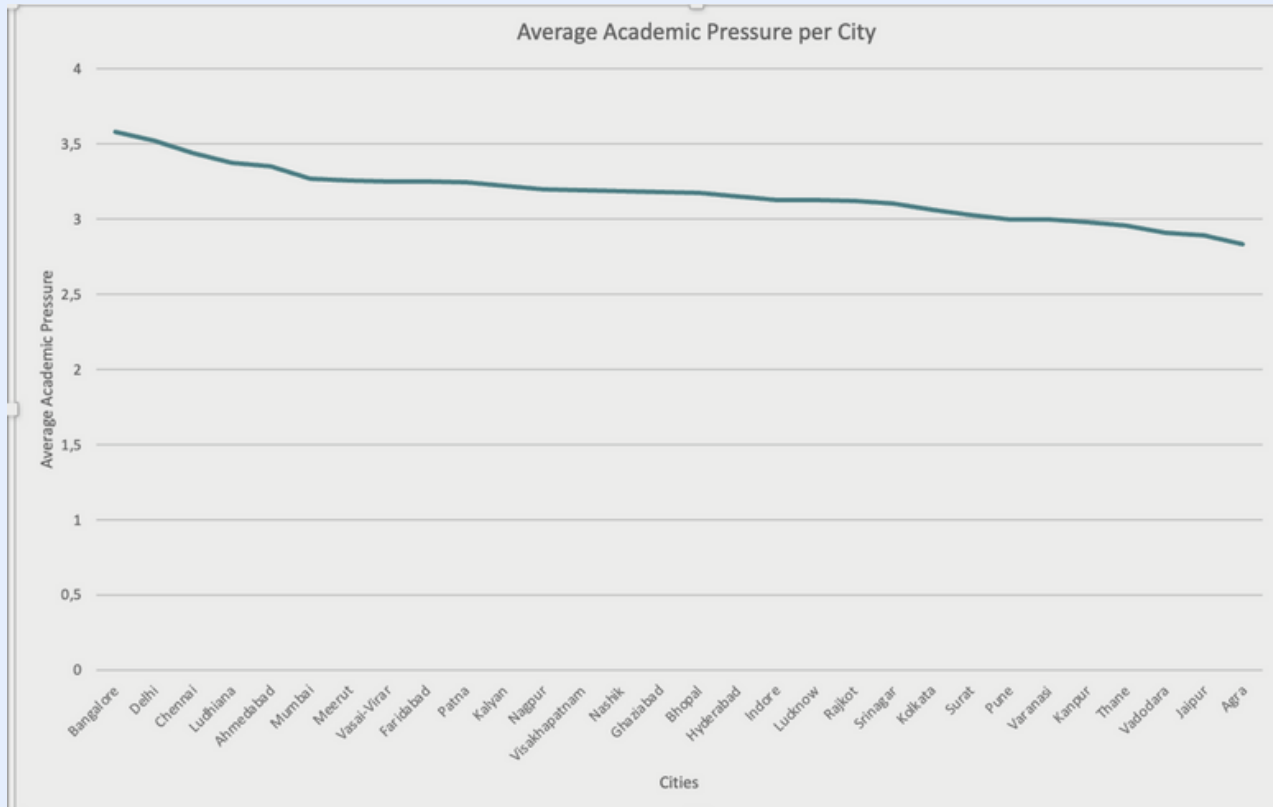
The Academic Pressure-City Model

Academic Pressure = 2.835 + 0.517 (Ahmedabad) + 0.746 (Bangalore) + 0.605 (Chennai) + 0.686 (Delhi) + 0.541 (Ludhiana) + 0.371 (VasaiVirar)

The Stress Capitals:
- Bangalore: The most stressful city (AvgPressure: 3.58/5)
- Delhi: Close second (Avg Pressure: 3.52)
- Chennai: Third (Avg Pressure: 3.44)

The "Chill" Cities:
- Agra: Lowest stress (Avg Pressure: 2.84)
- Jaipur: Second lowest (Avg Pressure: 2.89)
- Vadodara: Third lowest (Avg Pressure: 2.91)

THE URBAN STRESS FACTOR

HIGH STRESS ZONES

- Bangalore (+0.75),Delhi (+0.69), Chennai(+0.60), Ahmedabad(+0.52), Ludhiana(+0.50) show significantly higher-pressure levels compared to the baseline(Agra).
- Fast-paced lifestyles in tech and educational hubs correlate with intense academic pressure.

STRESS AMPLIFIED IN TIER-1 CITIES

- The "Tech Hubs" (Bangalore, Chennai) and the Capital (Delhi) are significantly harder on students than Tier-2 cities.
- Regression confirms that urbanization is a major, statistically significant driver of student stress.

