Smartphone Screen Time as a Predictor of Academic Performance
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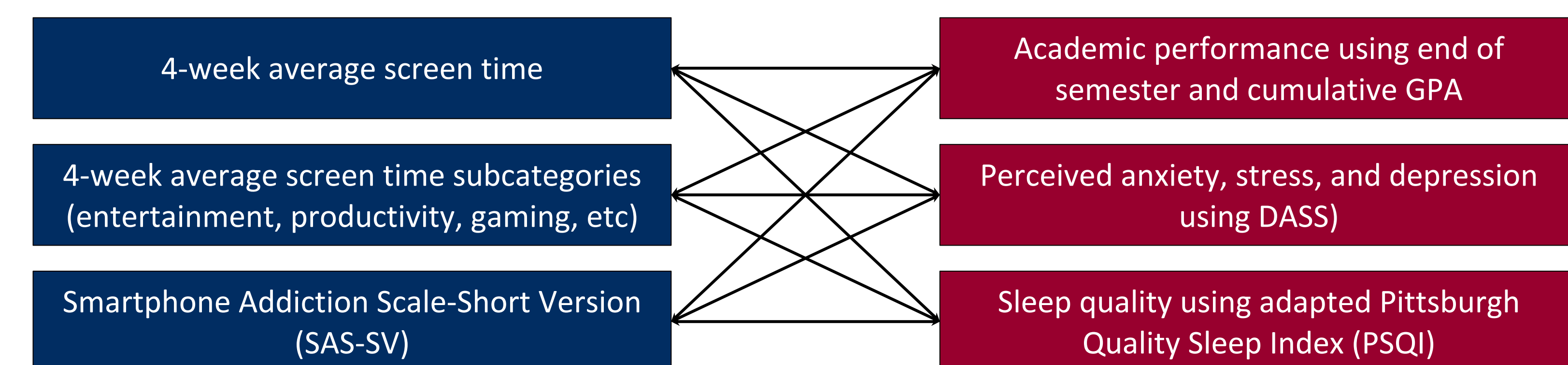
INTRODUCTION & BACKGROUND

- Mobile phones have become ubiquitous among university-aged adults with an estimated 96% of 18-29 year olds having access to a smart phone.[1]
- The effects of smartphone screen time and academic performance in health professional students have primarily been studied in medical schools abroad.[2-5]
- The impact of smartphone screen time on the mental health and sleep quality of health profession students has been a secondary focus in many studies.[3-5]
- Only one previous study in the pharmacy literature used focus groups to study the perceived effects of smartphone use but lacked actual screen time metrics.[6]
- This study seeks to determine the influence of screen time on professional year 1 (P1) through professional year 3 (P3) pharmacy students' academic performance, sleep quality, stress, and anxiety

METHODS

- A single center, IRB-approved study at a private school of pharmacy with two campuses in Fairfax and Winchester, Virginia

Inclusion Criteria	Exclusion Criteria
○ 18 years and older ○ P1, P2, P3 students at Shenandoah University ○ Consent to voluntarily participate	○ P4 students, faculty, and/or instructors

- Enrolled students completed an initial 36-item survey to provide informed consent, demographic information, their perceived stress (Depression Anxiety Stress Scale-8; DASS-8), sleep quality (Adapted Pittsburgh Quality Sleep Index; PQSI), and smartphone addiction (Smartphone Addiction Scale-Short version; SAS-SV).
- Text messaging software was used to collect screenshots of each students' previous week's screen time over 4 weeks throughout the Spring 2023 semester.
- Average time spent per day, three most popular applications used, and time spend on each mobile application were extracted from the screenshots each week.
- For iPhone users, the average amount of time spend on social media apps versus productivity apps was also collected.
- Primary Outcome: Correlation between 4-week average smartphone screen time and academic performance measured by end-of-semester grade point average (GPA).
- Secondary Outcomes: Arrows note correlations tested

4-week average screen time	Academic performance using end of semester and cumulative GPA
4-week average screen time subcategories (entertainment, productivity, gaming, etc)	Perceived anxiety, stress, and depression using DASS)
Smartphone Addiction Scale-Short Version (SAS-SV)	Sleep quality using adapted Pittsburgh Quality Sleep Index (PSQI)

- Three different populations were tested.
  - Initial survey population: Students who completed the initial survey who provided student identification numbers.
  - Screentime population: Students who provided at least one screen time during the 4 week monitoring period.
  - Screentime subcategories populations: Students who were Apple iPhone users for subcategories of screentime.
- Statistical Analysis: Non-parametric testing using Spearman rank-order correlation coefficient was utilized to compare linear outcomes. Descriptive statistics were utilized for baseline demographics. A p-value of <0.05 was used to indicate significance

