Analysis of Daily Activity Patterns

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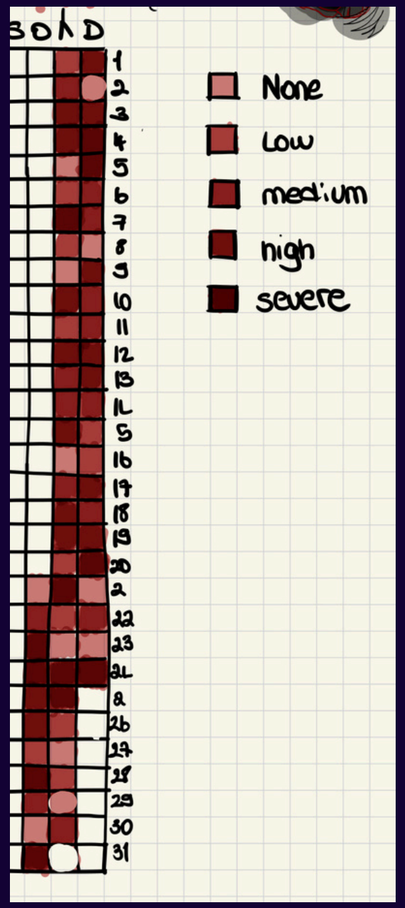
Hypothesis

My daily rate of the day increases according to the sportive activity

My daily rate of the day decreases according to my anxiety level

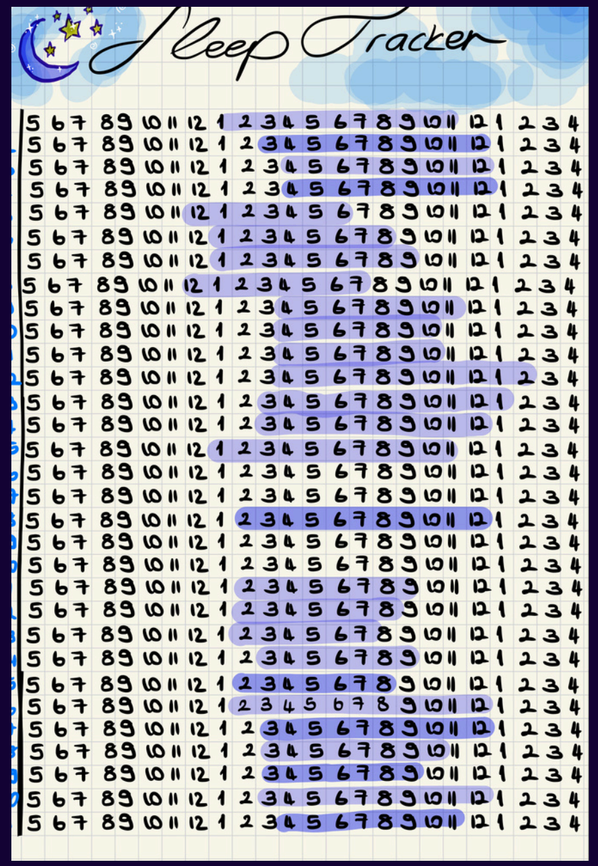
My daily rate of the day increases according to my sleep hours

Dataset



I gathered my **anxiety level** data from the trackbook I update daily, converted them into csv.

I gathered my **sleep hours** data from the trackbook I update daily, converted them into csv.



I gathered my **rate of the day** data from the trackbook I update daily, converted them into csv.

I gathered my **step counts** which represents my sportive activity**,** from Apple Health app , converted them into csv.

I **cleaned** the huge health data of 5 years, to achieve the relevant part in 2024

Index	type	sourceName	sourceVersion	device
60526	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	1442	<<HKDevice: 0x302add860>, name:iPhone, manufacturer:Apple Inc., model:iPhone
60527	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	1442	<<HKDevice: 0x302add860>, name:iPhone, manufacturer:Apple Inc., model:iPhone
60528	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	1442	<<HKDevice: 0x302add860>, name:iPhone, manufacturer:Apple Inc., model:iPhone
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60550	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	1442	<<HKDevice: 0x302add860>, name:iPhone, manufacturer:Apple Inc., model:iPhone

```
[7]: filtered_data = data[data["type"] == "HKQuantityTypeIdentifierStepCount"]
     filtered_data.head()
```

[7]:

	Unnamed: 0	type	sourceName	sourceVersion	device	unit	creationDate	startDate	endDate	value
0	60526	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	14.4.2	<<HKDevice: 0x302add860>, name:iPhone, manufac...	count	2024-01-01 00:40:00+03:00	2024-01-01 00:17:12+03:00	2024-01-01 00:17:17+03:00	12.0
1	60527	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	14.4.2	<<HKDevice: 0x302add860>, name:iPhone, manufac...	count	2024-01-01 00:51:22+03:00	2024-01-01 00:40:19+03:00	2024-01-01 00:40:58+03:00	14.0
2	60528	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	14.4.2	<<HKDevice: 0x302add860>, name:iPhone, manufac...	count	2024-01-01 01:01:25+03:00	2024-01-01 00:50:22+03:00	2024-01-01 00:50:25+03:00	8.0
3	60529	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	14.4.2	<<HKDevice: 0x302add860>, name:iPhone, manufac...	count	2024-01-01 15:08:05+03:00	2024-01-01 14:57:00+03:00	2024-01-01 14:57:15+03:00	33.0
4	60530	HKQuantityTypeIdentifierStepCount	Elif tuana iPhone'u	14.4.2	<<HKDevice: 0x302add860>, name:iPhone, manufac...	count	2024-01-01 15:48:56+03:00	2024-01-01 15:37:53+03:00	2024-01-01 15:38:06+03:00	24.0

