HUBERMAN LAB

Use Caffeine for Mental & Physical Performance

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September 4, 2024 | This newsletter is sponsored by **Mateína**

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Join over 800,000 others in getting regular emails from Dr. Andrew Huberman. You'll also receive Huberman Lab's Neural Network Digest, Vol 1, a curated collection of our most impactful newsletters on sleep, fitness and cold exposure.

Thank you for joining the Huberman Lab Neural Network — a once-a-month newsletter with science and science-related tools for everyday life. This newsletter aims to provide you with actionable information in a condensed form.

In the episode "Using Caffeine to Optimize Mental & Physical Performance," I discuss one of the most widely used substances in the world: caffeine.

Most people are drawn to caffeine's ability to increase alertness and reduce feelings of sleepiness and fatigue. This newsletter explains how caffeine affects the brain and body to produce these effects and describes science-supported tools, caffeine schedules and dosages to best leverage caffeine for physical and mental performance.

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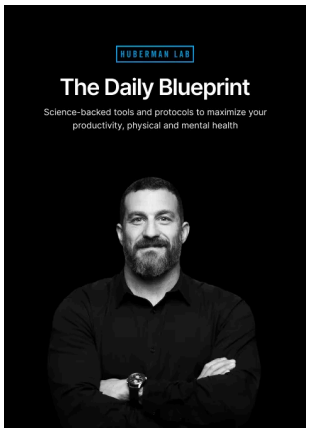

This comprehensive guide covers everything from morning routines and exercise to sleep optimization and stress management, helping you create a balanced, healthy lifestyle.

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Strong Reinforcer

anywhere from 50 to 500 and as much as 800 milligrams of caffeine (!), depending on the size and source.
    - Avoid extended consumption of high levels of caffeine — there is an increased risk of headaches, anxiety, irritability and blood vessel damage.

- Caffeine is a diuretic, causing the loss of fluid, sodium and other electrolytes.
    - Consume equal volumes of water with your caffeine to avoid jitteriness, blurry vision or a low blood sugar feeling.
    - Ideally, add a small pinch of sea salt, table salt or electrolyte-replacement powder like LMNT to the water (Note: LMNT is a Huberman Lab sponsor).

- Supplement: If you experience any anxiety or jitteriness when consuming even smaller doses of caffeine, consider supplementing with theanine to reduce those negative

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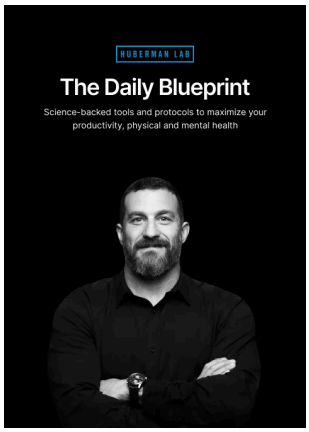

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- Consuming caffeine on an empty stomach allows for a smaller dose to have the same stimulant and performance-enhancing effects.
- Peak focus and alertness will occur ~30 minutes after caffeine consumption and last ~60 minutes.

Sleep & Caffeine

Adenosine builds up during the day and causes feelings of sleepiness and lethargy. Caffeine works by binding to adenosine receptors in the brain and prevents adenosine's effects, which in turn helps us feel less tired and more energetic. However, while caffeine can be an effective tool for combatting daytime drowsiness, it's important to be mindful of its lasting effects on your body.

Although individual genetic variations exist, for most people, caffeine has a quarter-life of approximately 12 hours. So, if you consume caffeine at noon, about 25% of it is still active in your body by midnight. Even if you're able to fall asleep after

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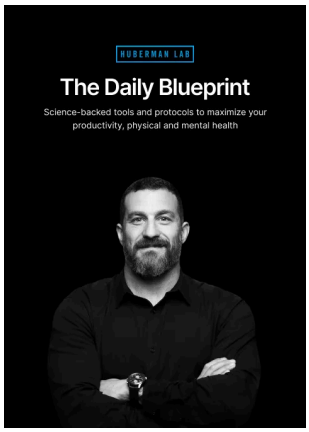

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Physical Performance

Research shows that caffeine consumption improves physical performance, including faster reaction time, heightened alertness, better focus, improved coordination, greater power output and increased endurance. It also reduces fatigue; increases VO2 max; enhances strength, peak power output, and muscle contractility; and improves feelings of well-being during exercise.

