FINAL TERM PROJECT – FITNESS ENERGY DASHBOARD

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1. Project Overview

This project explores relationships between daily protein intake, sleep duration, workout intensity, and restfulness over a continuous 30■day period. Using D3.js, a custom battery■style visualization was built to reveal energy patterns and recovery trends. The goal was to evaluate whether higher protein intake aligns with longer sleep and how additional factors influence recovery.

2. Research Hypothesis

As protein intake increases, sleep hours also increase.

This hypothesis focuses on the connection between nutritional intake and nightly recovery. Sleep duration is treated as the primary recovery metric, and protein intake represents daily fuel availability.

3. Data Collection Process

Data was collected every morning using the same routine for consistency.

Variables:

• Workout Duration: 0–100 minutes

• Sleep Hours: 6.2–8.5 hours

• Protein Intake: 110–150 grams

• Restfulness: 3–5

All 30 days include notes to provide context such as university workload, soreness, or peak training days.

4. Visualization Design

A battery metaphor was chosen for its intuitive mapping to energy and recovery. The encoding system:

• Battery width → protein intake (linear scale)

• Fill height → sleep percentage (linear scale)

• Color → restfulness score (threshold scale)

• Labels → workout duration and sleep percentage

This approach delivers a clean, minimal, truthful representation following Munzner, Cairo, and Few's visualization principles.

5. Alternative Ideas Considered

Several alternatives were sketched and compared:

• Multiline chart (sleep + protein)

• Scatterplot matrix

• Heatmap calendar

These were rejected because they lacked the emotional clarity and intuitive metaphor achieved by the battery layout. The battery communicates recovery immediately through shape and color.

6. Key Insights

Insight 1 – Higher protein aligns with longer sleep.

Days above 140g protein frequently show 7.8+ hours of sleep, often with green recovery zones.

Insight 2 – Poor recovery reveals multi■factor interactions.

Red■outlined batteries show that high protein alone does not guarantee good restfulness. Sleep fragmentation or heavy workouts reduce recovery.

Insight 3 – Training intensity influences sleep.

Several peak days occur when protein, sleep, and workout duration align.

Insight 4 – Rest days are not automatically high recovery days.

Sleep quality is more important than rest alone.

7. Final Conclusion

The visualization supports the hypothesis with consistent patterns. However, protein and sleep are affected by other variables such as workout duration and recovery quality. The strongest relationships appear when all metrics align optimally.

8. Data Collection Reflection

The process improved my understanding of structured tracking. Recording data daily exposed patterns I previously overlooked. I learned the importance of consistent measurement, avoiding missing values, and maintaining realistic notes for context.

9. Future Improvements

- Add weekly and monthly comparison dashboards.
- Automate data collection via Google Sheets API.
- Add interactive tooltips.
- Track additional metrics such as water intake or HRV.

10. Works Cited

Munzner, T. Visualization Analysis and Design.

Cairo, A. The Truthful Art.

Few, S. Information Dashboard Design.

D3.js documentation and examples from DGM 6109 course.