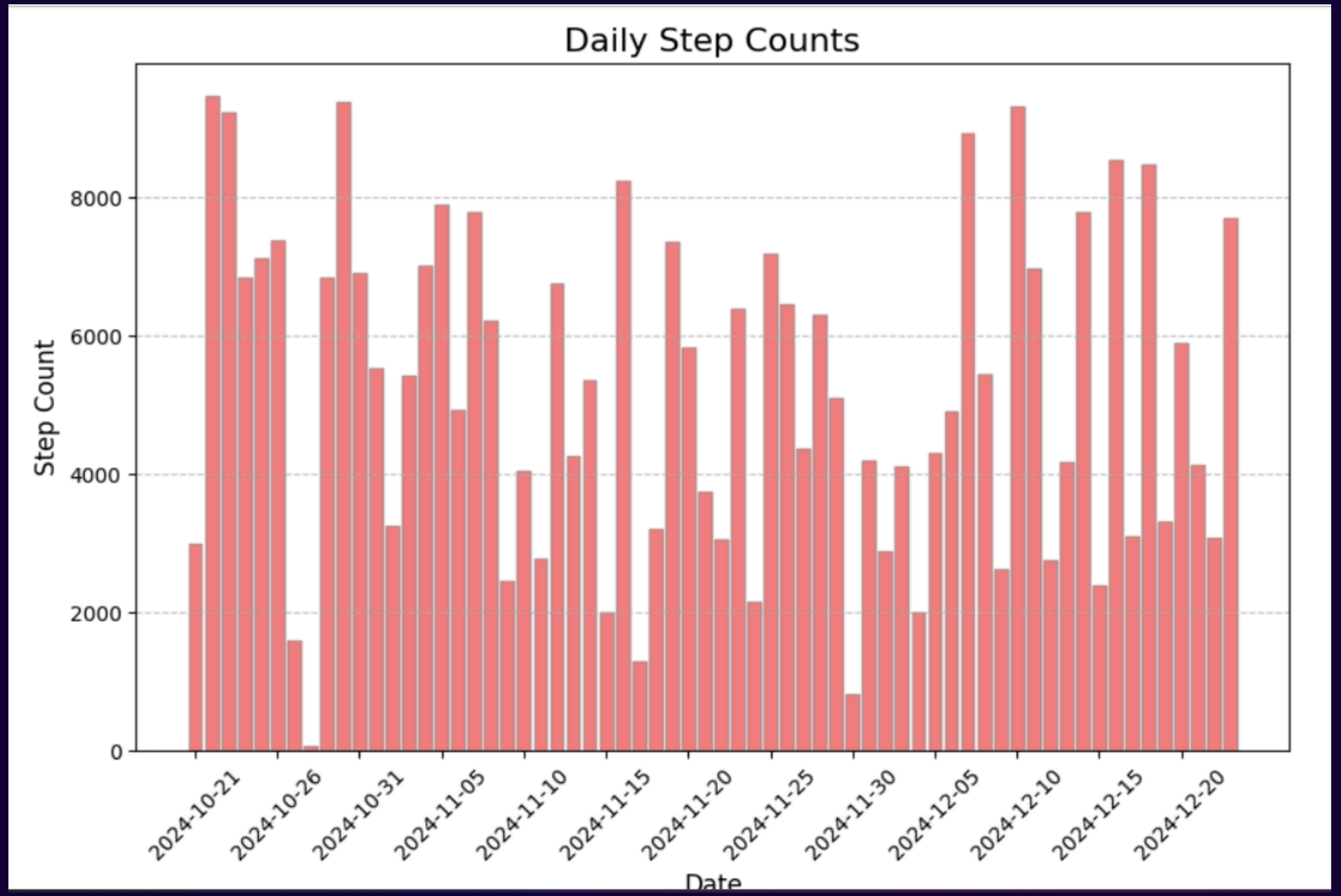
```
filtered_data["startDate"] = pd.to_datetime(filtered_data["startDate"], errors=
```

```
[9]: column_reduced_data = year_filtered_data[["startDate","endDate","value"]]
     column_reduced_data
```

[9]:

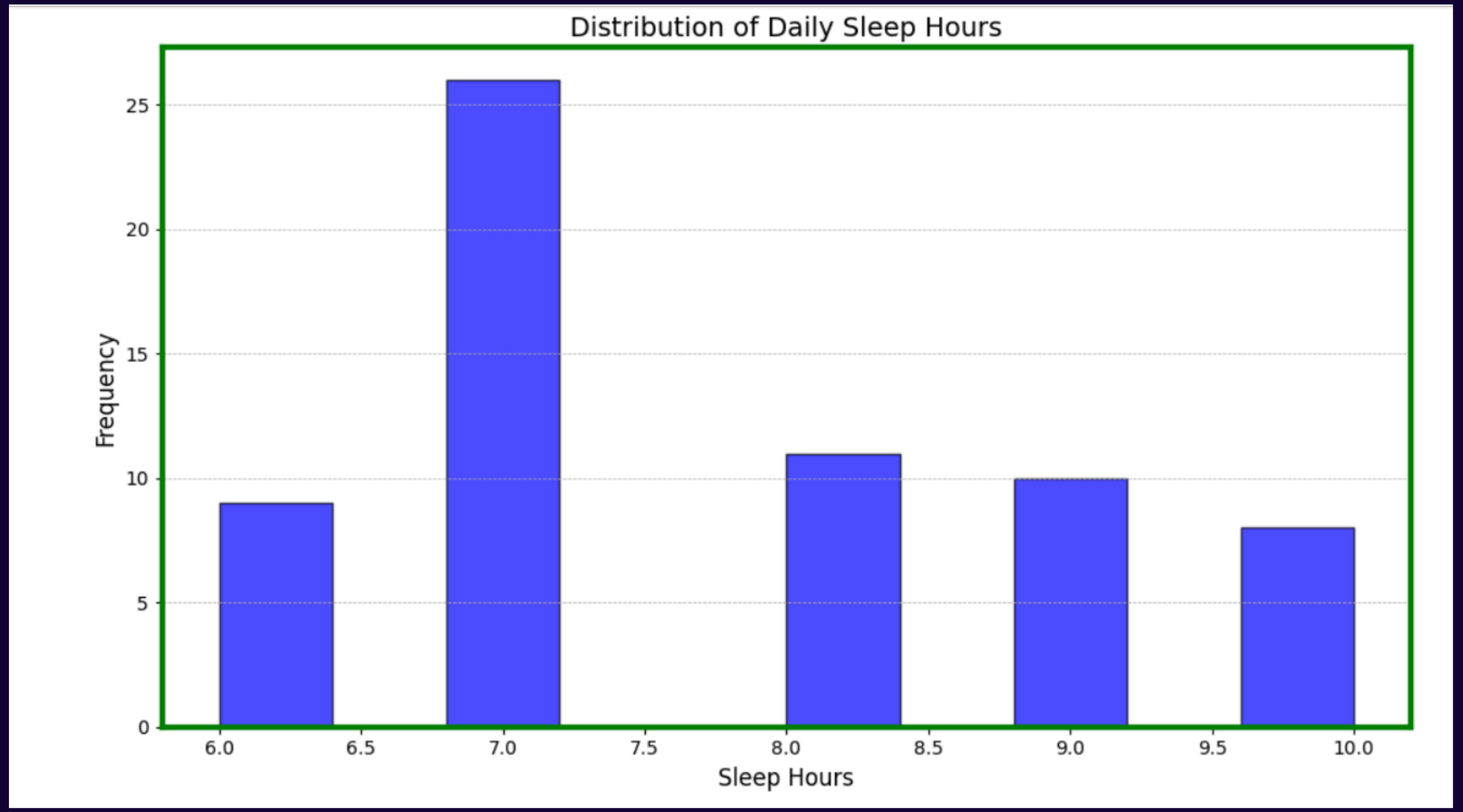
	startDate	endDate	value
6220	2024-10-21 00:24:16+03:00	2024-10-21 00:24:23+03:00	6.0
6221	2024-10-21 11:31:13+03:00	2024-10-21 11:38:09+03:00	736.0
6222	2024-10-21 13:34:57+03:00	2024-10-21 13:44:06+03:00	607.0
6223	2024-10-21 13:50:16+03:00	2024-10-21 13:51:07+03:00	55.0
6224	2024-10-21 14:37:35+03:00	2024-10-21 14:43:33+03:00	405.0
...	...	...	...
7529	2024-12-23 17:59:37+03:00	2024-12-23 18:02:51+03:00	71.0

I **manipulated** the data many times to extract the step count part in perfect form

