**Mental Health Analysis project**

**🧠 1. Behavioral Factors Influence Mental Health**

* **Social Media Hours** and **Screen Time Hours** are **strongly correlated**, suggesting they represent a common digital engagement behavior.
* Both are positively associated with **stress scores**, indicating that increased screen usage may contribute to elevated stress levels.

**😓 2. Stress Is Measurable and Multidimensional**

* **Survey Stress Score** (subjective) and **Wearable Stress Score** (objective) are moderately correlated, confirming that self-reported stress aligns reasonably well with physiological stress.
* This validates using both types of measures for a well-rounded mental health assessment.

**🛌 3. Sleep and Exercise Appear Protective**

* Weak **negative correlations** between sleep/exercise hours and stress scores suggest:
  + More sleep and physical activity might **slightly lower stress**.
  + These are **potential intervention areas** to improve student mental wellness.

**📚 4. Academic Performance Shows Behavioral Clustering**

* **PCA analysis** revealed clusters in student behavior by academic performance:
  + Students with **better academic performance** tend to share similar patterns (e.g., lower stress, moderate screen time).
  + Those with **poor performance** tend to cluster around high stress and screen usage.

**🔮 5. Prediction Is Challenging with Limited Features**

* The Random Forest classifier achieved ~26% accuracy:
  + Indicates that **behavioral metrics alone** are **not sufficient** to predict academic outcomes accurately.
  + Other unmeasured factors like **study habits, cognitive ability, socio-economic background, or school quality** likely play a significant role.

**✅ Overall Value of the Project**

* Demonstrates **how to analyze the interplay** between behavior, mental health, and performance using real-world data.
* Provides a base for **building wellness monitoring tools** or **early warning systems**.
* Highlights the importance of **multi-modal data** (behavioral + academic + physiological) in student analytics.