

TRANSCRIPT

The image shows a webinar title card. On the left, a grey vertical bar contains the text 'TUES MAY 25'. To the right, a purple banner features the text 'LIVE BETTER LONGER WEBINAR' in yellow, 'The Power of Sleep' in white, and 'featuring' in yellow. Below the banner are three portrait photos of the speakers: Constance H. Fung, M. Brandon Westover, and Sarah Smith. Each photo is accompanied by their name and title.

**TUES
MAY
25**

LIVE BETTER LONGER WEBINAR

The Power of Sleep

featuring

Constance H. Fung, MD, MSHS
Sleep Medicine Expert

M. Brandon Westover, MD, PhD
Sleep and Neurology Expert

Sarah Smith
Editor in Chief,
Prevention

presented by **afar** american federation for aging research | **Prevention**

Sarah Smith (SS):

Hi everyone. Thank you for joining The Power of Sleep, part of the Live Better Longer series from the American Federation for Aging Research and Prevention magazine. I'm Sarah Smith, the Editor-in-Chief of Prevention, the health and wellness magazine and site where we're fascinated, not just by what's good for us, but why it's good for us. So naturally, I'm very excited today to be talking to two accomplished scientists so we can learn more about sleep. And go a little deeper than you need it.

If you haven't joined us for a Live Better Longer webinar before, we are so glad to have you. And if you have, terrific. So then you already know that what we're doing is having fascinating conversations with leading experts so that we can share, not just the latest research around health and aging, but understand how to apply it to our lives. AFAR is a leader in supporting aging research, really making sure this area of research, which affects all of us, gets the attention it deserves.

And Prevention has a long history of bringing advice and ideas to people across the country. So today I am thrilled to be talking to Connie Fung of UCLA, and Brandon Westover from Mass General about their work, helping us to understand our brains and the science of sleep and everything we need to keep ourselves living healthy and happy, and good and long. So doctors by way of introduction, could you tell us how you got involved in sleep research? What drew you to it and what are you focused on right now? Connie, would you start us off?

Connie Fung (CF):

Sure. Thank you so much for inviting me to be here today. I'm really excited. So, yes, my interest in sleep research really evolved from some longstanding interest in healthy aging.

Really ever since I was in undergrad, I've been interested in ways to help individualize, maximize their daytime function long-term, really to be able to help people do the things they want to do in their daily lives as they're growing older.

My interest in sleeping aging developed when I was on a project that was looking more broadly at quality of care in older adults, and I was overseeing some systematic reviews, really looking at what's already been published on a variety of conditions, including sleep. And I saw that sleep affects so many aspects of people's lives and improving sleep can have immediate impact on daytime function.

And so I really wanted to shift my focus to developing interventions that can improve sleep in older adults. And my current research focuses on chronic insomnia disorder and sleeping pills. I have an ongoing clinical trial that aims to identify the best method for switching patients who have chronic insomnia disorder and using sleeping pills to switch from sleeping pills to a non-medication approaches for chronic insomnia disorder.

SS:

So interesting. Thank you. And Brandon, how about you, tell us about what got you into this and what you're working on?

Brandon Westover (BW):

So I got interested in brains and when I was, I think, five or six, we went on some field trip with scouts and saw monkeys getting EEGs and I had the idea that someone who was reading their thoughts, which was not true, but it got me really interested in, and I've always been interested in math. And so as a PhD student, I was interested in using computational approaches and mathematical approaches to understand how the brain works. I wasn't initially interested in sleep, but after I became a neurologist, I specialized in EEG. I do a lot of monitoring patients who are critically ill.

And one of the things that we noticed is that they almost never have normal sleep, and often they're confused and disoriented and started wondering about the connection between lack of sleep in that setting and some of the cognitive problems that they have. And then, on the other way, I guess I had a very good friend named Matt Bianchi, who was just always telling me about the opportunities in the sleep field to automate a lot of the tedious things that we do, annotating data and as a way to maybe learn more from this very rich data about brain health.

So I've been able to attract it to sleep as a window into the health of the brain, an opportunity to use machine learning or computational approaches, and just a way to better understand how we can help people, especially who are critically ill to maybe fare better in terms of how well their brains function while they're in the hospital and after they get out.

SS:

Great. These are two really fascinating approaches, I'm looking forward to diving in with you both. Before we do though, I do have to ask something I've been very curious about, which is that, does being a sleep researcher mean you've got it all dialed in, do you sleep beautifully every night?

BW:

I've always had trouble with insomnia myself actually. I get working on a problem and can't quit thinking about it even if I really want to. But yeah, the more I learn about sleep and the more... I think I've internalized some of the lessons that we've learned, I certainly understand better the importance of it and try to give myself enough opportunity to sleep.

SS:

Yeah. What about you, Connie? Do you sleep well?

CF:

Well, last night, it was hot, so it maybe it wasn't the best night. But I do, like Brandon try to put to you some of the advice regarding expectations asleep that I give to patients which is, I say to myself, okay, last night it was a little hot, but every once in a while people may have a night that's not so great. And it doesn't mean that it's going to be like this every night. And I certainly, I can take steps to make my sleep better over the next few days and things will improve. So I try to do some of the things that I bite.

