
Group: BetterBuzz

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Caffeine Productivity & Rest

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OVERVIEW

College students and working adults rely on caffeine to stay awake, study, and get through long days. Even though most people drink coffee, tea, or energy drinks on a daily basis, it is not always clear how each type of caffeinated beverage actually affects **focus** during the day and **sleep quality** at night. A lot of what we “know” about caffeine comes from personal stories rather than data.

Our project, *Caffeine Productivity & Rest*, uses real survey data to explore how different caffeine sources relate to productivity and rest. We want to understand whether certain drinks (like coffee or energy drinks) really help people focus more, and what trade-offs they might have when it comes to sleep. The goal is to move beyond qualitative understanding and actually quantify these relationships.

DATASET

We use the [**Caffeine Intake Tracker**](#) dataset from Kaggle. It contains 500 observations and 13 features that describe people’s caffeine habits and how they feel:

- `caffeine_mg` – Amount of caffeine consumed (normalized)
- `age` – Age of the participant (normalized)
- `focus_level` – Self-reported focus level on a 0–1 scale
- `sleep_quality` – Self-reported sleep quality on a 0–1 scale
- `sleep_impacted` – Binary flag (1 = sleep was negatively impacted, 0 = no impact)
- `beverage_coffee, beverage_tea, beverage_energy_drink` – One-hot encoded beverage type
- `time_of_day_morning, time_of_day_afternoon, time_of_day_evening` – When the person consumed caffeine
- `gender_female, gender_male` – One-hot encoded gender variables

In our code, we combine the one-hot beverage columns into a single categorical feature called `beverage_type` with values like "Coffee", "Tea", and "Energy Drink". This lets us easily group by drink type in our analysis and visualizations.

RESEARCH QUESTIONS

Project focuses on these core questions:

1. Does the type of caffeinated beverage (**coffee, tea, or energy drink**) affect focus levels?
2. Does beverage type affect sleep outcomes, including sleep quality and whether sleep was negatively impacted?
3. How do other factors like caffeine amount and time of day interact with beverage type when it comes to focus and sleep?
4. *(Stretch goal)* Can we build a simple predictive model to estimate the probability that a person's sleep will be impacted, based on their caffeine intake pattern?

HYPOTHESIS

Coffee and energy drinks will have higher focus levels on average, but will have a negative impact on sleep and sleep quality as opposed to tea.

More specifically, we expect:

- **Focus:** Coffee and energy drink drinkers will report higher `focus_level` than tea drinkers.
- **Sleep quality:** Tea drinkers will have higher average `sleep_quality` scores.
- **Sleep impact:** Coffee and especially energy drinks will show higher rates of `sleep_impacted = 1` than tea.

EXPECTED OUTCOMES & SIGNIFICANCE

By the end of the project, we expect to:

- Clearly show how **coffee, tea, and energy drinks** differ in terms of average focus and sleep outcomes.
- Quantify the trade-off between **productivity (focus)** and **rest (sleep quality)** for each beverage type.
- Provide easy-to-understand visualizations that summarize the relationships in the data.
- *(If we complete the stretch goal)* Demonstrate a simple model that can estimate someone's risk of sleep disruption based on their caffeine habits.