RESULTS

- At the time of the survey, 174 P1, P2, and P3 students were enrolled in the school of pharmacy.
- Sixty-one students filled out the initial survey, but 4 students failed to provide their student identification numbers and could not have correlations between their screentime and academic success
- Thirty-eight students submitted at least one screen time recording and 30 students had screentime subcategory data

| Table 1: Baseline Demographics		
	Initial Survey Population, n= 57	Screen time population, n=38
Apple (IOS), n (%)	47 (82.5)	30 (79.0)
Female gender, n (%)	42 (73.7)	27 (71.1)
Age, n (%)		
18 – 21 years old	7 (12.3)	3 (7.89)
22 – 25 years old	33 (57.9)	24 (63.2)
26 – 29 years old	9 (15.8)	5 (13.2)
30 years old and older	8 (14.0)	6 (15.8)
Race/ethnicity, n (%)		
Hispanic, Latino, or Spanish origin of any race	3 (5.26)	3 (7.9)
Asian	7 (12.3)	5 (13.2)
Black or African American	4 (7.02)	4 (10.5)
White	39 (68.4)	25 (65.8)
Median daily screen time, mean (SD)	N/A	5.80 (2.30)
SAS-SV, mean (SD)	26.8 (7.64)	26.3 (6.85)
DASS-8, mean (SD)	11.1 (8.98)	9.87 (8.82)
PQSI, mean (SD)	9.91 (4.08)	12.2 (5.99)
4-Week Average Time Spent on social media apps, mean (SD)	N/A	20.1 (10.3)
Number of reported social media apps, mean (SD)	3.05 (1.23)	3.11 (1.16)

End of Semester GPA vs 4-Week Average Screentime

RESULTS (CONTINUED)
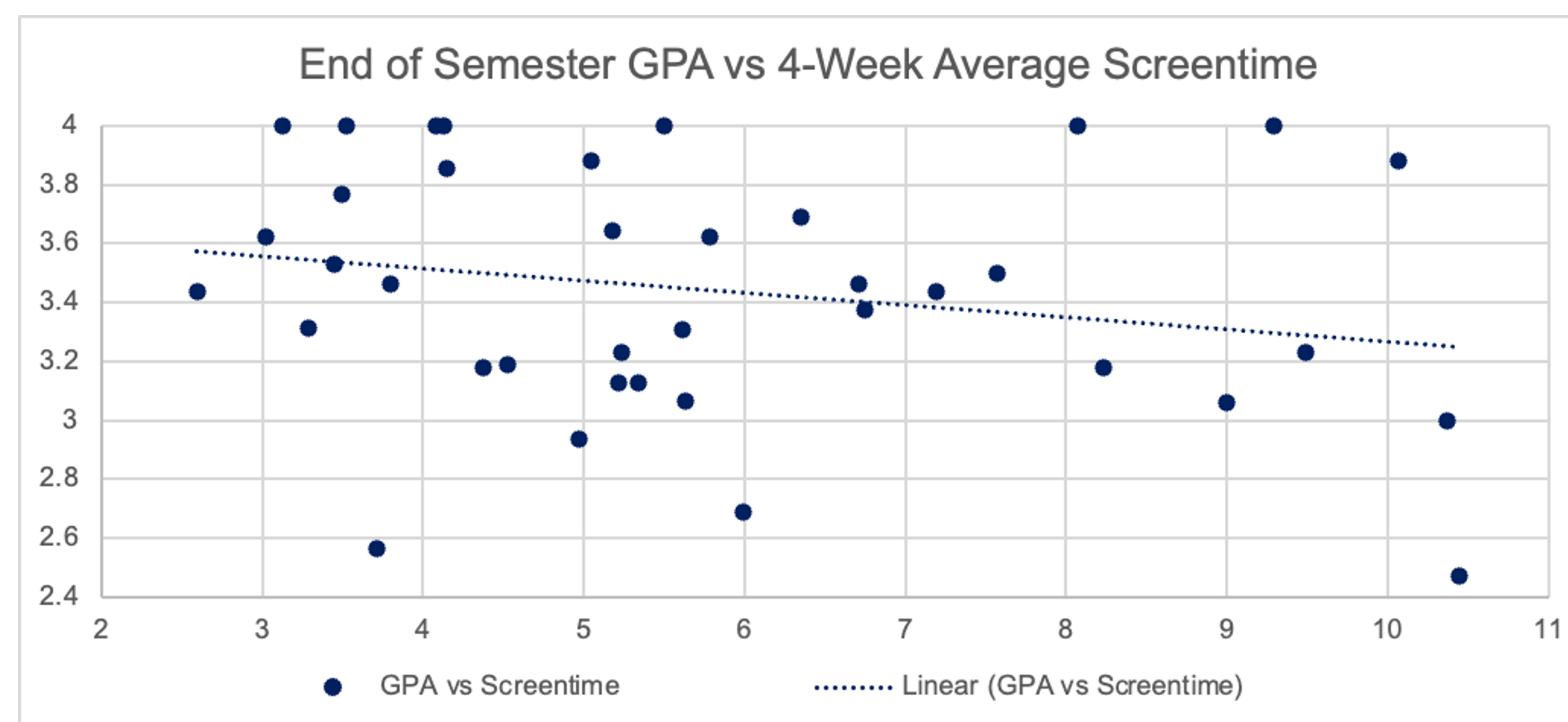
Table 2: Primary & Secondary Outcomes		
4-Week Average Screen Time Correlations	Correlation Coefficient	P-Value
Cumulative GPA	-0.255	0.123
End-of-semester GPA	-0.234	0.141
DASS Scale	-0.09	0.591
DASS Stress Subscale	0.068	0.683
DASS Depression Subscale	-0.044	0.795
DASS Anxiety Subscale	-0.142	0.395
Sleep (PQSI)	-0.0754	0.65278
SAS-SV Correlations	Correlation Coefficient	P-Value
Cumulative GPA	-0.02	0.904
End-of-semester GPA	0.048	0.775
DASS Stress Subscale	0.369	0.005
DASS Depression Subscale	0.268	0.044
DASS Anxiety Subscale	0.165	0.221
Sleep (PQSI)	0.22918	0.07562

