

## **[Transcript] Huberman Lab / AMA #8: Balancing Caffeine, Decision Fatigue & Social Isolation**

Welcome to the Huberman Lab Podcast, where we discuss science and science-based tools for everyday life.

I'm Andrew Huberman, and I'm a professor of neurobiology and ophthalmology at Stanford School of Medicine.

Today is an Ask Me Anything episode, or AMA.

This is part of our premium subscriber channel.

Our premium subscriber channel was started in order to provide support for the standard Huberman Lab Podcast, which comes out every Monday and is available at zero cost to everybody on all standard feeds, YouTube, Apple, Spotify, and elsewhere.

We also started the premium channel as a way to generate support for exciting research being done at Stanford and elsewhere, research on human beings that leads to important discoveries that assist mental health, physical health, and performance.

I'm also pleased to inform you that for every dollar the Huberman Lab Premium Channel generates for research studies, the Tiny Foundation has agreed to match that amount, so now we are able to double the total amount of funding given to studies of mental health, physical health, and human performance.

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And for those of you that are not Huberman Lab Podcast Premium Subscribers, you can still hear the first 20 minutes of today's episode and determine whether or not becoming a premium subscriber is for you.

So without further ado, let's get to answering your questions.

The first question is about the pros and cons of daily caffeine consumption.

The question reads, what is your opinion on the net benefit of daily caffeine consumption and how can somebody determine if daily caffeine consumption is right for them?

Well, first of all, I did an entire episode about caffeine.

You can find that by going to [HubermanLab.com](https://HubermanLab.com).

At that website, you can put in caffeine into the search function, and you'll find links to that episode in all the formats, YouTube, Apple Spotify, et cetera.

And it's time-stamped, of course.

You can navigate to the particular topics most of interest to you.

However, for sake of this discussion, I can summarize a few of the key points.

The most important thing to understand is that for most adults, so that is people about age 18 to 20 or older, daily caffeine consumption is not going to be a problem provided it does not induce anxiety, and certainly provided that not induce anxiety or panic attacks, and provided that it does not disrupt your nighttime sleep.

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This is why I always recommend that if you are going to consume caffeine in any form, coffee, tea, soda, or otherwise, that you try not to ingest caffeine within the eight and ideally within the 10 or even 12 hours prior to bedtime.

That's because the half-life of caffeine is such that even if you are able to, for instance, have a cup of coffee around 3 p.m. or 4 p.m. and then fall asleep around midnight, the architecture of the sleep that you get is going to be disrupted.

For instance, it is very important that you get sufficient amounts of both slow-wave deep sleep as well as rapid-eye movement sleep each night.

If you consume caffeine too close to bedtime, and here I'm defining too close as anywhere from eight to 12 hours before going to sleep, chances are you're not going to get as much rapid-eye movement sleep or slow-wave sleep that you would otherwise.

It is the amount of rapid-eye movement sleep and slow-wave sleep that together lead to whether or not you feel you had a good night's sleep in terms of your next-day alertness and cognitive abilities.

Again, some people may find that they can drink caffeine in the late afternoon, maybe even at night and still fall asleep, but I promise you, even if you're in that category, you will sleep far better, meaning the architecture of your sleep will be better and you will feel far more rested the next day if you abstain from caffeine within the eight to 12 hours prior to bedtime.

I should also say that none of us are perfect, myself included.

I will sometimes have a cup of coffee in the late afternoon and sometimes that will cause me to stay up a little bit later.

Sometimes it won't.

I don't think you want to obsess or worry too much about having some caffeine every once in a while in the late afternoon if you are still able to fall asleep, but don't make it a regular habit.

Now, as far as we know, there is no drawback to consuming caffeine on a daily basis.

Again, provided it does not disrupt your nighttime sleep and provided that does not induce anxiety.

In fact, most of the world consumes caffeine every single day.

The current estimates are that 90%, that's right, 90% of adults throughout the world consume a caffeinated beverage every single day.

That's a staggeringly high number making caffeine the most popular drug on the planet.

In fact, because of the way that caffeine works, and just to remind you how it works, it effectively blocks adenosine receptors.

Adenosine is a molecule that builds up in your brain and body more and more according to how long you've been awake.

It makes you feel sleepy.

Caffeine blocks the adenosine receptor and then when it is dislodged from that receptor, whatever adenosine has built up and is around can then bind to the adenosine receptor and makes you feel very sleepy.