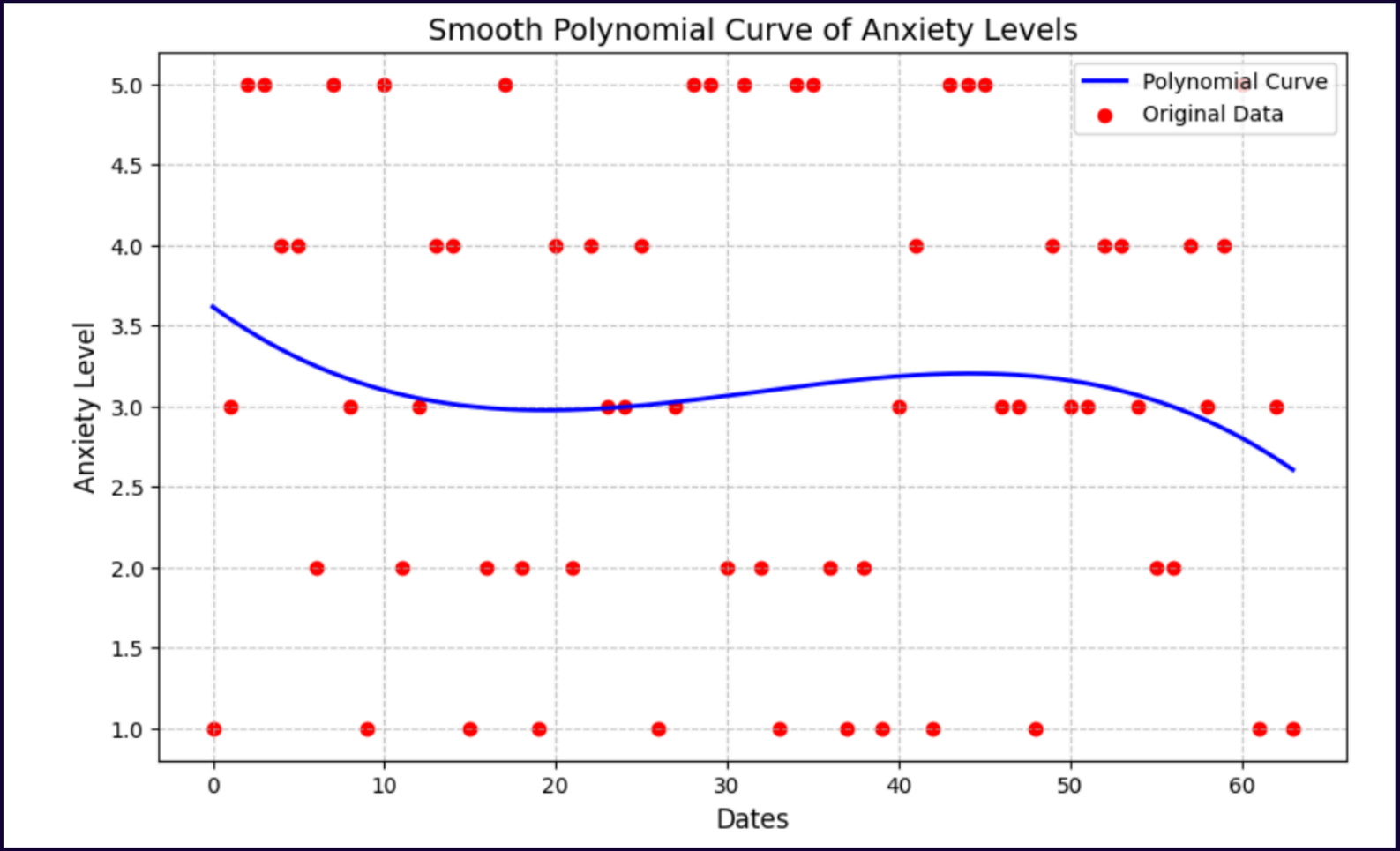


I started to **visualize** my data to gain insight

- The data shows significant variability in daily step counts.
- There doesn’t appear to be a clear trend.

