Task D
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Dataset Used: Sleep Efficiency Dataset
https://www.kaggle.com/datasets/equilibriumm/sleep-efficiency

The following dataset has been chosen to analyze and visualize different factors affecting sleep efficiency. Hence can help us to avoid certain factors and pay attention to certain others to improve sleep efficiency.

Description: Highlighted fields are used in visualization.

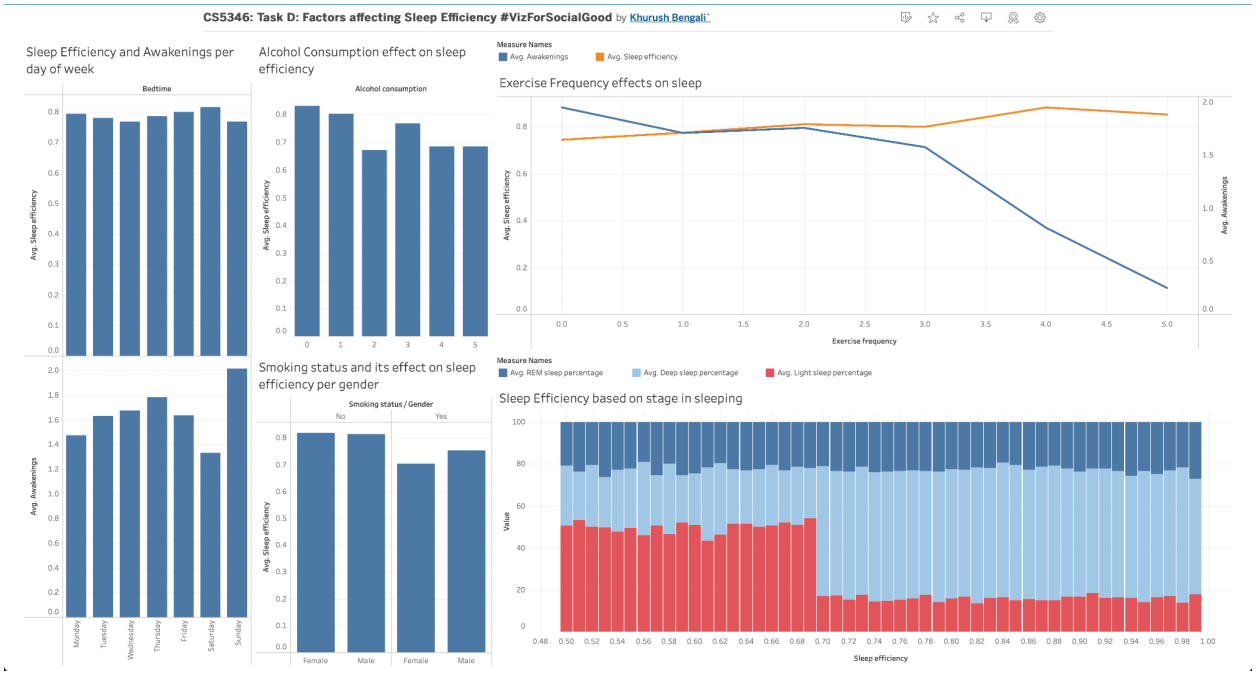
Dimension / Measure	Description	Data Type	NOIR
ID	Unique ID	Qualitative	Nominal
Gender	Gender (male/female)		
Smoking status	Smoking status (yes/no)		
Bedtime	Bedtime (date and time)		Interval
Wakeup time	Wake-up time (date and time)		
Age	Age of person	Quantitative	Ratio
Sleep duration	Duration of sleep (in hours)		
Sleep efficiency	Sleep efficiency (0 to 1)		
REM sleep percentage	Percentage of REM sleep		
Deep sleep percentage	Percentage of Deep sleep		
Light sleep percentage	Percentage of Light sleep		
Awakenings	Number of awakenings during the night		
Caffeine consumption	Caffeine consumption (in 24 hrs)		
Alcohol consumption	Alcohol consumption (in 24 hrs)		
Exercise frequency	Exercise frequency (times per week)		

Following are the queries for this task:

1. Comparing sleep efficiency and the number of times people awaken at night with the day of the week.
2. Effect of alcohol consumption on sleep efficiency.
3. Effect of smoking on sleep efficiency. Does this affect more in the case of male or female?
4. Effect of exercise frequency on sleep efficiency and number of times people awaken at night.
5. Comparing light, deep and REM sleep percentage for different sleep efficiencies.

Visualizations:

https://public.tableau.com/app/profile/khurush.bengali./viz/CS5346TaskDFactorsaffectingSleepEfficiencyVizForSocialGood/FactorsAffectingSleepEfficiency?publish=yes



Visual Encodings Used:

1. Bar charts for comparing sleep efficiency and awakenings per day of the week, alcohol consumption effect on sleep efficiency and smoking status and its effects on sleep efficiency per gender.

2. Line chart for comparing exercise frequency and its effects on sleep (colour encoded as efficiency and awakening).
3. Stacked bar chart used to compare different stages in sleeping (colour encoded as light, deep and REM) with respect to sleep efficiency.

Findings and Observations:

1. Average sleep efficiency is almost the same every day of the week, we see a slightly better sleep efficiency as we tend to go towards the weekend. Also we can see a slight decrease in sleep efficiency as we go from Monday to the middle of the week.
2. Awakenings per day show us that weekends have a drastic change in times people awaken at night. Saturday has the least probability as it's followed by sunday and the day off, whereas sunday has the highest maybe due to a work day later.
3. Next bar chart shows us that alcohol consumption does have a slight negative effect on sleep efficiency.
4. Smoking also has a negative effect on sleep efficiency. Females tend to have lower sleep efficiency than males when smoking.
5. Higher exercise frequency does slightly increase sleep efficiency. Furthermore, we see far less awakening when people exercise more frequently. Hence, exercising more can improve the quality of sleep.
6. Generally to have a better sleep we need to have a lower light sleep duration and higher deep sleep duration. REM duration is where the body is completely in deep sleep (also called as the dreaming stage). When we compare sleep efficiency with stages in sleeping, we observe that light sleep average reduces after 0.70 sleep efficiency, indicating the minimum sleep efficiency needed for a good quality sleep.

In Summary: Smoking or alcohol consumption leads to lower sleep efficiency. Day of the week also determines the quality of sleep. Exercising regularly improves sleep efficiency and reduces the amount of time people awaken. Minimum sleep efficiency to have a good quality sleep is 0.70.