That's the caffeine crash.

So if 90% of the adult population of the planet Earth is consuming caffeine every day, that means 90% of the adult population of planet Earth is blocking their adenosine receptors

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for some portion of their daily life and then their adenosine is binding to the vacant receptor once the caffeine has dislodged.

And why are 90% of adult humans consuming caffeine every day?

Well, to feel more energized, more focused, to have more both cognitive energy and physical energy.

Now, of course, most people are not walking around thinking, Oh, caffeine gives me more energy, more focus, etc.

Most people are consuming caffeine every single day and are consuming caffeine every single day in order to feel quote unquote normal to be at their baseline level of cognitive ability and physical energy and so on.

In fact, if you look at the data on caffeine consumption, what you'll find is that caffeine actually is a cognitive enhancer.

It can improve learning and memory.

It can increase physical energy.

It can increase mental and physical stamina.

But a feature of those studies that's not often discussed, but that was however discussed in the full episode on caffeine is that studies of caffeine typically are done by taking chronic caffeine users and then having them abstain from caffeine for some period of time, usually four days to two weeks in which time they undergo caffeine withdrawal.

They do not feel well.

They get foggy headed.

They have less energy.

There's some malaise, sometimes even some mild depression.

And then what they do is they have people take caffeine and take a cognitive exam or do some physical activity and compare their performance to what it was when they were in the withdrawal state.

Another typical form of study on caffeine is to take people who are naive to caffeine or who never take caffeine and then have them ingest caffeine and then measure their cognitive and or physical performance.

And in both cases, you see improvements.

What I'm saying here is that daily caffeine consumption is not going to lead to improvements in cognitive ability or improvements in physical ability above one's baseline unless you either abstain from caffeine for some period of time, typically four days to two weeks prior, or you are not somebody who typically ingests caffeine.

In other words, 90% of the world's population is drinking caffeine on a daily basis to be at their normal level of mental and physical functioning.

So the question was, is there a net benefit to daily caffeine consumption?

And here I can reliably say, provided you don't suffer from anxiety attacks or lack of sleep from the caffeine consumption, provided that you're mindful of not ingesting caffeine too late in the day, there doesn't seem to be any big drawback to drinking caffeine on a daily basis.

However, there doesn't seem to be any great benefit, at least in terms of direct effects on cognitive or physical ability.

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Okay, so I realized this is a little bit of a convoluted answer, but we have to be honest with one another here.

Caffeine is a performance enhancing drug, but only when compared to the non-caffeinated state and 90% of the adult population of the world is caffeinated.

So adding more caffeine above what you would normally consume is certainly not going to allow you to think better and perform better physically.

Here's a useful way to think about caffeine.

Most people can pretty well tolerate doses of caffeine anywhere from 100 milligrams to 300 milligrams, depends on body weight and depends on your tolerance, tolerance, of course, based on how familiar you are with the effects of caffeine and how regularly you consume it. A typical cup of coffee, which by the way does not exist, depending on the vendor, depending on how much water to coffee ratio one uses, depending on whether or not it's French press or it's pour over, the type of coffee, et cetera, all of that is going to determine the total amount of caffeine in that coffee.

But we can set some outer bounds on the total amount of caffeine that likely exists in a cup of coffee.

And it's probably somewhere between 100 milligrams that would be on the weaker side for a six or eight ounce cup of coffee out to about 300 milligrams for the equivalent six to eight ounces of coffee.

But if you were to brew your coffee very, very strong, or like me occasionally throw a shot of espresso in there too, you could get that number up to 400 or 500 milligrams of caffeine.

I personally tolerate caffeine pretty well.

I've been drinking caffeine since I was a teenager, mostly in the form of brewed, unflavored Yerba mate tea.

It's important to stay away from the smoked varieties of Yerba mate.

If you're going to get your caffeine from Yerba mate, the smoked varieties can be carcinogenic. The non-smoked varieties don't seem to have that property, but there's a lot of caffeine in Yerba mate.

So I'll drink Yerba mate and have for many, many years, or I'll drink black coffee or espresso or espresso americano, things of that sort.

That's my preferred source of caffeine.

Most people are drinking coffee to get their caffeine.

And I would say that if you are going to drink your caffeine, drink it in the early part of the day.

As I mentioned earlier, I am a big proponent of delaying your first caffeine intake until at least 90 minutes after waking in order to avoid the afternoon crash.

I've talked a lot about this on the podcast.