STRESS & DEGREE

Degree and Academic Pressure (top 10)
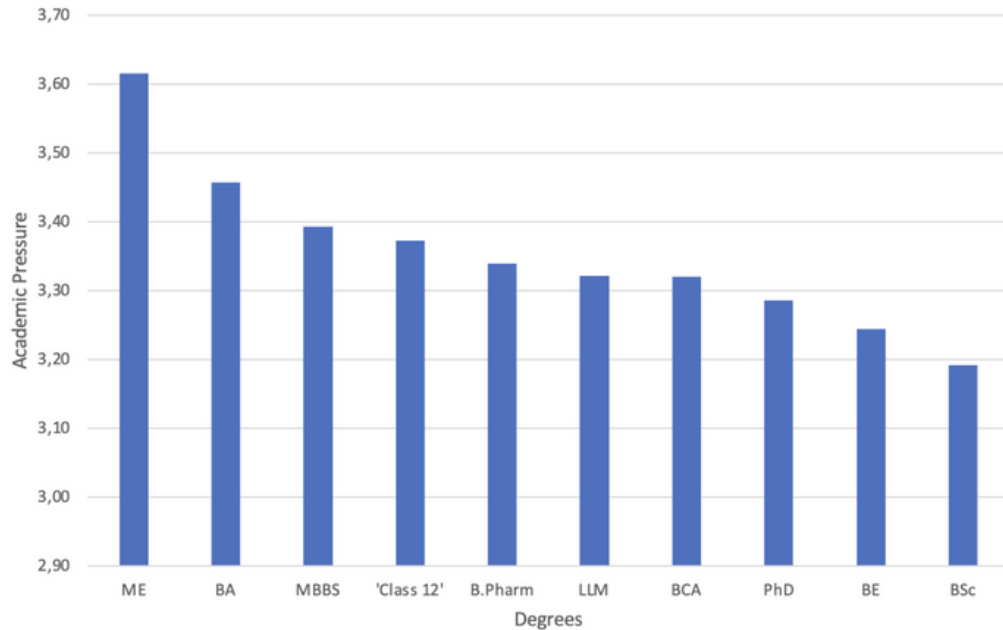
The Academic Pressure-Degree Model

Academic Pressure = 3.372 − 0.333·BArch − 0.390·BCom − 0.515·MCom − 0.536·MEd − 0.513·MTech − 0.461·MA − 0.440·MCA − 0.407·MSc

- **Descriptive Statistics:** ME, BA, MBBS appear among the most stressful degrees

- **Regression Analysis**: Based on the regression analysis, only B.Arch, B.Com, M.Com, M.Ed, M.Tech, MA, MCA, and MSc are statistically significant.

✓ **Class 12 is the Peak:** Identified as the most stressful period, likely due to high-stakes university entrance exams.

✓ **Post-Grad Relief:** Surprisingly, Master's students report significantly lower stress than Class 12
For Example: M.Com (-0.515), M.Ed (-0.536), M.Tech (-0.513), MA (-0.461), MCA (-0.440), MSc (-0.407)

✓ **Implication:** Stress declines as students enter college, and decreases further in Master's programs.

CONCLUSION

DATA
METHODOLOGY

BUSINESS
PROBLEM 1

BUSINESS
PROBLEM 2

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PROBLEM 3

CONCLUSION

STUDY
LIMITATION

CONCLUSION

WELL-BEING DRIVES PERFORMANCE

Stress strongly predicts CGPA and depression risk, confirming its central role in student outcomes.

PRESSURE HOTSPOTS IDENTIFIED

Class 12 and urban environments amplify stress, while postgraduate programs show significantly lower pressure.

INSTITUTIONAL ACTION REQUIRED

Effective strategies include reducing workload intensity, implementing supportive academic policies, and providing mental-health resources.

LONG TERM SOLUTIONS

PRIORITIZE HEALTH

Shift focus from "sleep hours" to "stress reduction." Mental health support is an academic necessity, not a perk.

TARGET HIGH-RISK

Deploy specific interventions for students in Metro hubs (Bangalore/Delhi) and Class 12 cohorts.

SYSTEMIC CHANGE

Implement "academic forgiveness" policies or wellness days during finals to mitigate pressure spikes.

STUDY LIMITATIONS

LIMITED

STUDY LIMITATIONS

DATA CONSTRAINTS

Analysis relies on self-reported data which is subject to bias. The dataset is cross-sectional, capturing a single point in time rather than longitudinal trends.

MISSING VARIABLES

Key factors such as innate intelligence (IQ), course difficulty, and financial background were not included, explaining the low R-squared for the grade prediction model.

THANK YOU!