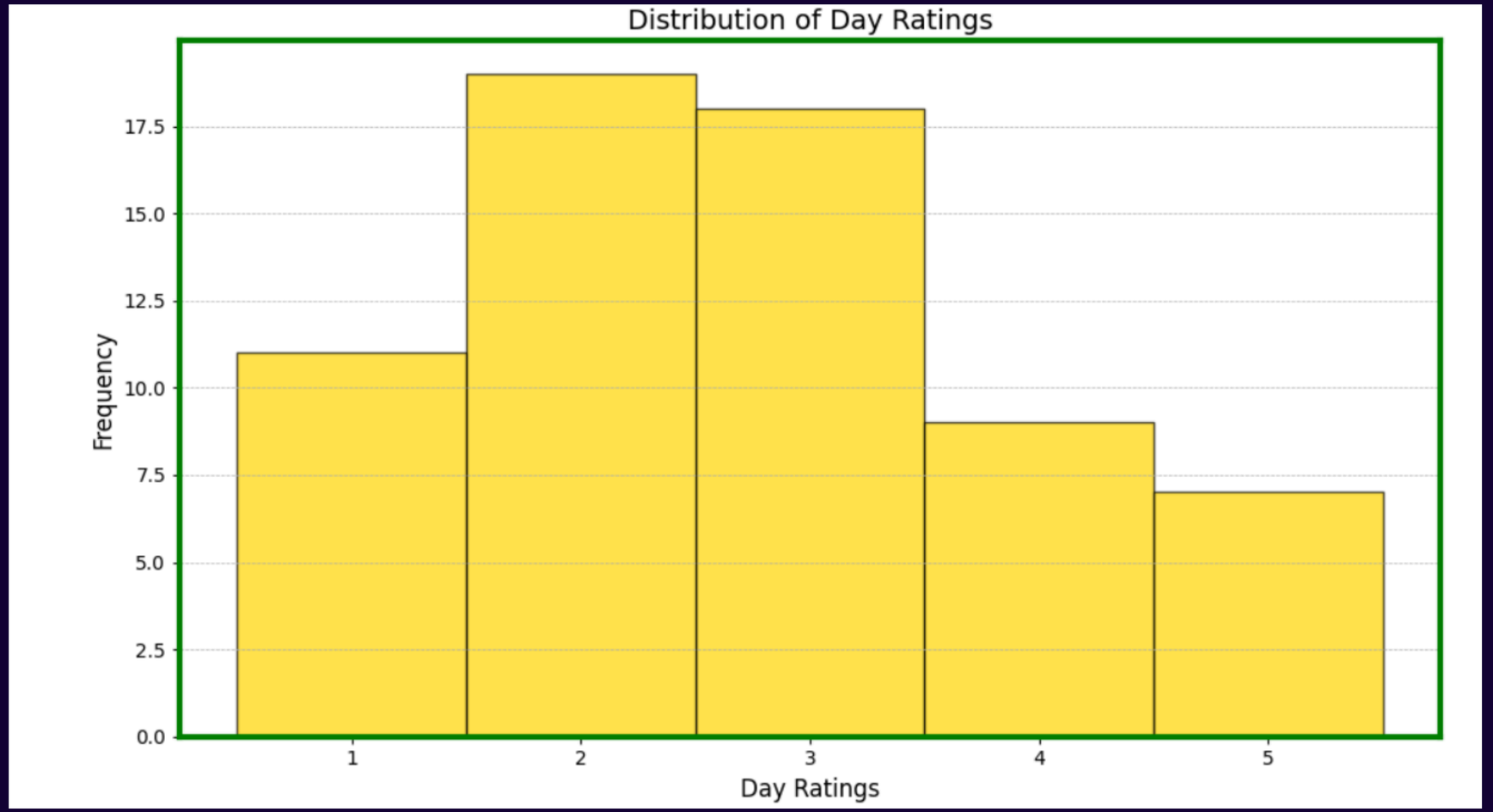


- Since most frequent sleep hour is 7 hrs, it is expected that my relevant day ratings to be boosted.



- This pattern suggests periodic changes in anxiety levels, with possible lower anxiety during the middle dates.

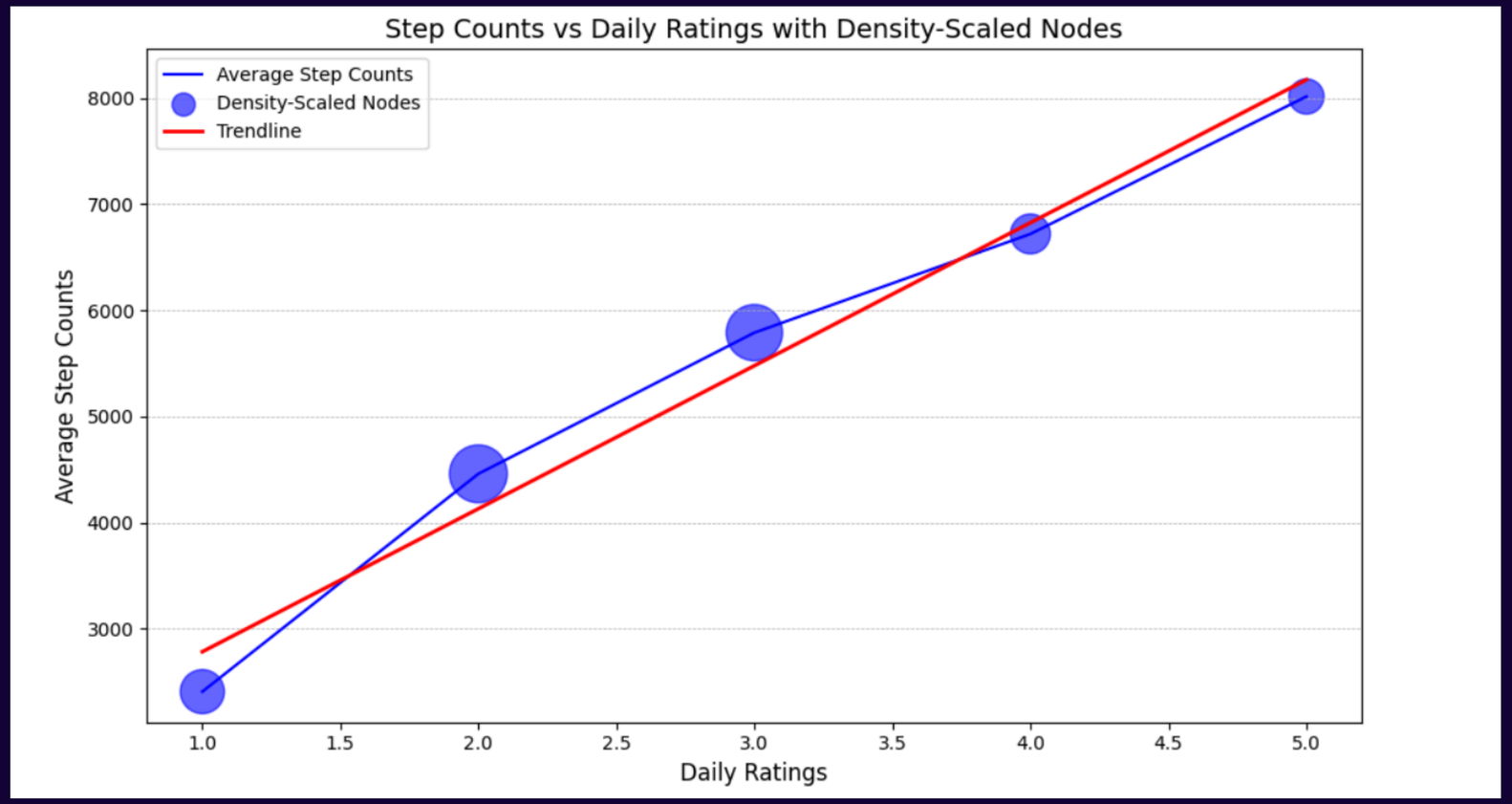
- However, we cannot directly conclude that I be less anxious during middle days of any month, since datum only include 2 months.