There are a lot of clips on the internet explaining the rationale behind that.

And if you do experience an afternoon crash in energy, I do recommend delaying your morning caffeine intake to 90 to 120 minutes after waking.

Now for people that want to get more of a true cognitive enhancing and performance enhancing effect from caffeine, again, you're going to have to abstain from caffeine for about

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four days.

For regular caffeine drinkers, that's going to be difficult.

That is going to lead to headaches.

That's going to lead to brain fog.

That's going to lead to feelings of malaise.

In fact, the last time I took four days off or even a week off from caffeine consumption was when I was sick.

I don't get sick very often.

But when I am sick, I generally abstain from caffeine.

And sometimes I wonder whether or not the malaise I feel from whatever viral or bacterial thing I might be dealing with when I'm sick is in part the malaise of caffeine withdrawal.

I certainly notice I feel much better when I return to drinking caffeine, but that tends to coincide with feeling relief from whatever sinus symptoms and other symptoms that might have been experiencing from the illness.

So it's not a good experiment.

I can't tease apart those variables.

So the short answer is for most adults, there does not seem to be any major downside to consuming caffeine.

And there have been scattered reports here and there in humans showing that ingesting caffeine can increase dopamine receptors, which will effectively allow you to get more out of the dopamine that you produce.

This is why caffeine has a mood elevating as well as energy elevating effect.

I should point out that some people just cannot tolerate caffeine.

It makes them too jittery, too anxious.

They start sweating.

They get heart palpitations.

It's very hard for these people to build up a tolerance to caffeine that allows them to enjoy it.

These are the people that can even feel a fluttering of the heart and a lot of energy lift from decaf coffee, something that to me is just a foreign concept, but some people are just that sensitive to caffeine that even the small amounts of caffeine in chocolate or decaf coffee make them feel too alert.

And they should abstain from caffeine.

I don't think they are in any way harming their health by abstaining from caffeine.

Then there's the issue of children and adolescents and teenagers and young adults ingesting caffeine.

And I covered some of this in the episode about caffeine, but there's been a lot of debate as to whether or not caffeine can cause osteoporosis, whether or not can leach calcium out of the bones, whether or not can stunt growth.

Frankly, there's not a lot of evidence for those sorts of claims.

And yet the developing brain is a very tender and malleable environment.

And as somebody who started off his career as a developmental neurobiologist studying developmental brain plasticity and wiring, it does sort of make me cringe to think about

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children younger than the age of, say, 14 ingesting large amounts of caffeine in any form, soda, coffee, tea, et cetera, despite the fact that there's very little evidence that it can stunt their growth.

I don't personally like the idea of the young brain being bathed in an adenosine receptor antagonist, which is effectively what caffeine is.

As much as possible, one wants the developing brain to develop in a milieu of unencumbered, nonchemically encumbered interactions between neurotransmitters and their receptors, unless of course there's a clinical need for a prescription drug or a supplement or some modification of a nutritional program specifically to up or down regulate the dopamine system or up or down regulate the serotonin system.

But those are the sorts of decisions that really should be made in close oversight and recommendations by a psychiatrist.

So the short answer around daily caffeine consumption in young people, meaning 14 and younger, is avoid it if you can have your children avoid caffeine if they can.

The occasional bit of caffeine is probably not going to be a problem.

The amount of caffeine in small amounts of chocolate probably not going to be a problem.

But caffeine in the form of energy drinks, sodas, coffee, tea for children younger than 14 just seems like a bad idea from everything we understand about brain wiring and the trajectories of brains that develop with a lot of chemical adjustment from other sources like caffeine.

Now for kids age 15 to say 18 or 20, a lot of brain wiring is still occurring, but a lot of it has been completed.

So probably not as risky to consume caffeine every once in a while or maybe even on a daily basis.

But there are two, I think there are great advantages to limiting the amount of caffeine that one ingests.

And of course, in the adolescent and teen years, nowadays a lot of kids are consuming energy drinks and soda.

And some of those energy drinks and sodas contain a lot of caffeine anywhere from 200 to 800 milligrams of caffeine.

And nowadays more sodas and energy drinks contain other things like amino acid precursors to neuromodulators like dopamine.

So for instance, a lot of energy drinks now contain ltyrosine, which is a precursor to dopamine.

A lot of them will contain theanine.

I've talked about theanine as a supplement that can promote more restful sleep if taken 30 to 60 minutes before sleep.

