Homework 1
Problem 4
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I certify that I have <u>personally</u> done the coding, generated the figures and written the report without aid from anybody else, and that I have not plagiarized, self-plagiarized, or used AI-generated text. I certify that I have acknowledged any sources I used to complete this assignment. ARM

1   Part 1: Proposing a Research Question

How does sleep correlate with the type of exercise (e.g., lifting, climbing, or running) and the time the exercise was performed?

2   Part 2: Experiment to Collect Data

There won't be an experiment necessarily to collect the data. I will just track my sleep and exercise data everyday for a long enough period of time to collect a sufficient sample size.

3   Part 3: Rationale for this Experiment

Being active is a very important part of my life. I've played sports my entire life and ran competitive track in high school. I am active almost every single day whether I am running, lifting, or rock climbing (Sometimes I'll play a different sport like badminton or soccer). I am curious to see how my active lifestyle affects my sleep quality and sleep time. This is especially important because sleep is crucial for recovery and overall health. Understanding the relationship between time and type of exercise and sleep quality can help me optimize my workout schedule. For example, if I find that running helps me get better sleep at night, I might start running the day before I have exams. Or maybe lifting weights at night before bed could disrupt my sleep and sleep latency and therefore, I won't lift weights the day before an exam.

4   Part 4: Describing the Data Collection Process

There will be a total of 4 variables to collect data for:

Sleep time (in hours): Tracked by sleep app on phone.

Sleep Quality (sleep latency, efficiency): Self-reported

Type of Exercise (lifting, running, climbing): Self-reported

Time of Day of Exercise (morning, afternoon, evening): Clock app on phone.

This data will be collected daily for a couple weeks to ensure the sample size is large enough.

All the data will be stored in an excel spreadsheet with the according column names and will be updated daily.

5   Part 5: Hypothesis and Variables.

Independent Variables: Type of exercise and time of day of exercise

Dependent Variables: Sleep quality and sleep time

Null Hypothesis: There is no significant correlation between sleep time/quality and the type and timing of exercise.

Alternative Hypothesis: Sleep quality/time is affected by the type and timing of exercise.

Working Hypothesis: From my previous experiences running track during high school, I anticipate that the timing and type of workout will influence my sleep. For example, I have noticed that after hitting legs my sleep time is very long, however, my sleep quality does not seem to match the amount of time I slept. I also anticipate that my best nights of sleep will come when I run that day.

Preliminary Data

	A	B	C	D	E	F	G	H
1	Date		Type of Exercise	Duration of Exercise	Time of Day of Exercise		Sleep Quality (out of 10)	Sleep Time
2	2/7		Arms and Shoulders	2 hrs	7:00 PM		6.5	7 hr 45 min
3	2/8		Legs	1 hr 15 min	1:00 PM		5	9 hrs
4	2/9		Running	25:27 min	6:00 PM		7	7 hrs
5	2/10		Rest	N/A	N/A		7	7 hrs 15 min
6	2/11		Chest and Back	1 hr 30 min	5:00 PM		6	7 hr 20 min
7	2/12		Rock Climbing	1 hr	5:00 PM			
8								

Figure 1. Preliminary data for experiment showing date, type of exercise, duration of exercise, time of day of exercise, sleep quality and sleep time.

6   Resources used to achieve this goal

Canvas Homepage: Homework template

Google Sheets: For data collection

Apple Health App: For sleep time data.

7   References

- Alnawwar, M. A., Alraddadi, M. I., Algethmi, R. A., Salem, G. A., Salem, M. A., & Alharbi, A. A. (2023). The effect of physical activity on sleep quality and sleep disorder: A systematic review. *Cureus*, *15*(8). https://doi.org/10.7759/cureus.43595