DISCUSSION

- Strengths:
  - Utilized previously validated scales to record perceived stress, anxiety, and depression, sleep quality, and smartphone addiction
- Limitations:
  - Included only four weeks of data from a single semester
  - Subtypes of screen time were only available for Apple iPhone users
  - Possible Hawthorne effect with students decreasing their smartphone screentime knowing they were being monitored
  - Higher performing students and students with less screen time at baseline may be more likely to enroll in the study.
  - Small sample considering population size
  - Screentime outside of smartphone use was not recorded
- Future Directions
  - Repeat study to include multiple schools of pharmacy to improve enrollment numbers and diversity
  - Repeated measures for sleep, depression, anxiety, and stress throughout study period
  - Repeated over multiple semesters
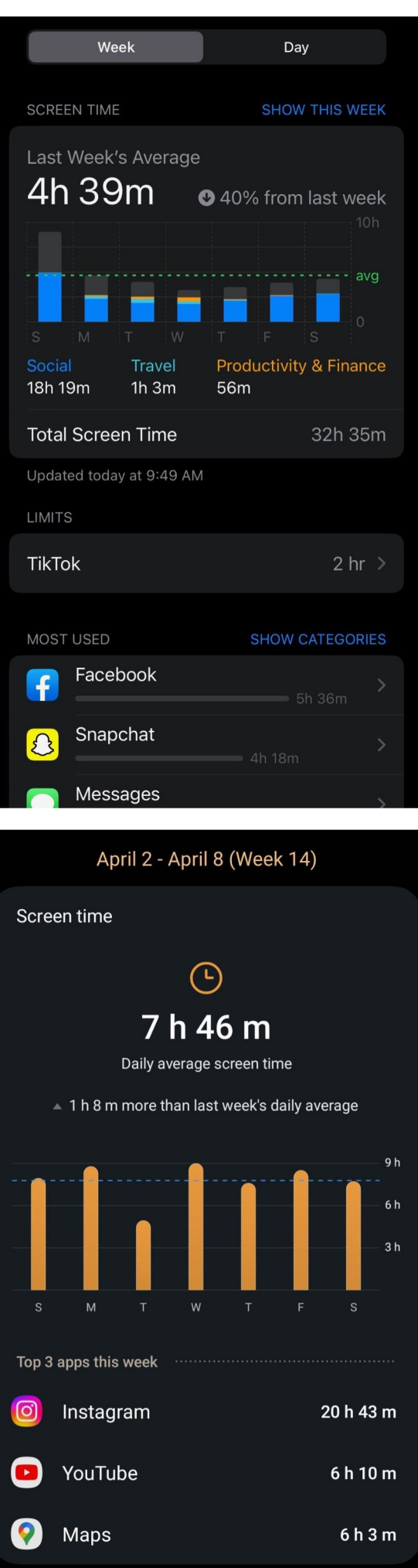
CONCLUSIONS

- This study found no correlation between smartphone screen time and end-of-semester or cumulative GPA.
- Perceived stress and depression were correlated with higher levels of smartphone addiction

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