The reason why a lot of energy drinks and sodas and frankly now coffee brands are including theanine in the coffee or energy drink or soda is because it tends to have a mild anxiety reducing effect and it reduces the jitters that caffeine creates.

And so that's actually a trick that these companies are using in order to get people to ingest more caffeine because by including the theanine, it's preventing the kid or adult from feeling too jittery and therefore they can continue to consume that drink without feeling like they're overstimulated.

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So if I were to take the parental neuroscientist adult voice here, I would say avoid caffeine intake as much as you can until you're about 18 years old.

But I'm realistic.

I realize that adolescents and teens age say 14 or 15 out to 18 and older are going to be consuming caffeine in the form of energy drinks and sodas, but reducing the total amount of caffeine that one is ingesting in those years, it just seems really advantageous again for all the same reasons I mentioned earlier.

You don't want the young brain bathing in a bunch of exogenous meaning externally introduced neurochemicals or in things like theanine or L tyrosine.

If you're going to indulge in caffeine or in energy drinks or theanine or L tyrosine for that matter, that's the sort of thing that probably is best left for people 18 and older.

And even there, if one finds that caffeine is for them, as do I, I think always best to try and get your caffeine from a clean source, a clean source meaning something that contains just coffee or just tea.

Again, this isn't a knock on energy drinks specifically, but you really have to make sure that whatever energy drink you're going to consume, you know what's in it.

You recognize what the different ingredients do and you recognize the potential of ingesting those ingredients chronically over and over again.

And I've talked a little bit about this on previous podcasts and I'll get into this again.

Maybe we'll do an entire episode about energy drinks because they are so commonly consumed nowadays.

Now getting back to the original question about daily caffeine consumption, this person goes on to say that for them, okay, this is their personal experience after a few weeks of consumption of daily caffeine, the negatives start to outweigh the positive ones.

They're getting poor quality sleep, lack of appetite, anxiety, et cetera.

And when they don't consume caffeine, they find it a lot easier to be mindful and their meditation practice is much better, but they're lethargic and less motivated.

Okay, so what they're describing are all the classic symptoms of caffeine overuse, probably not abuse in this case, although caffeine can be truly abused, people taking caffeine pills, et cetera, in large quantities.

We're not talking about that, but this person is describing the classic pattern of overuse of caffeine and the classic pattern of withdrawal from caffeine when they stop taking it.

So what should somebody like this do?

And I think that's an important question to answer because I think a lot of people fall into this category.

They drink caffeine every day.

They're no longer getting the performance enhancing effect of caffeine.

So they're taking it just to be normal or feel like they can focus normally and have normal amounts of energy.

But then if they try and come off, they feel worse.

Okay, there are a couple of ways to do this.

You can taper your caffeine intake off over the course of four to seven days, but most

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people don't have the discipline or don't want to spend the time doing that.

But if you want to, the way you would do that is you would cut it by about 10 or 15% per day.

You could do that by volume or you could do that by concentration of coffee, that sort of thing.

A simpler way to go about all this, that still will allow you to get some of the performance enhancing effects of caffeine and yet experience far less withdrawal would be two things.

First of all, just have your amount of caffeine intake for two or three days.

So again, that could be by volume or it could be by concentration, probably easiest to do by volume.

And so instead of drinking an eight ounce coffee in the morning, maybe you do four ounces of regular coffee, four ounces of decaf or you just have the four ounces of coffee.

You do that for three or four days.

And then you take perhaps one full day off from caffeine, maybe another full day off.

You're going to feel a lot less bad on those two days, having cut your caffeine intake in half in the previous four days, than you would if you just went cold turkey.

And then you go back to ingesting caffeine, but you go back to ingesting caffeine at that 50% dose or what used to represent that 50% dose of caffeine for you.

And you just continue that way on a daily basis.

And then every once in a while, when you want the performance enhancing effects of caffeine, you go back to what was your original dose, which is now double what you're taking on a daily basis.

So what we're really talking about here is not going cold turkey.

We're not talking about quitting caffeine indefinitely.

What we're talking about is cutting the amount of caffeine that you drink in half for about four days, okay, plus or minus a day, and then taking two days off from caffeine completely and then going back on that half dose of caffeine indefinitely.

That's your new baseline of caffeine intake.

And then every once in a while, if you need a bit more of a lift, you ingest twice as much caffeine or a coffee that's twice as concentrated.