- My day evaluations which may correspond to my average happiness level seem to be not extreme, pointing to an average daily mood.

Correlation Analysis

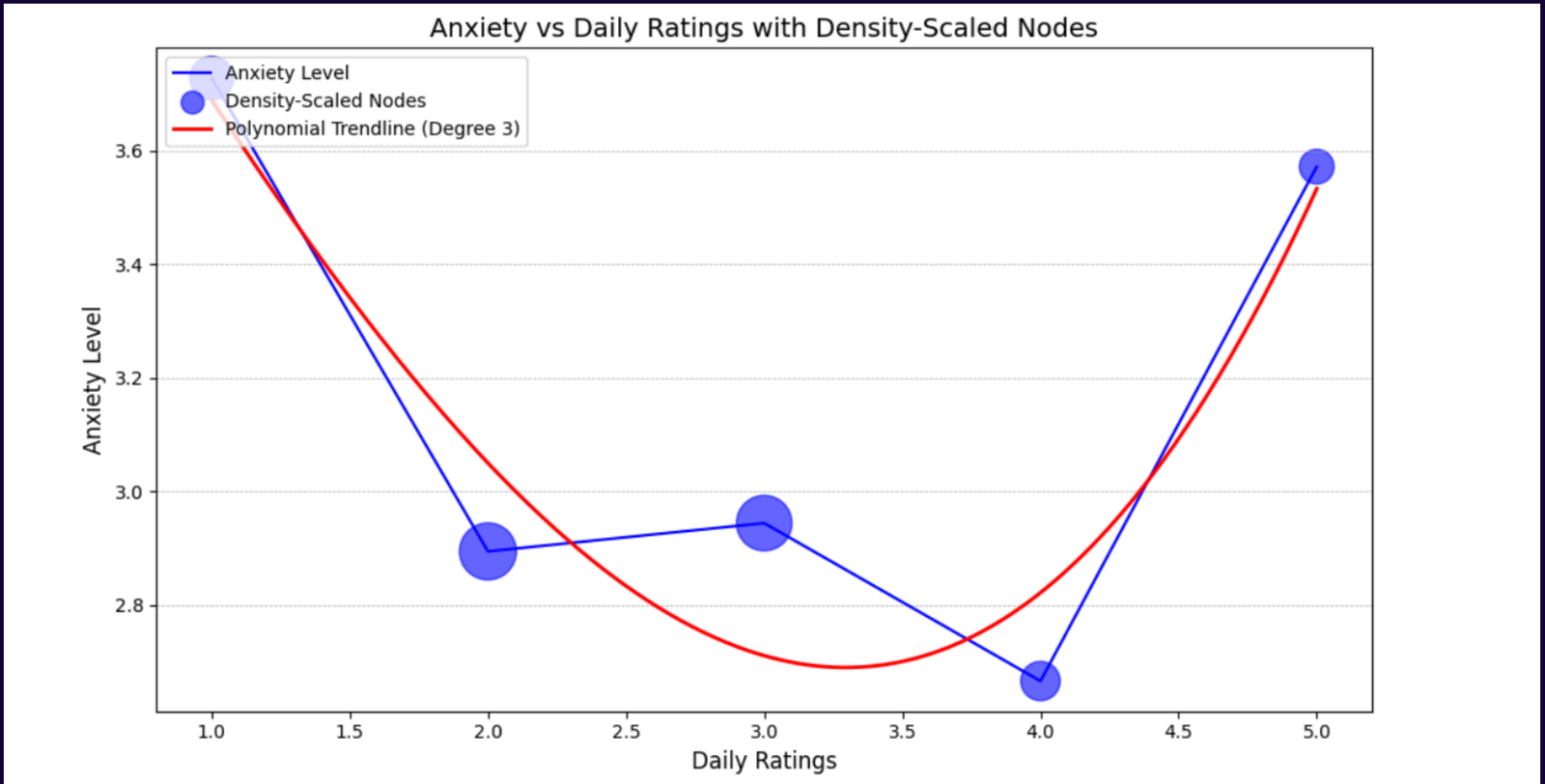
For Step Counts



- It appears to be a positive correlation between Step Counts and daily rating.