Tool: Enhance Performance with Caffeine Abstinence

To experience the maximum performance-enhancing effects of caffeine, abstain from caffeine for a few days (3 to 20 days). Then, on the day of the physical challenge (e.g., marathon), ingest caffeine ~30 minutes before the start. Caffeine's effects are more potent following a period of abstinence for peak performance-enhancing effects.

If multiday abstinence is too painful, try a variation and reduce your daily caffeine dose for 1-3 weeks, or even a few days.

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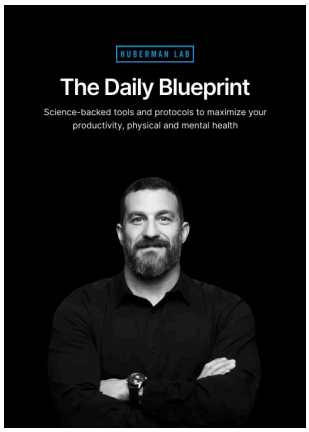

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A spike in dopamine will always be followed by a dip below baseline before it returns to baseline. When dopamine is low, you can feel unmotivated or melancholy until dopamine returns to baseline levels. The worst thing you can do in the below-baseline phase is to try and spike your dopamine again with pharmacology, as that will drive your baseline down even more.

Caffeine is a Strong Reinforcer

We subconsciously prefer drinks and foods that contain caffeine.

In part, these reinforcing effects are due to caffeine's ability to improve focus, alertness, mood and feelings of overall well-being. Caffeine can also increase the number of dopamine receptors within the reward pathways of the brain. This further amplifies the effects of dopamine (and caffeine!).

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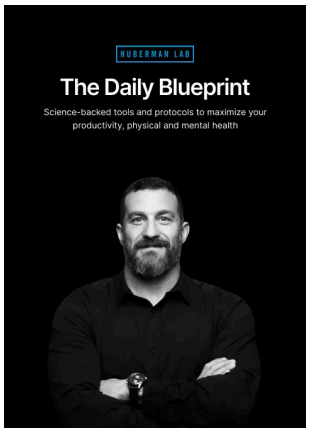

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reinforced through both sugar and caffeine's effects on dopamine.

I hope this overview of the mechanisms and specific tools for how to optimize and utilize caffeine will be helpful as you pursue your physical and mental performance goals. If you're interested in learning more about caffeine science, you can explore our topic page.

Thank you for your interest in science!

Andrew

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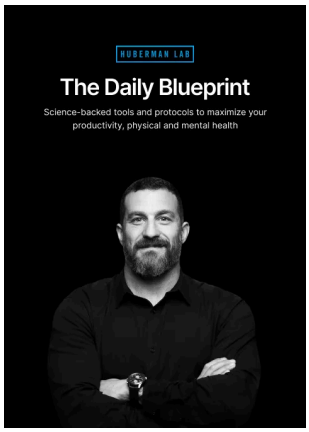

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In the world's #1 health podcast, Dr. Andrew Huberman explores science and science-based tools to help listeners live a healthier, more fulfilling life.

★★★★★ Imagine. Thank you for your dedication to helping us understand ourselves

Dr. Huberman and his guests have been so enlightening to my health and fitness. I have implemented many of the protocols presented to include photo-therapy, cold exposure and many of the workout

Colten V.

★★★★★

This podcast is one of the best out there. I'm learning so much about my body and brain and how to improve my overall health and

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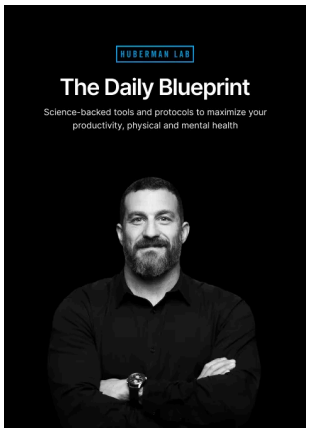

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Constructive Critique