We should acknowledge that most people aren't going to be really precise about the amount of ounces and the amount of caffeine.

Nonetheless, it's pretty straightforward to know that you're reducing your caffeine intake.

Certainly it's clear to know if you're ingesting no caffeine for a couple of days.

It's pretty clear when you're doubling the amount of caffeine, but you don't have to worry so much that you're exactly doubling the amount of caffeine.

You could drink one and a half times as much as you happen to drink on the day before, or you could drink three times as much.

You would definitely feel it if you drink three times as much.

One very important thing to recognize is that on any day where you really spike your caffeine intake above baseline, no matter where that baseline is, when you start, could be zero, could be 400 milligrams, could be 200 milligrams, when you double that intake, you will get a big boost of energy.

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The next day, you're going to feel the crash from that.

You're going to feel more lethargic.

You're going to feel not so good.

This has to do with dopamine receptor modulation.

This has to do with adenosine receptor modulation.

The important thing to do is not continue to consume that elevated level of caffeine, which is what most people do, and then they set a new higher baseline just to feel normal.

The key thing is to just manage to get through that crash day, manage to get through that one day where you feel a little less good or maybe even down a bit.

Get outside a bit.

Get some more sunshine.

We know that spikes your cortisol in a good way.

It can increase the catecholamines, dopamine, et cetera.

Get a little bit more sunlight.

Get a little bit more movement.

Get outside.

Do something to offset those feelings of malaise and then get right back to your original goal level of caffeine each day.

There's no use in getting so quantitative that you make your life miserable, measuring things out like a laboratory chemist.

If you're that type and you want to do that, be my guest, but unless you're taking caffeine in pill form, it's very, very hard to get extremely exact about the amounts of caffeine that you're ingesting.

So it is okay to eyeball it, but understand the contour of how caffeine works and what the caffeine performance enhancing effect comes from.

It comes from a caffeine intake above baseline.

Understand that anytime you go above baseline with your caffeine intake, there's the potential of some anxiety.

Understand that there's going to be a slight withdrawal effect that lasts about 24 to 48 hours, battle through that short period, and you'll be right back where you started and where you need to be so that you can enjoy caffeine on a daily basis and derive the benefits because there are many benefits to drinking caffeine and avoiding some of the potential hazards.

And again, if you're a young person, I recommend delaying that caffeine intake.

Maybe, I don't know, 10 years.

Thank you for joining for the beginning of this Ask Me Anything episode to hear the full episode and to hear future episodes of these Ask Me Anything sessions, plus to receive transcripts of them and transcripts of the Huberman Lab Podcast Standard Channel and premium tools not released anywhere else, please go to [HubermanLab.com](https://HubermanLab.com) slash premium. Just to remind you why we launched the Huberman Lab Podcast Premium Channel, it's really two-fold.

First of all, it's to raise support for the standard Huberman Lab Podcast Channel, which of course will still be continued to be released every Monday in full length.

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We are not going to change the format or anything about the standard Huberman Lab Podcast and to fund research, in particular research done on human beings, so not animal models, but on human beings, which I think we all agree is a species that we are most interested in.

And we are going to specifically fund research that is aimed toward developing further protocols for mental health, physical health and performance.

And those protocols will be distributed through all channels, not just the premium channel, but through all channels, Huberman Lab Podcast and other media channels.

So the idea here is to give you information to your burning questions in depth and allow you the opportunity to support the kind of research that provides those kinds of answers in the first place.

Now, an especially exciting feature of the premium channel is that the Tiny Foundation has generously offered to do a dollar-for-dollar match on all funds raised for research through the premium channel.

So this is a terrific way that they're going to amplify whatever funds come in through the premium channel to further support research for science and science-related tools for mental health, physical health and performance.

If you'd like to sign up for the Huberman Lab premium channel, again, there's a cost of \$10 per month, or you can pay \$100 up front for the entire year.

That will give you access to all the AMAs.

You can ask questions and get answers to your questions.

And you'll of course get answers to all the questions that other people ask as well.

There will also be some premium content, such as transcripts of the AMAs and various transcripts and protocols of Huberman Lab Podcast episodes and not found elsewhere.

And again, you'll be supporting research for mental health, physical health and performance.

You can sign up for the premium channel by going to [hubermanlab.com slash premium](https://hubermanlab.com/premium).

Again, that's [hubermanlab.com slash premium](https://hubermanlab.com/premium).

And as always, thank you for your interest in science.