Correlation Analysis

For Anxiety Levels

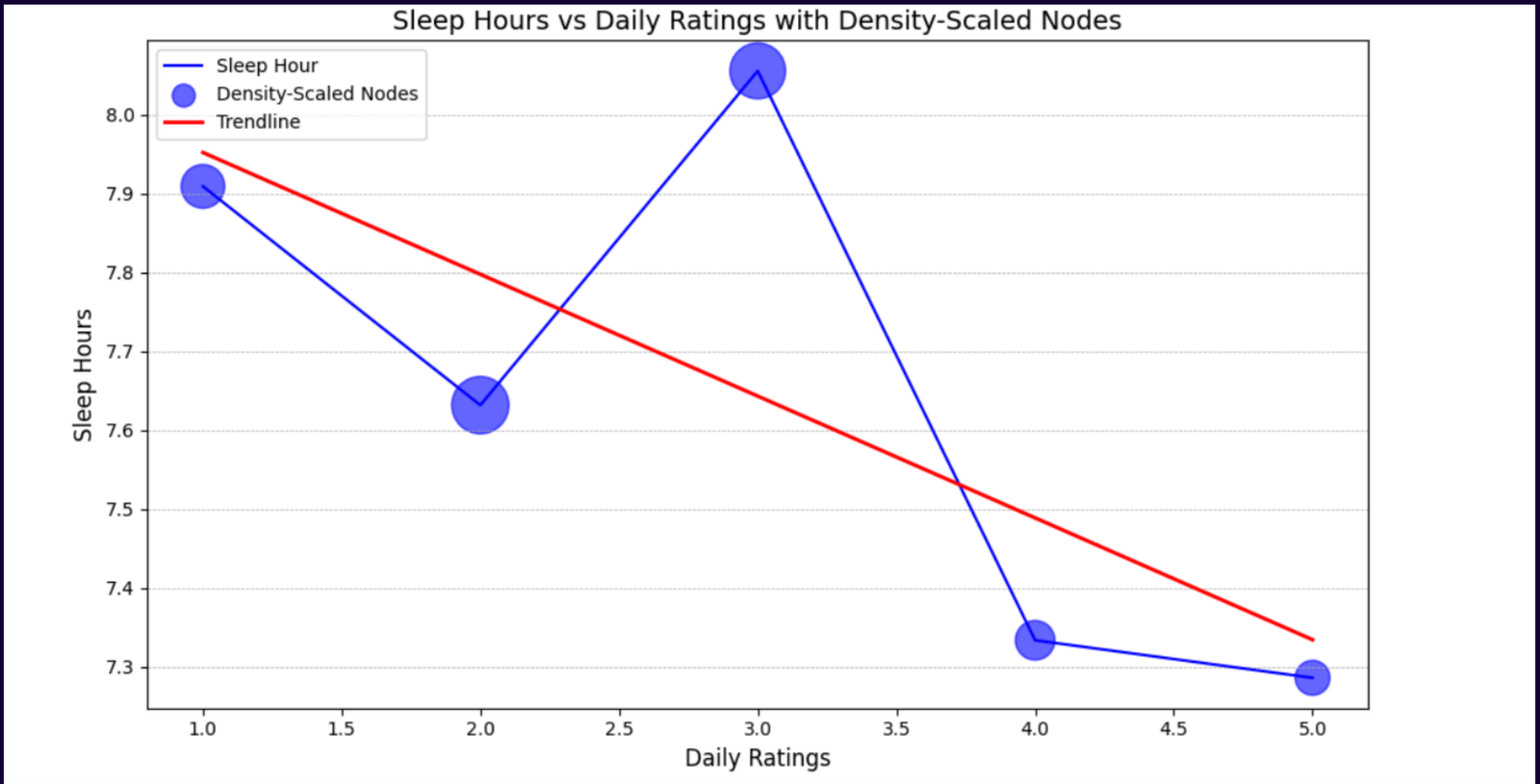


Based on the U shaped relationship observed in the graph and the non-linear trend, the correlation between anxiety levels and day ratings is not strictly positive, we can say.

It can be because of that I study much when I feel anxious, which make me rate my day well :D

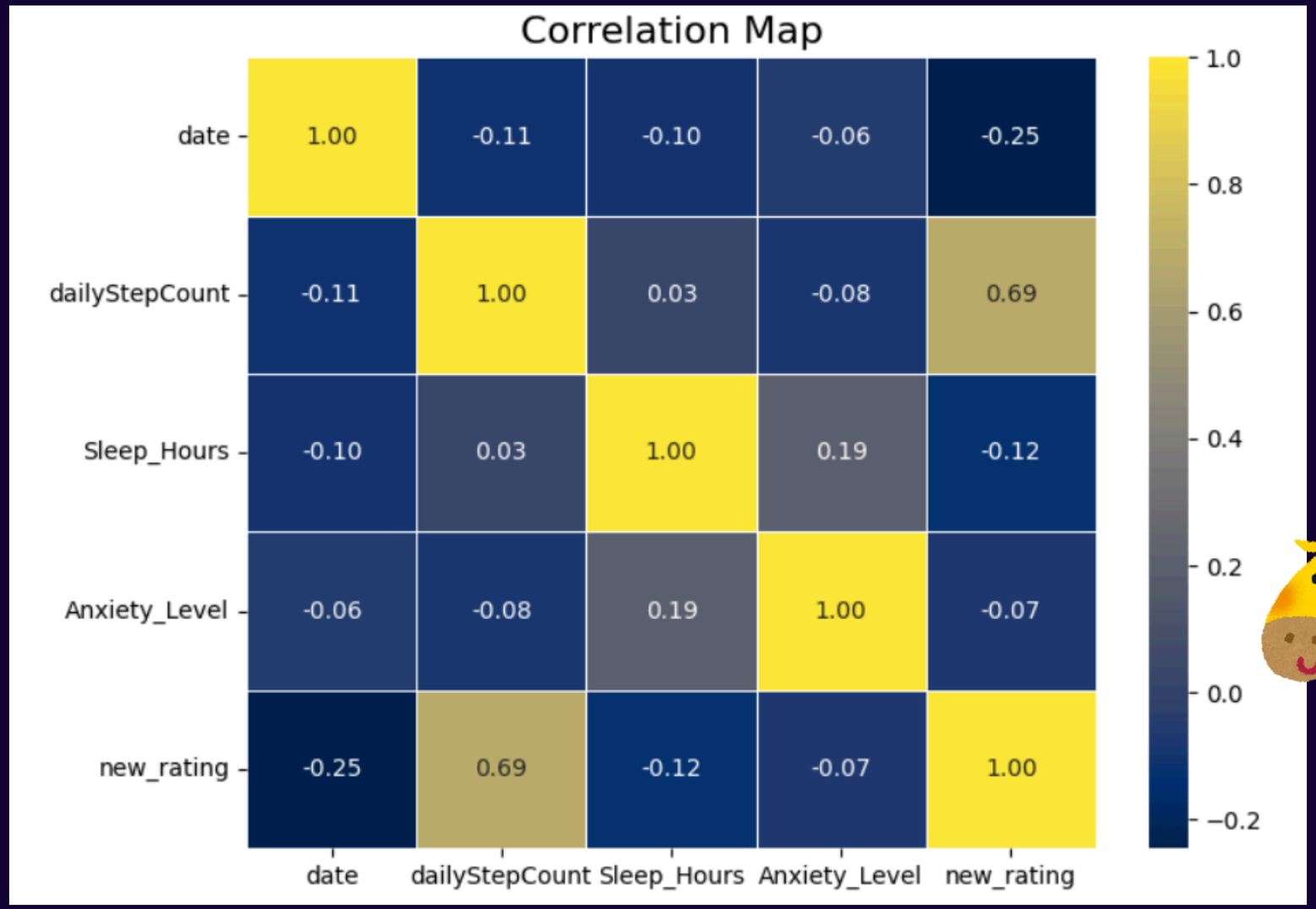
Correlation Analysis

For Sleep Hours



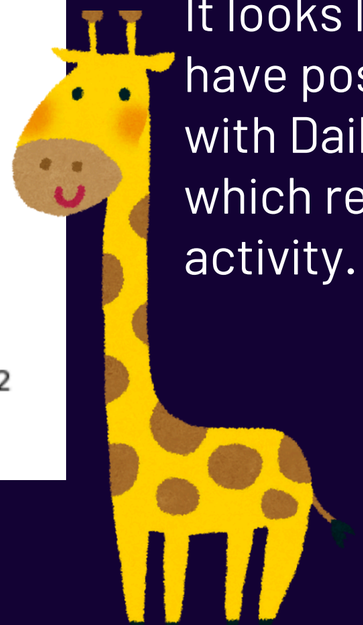
This graph reveals a negative relationship between sleep hours and daily ratings, with higher ratings corresponding to shorter sleep durations.

This is surprising, since we have been suggested to sleep well so that we have a good day, appears to be not that important at all.



A clue, regarding the results

It looks like we have only have positive correlation with Daily step count, which refers to sportive activity.



Hypothesis Testing

```python
from scipy.stats import pearsonr
corr, p_value = pearsonr(merged_data['Sleep_Hours'], merged_data['new_rating'])
print(f"P-value for Sleep Hours: {p_value}")
```

```
P-value for Sleep Hours: 0.32713983279648845
```

```python
corr, p_value = pearsonr(merged_data['Anxiety_Level'], merged_data['new_rating'])
print(f"P-value for Anxiety Level: {p_value}")
```

```
P-value for Anxiety Level: 0.6017088275978877
```

```python
corr, p_value = pearsonr(merged_data['dailyStepCount'], merged_data['new_rating'])
print(f"P-value for Step Counts: {p_value}")
```

```
P-value for Step Counts: 2.7294399552362156e-10
```

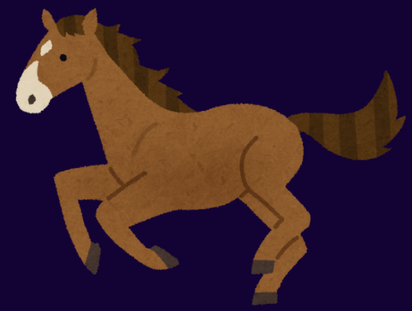
After calculating the corresponding p-values for better analysis, we can observe that:

After calculating the corresponding p-values for better analysis, we can observe that:

- **Hypothesis**: My daily rate of the day increases according to my sleep hours
- **Result**: **Not supported**. P-value indicates no significant impact.

Hypothesis: My daily rate of the day decreases according to my anxiety level
Result: **Not supported**. P-value indicates no significant impact.

Hypothesis: My daily rate of the day increases according to the sportive activity.
Result: **Supported**. The low p-value strongly supports this relationship.



I have learned that:

I should increase my sportive activites to elevate my daily mood.

Wider dataset can reveal more accurate results since current data is just for 2 months.