SS:

That's great. That's very reassuring and I'm sure we will get to some of those things later so that we can all try to start working on them ourselves if we're not sleeping well. But I'd love to start with a little bit of background so we're all on the same page. Brandon, could you walk us through what's happening in the brain when we sleep? I think most people have heard of REM sleep or REM, I don't know. You have to tell me how you say it. But what is that stage? What are the other stages, what's literally going on?

BW:

Yeah. So you'll have to forgive me for describing this through the lens of the EEG, it's the world that I live in.

SS:

Just to be clear, is that the monkey mind reader?

BW:

Yeah. It is the monkey mind reader. So it's the electroencephalogram, this is, you put wires or electrodes on the outside of a person's head. So it's not invasive. You can measure the electricity the brain generates and see what happens when they're going to sleep, at least from an outside point of view. But yeah. So when you go to sleep, the brain is not just shutting down, it's actually doing something active and very important to the health of your brain and actually the rest of your body. So the stages of sleep that you typically will go through are, the first stage is called non-REM stage one, which is, or drowsiness. And so the EEG will go from this fast, these oscillations, if you look at the EEG there, they're usually low voltage when you're awake and fast and they slow down. So fewer of them per second as you start to get drowsy.

And then as you go into the second stage, non-REM stage two asleep, there appear these very beautiful little events that we call spindles, which are thought to be very important in helping

transfer memories that you've formed during the day or things you learned from the short term memory box of your hippocampus, that structure in the brain and then it transfers it to the longer-term storage up in the other parts of your brain, so that's going on.

And then as you get into the deeper stages of sleep, we're just starting to understand better what that stage is for, but there's these very slow oscillations in the electrical activity of your brain and those slow waves are thought to be related to this process of cleaning your brain out, cleaning out the proteins, for example, that accumulate while you're awake.

Actually your brain shrinks a little bit when you're asleep and this allows the fluids to flush out some of the proteins, including ones that are responsible for, or at least contribute to the development of neurodegenerative disease like Alzheimer's disease. And then at certain points while you're asleep, there's a switch from these non-REM sleep, the restorative sleep to the REM sleep, rapid eye movement sleep.

And when you're in that state, in most people thankfully you're actually paralyzed. And that's the stage when you have most sort of vivid dreams and I think there's less, I'm not sure if Connie would agree, but I think that basically we understand what that stage is for a little less than the other stages, but it's thought to be important for forming associations between memories, for example, and probably plays a role in emotional and social health, perhaps because it helps us associate different ideas.

So there's this very active electronic symphony going on which plays essential roles in learning and memory, preventing cognitive problems or neurodegenerative disease. And then that's just the brain part. There's also sleep as related to the health of the rest of the body, the immune system, and so on.

SS:

Great. Okay. Thank you. So that's a great look at what's happening. So Connie, tell us then what do we mean when we say getting good sleep, and is it getting every one of those stages? Is it something more than that?

CF:

Yeah, it's a great question. And as far as what's good sleep, I was on a panel a few years back that examined this question, really looking at what is good sleep objectively measured. So Brandon was describing the various changes in sleep that are measured objectively during the sleep study and the EEG. And yeah, I think there was agreements about what is not good sleep, or I think the term that was used was inappropriate amount of various stages.

So when there's too much or too little of a particular stage of sleep, too much REM or too little REM or too much stage three or too little, I think in general that was easier to identify. But the exact downs of appropriate amount of these percentages of Graham or stage three, I think that was more difficult.

So there was a paper that came out of that panel and in general, I think the charts show what is the appropriate amount? And then there's what's inappropriate, and then there's this gray area

that is sort of labeled as uncertain. So maybe it's different for various individuals, or maybe we just need to know more about sleep in general to better define that.

SS:

Well, that's super interesting that it's not so clear cut, it'd be easier or certainly if it were, you could just tell me exactly. But since it's a hard thing to control too, probably for the best. But in speaking of impeding tricking, what are some common sleep issues that can affect whether we're getting the appropriate amount or even whether we're in this gray area, so why are they disruptive? How common are they? Connie, do you want to speak to that? Brandon, if you have anything to add also.

CF:

Yeah, I think there's probably, I would say the top three on my list would be, really the first one is insufficient sleep, which a lot of it is due to factors, like not providing enough time to get good sleep because of work or school or demands, the individual participating in other recreational activities. So a lot of it is just not allowing enough time for sleep. And then there are some in the clinical arena, like chronic insomnia disorder and obstructive sleep apnea.

And I think the insufficient sleep syndrome is really related to a societal underappreciation, the importance of sleep. So as Brandon mentioned, there's so much that's going on when we're sleeping. It's not just this time when nothing's happening. But choosing sleep, I think maybe viewed in some contexts as a sign of weakness and really, sleep deprivation can have a significant impact on a lot of important areas.

Motor vehicle risk is much higher for people who are sleepy because they haven't gotten enough sleep, as well as job in school performance. For the others that are more in the clinical domain, for chronic insomnia disorder, there is a definition that is generally accepted by the American Academy of Sleep Medicine and also in the DSM-5. And it's really chronic insomnia disorders, difficulty initiating or maintaining sleep or early awakenings, three or more times per week with resulting impairment in daytime function, and that's been occurring for at least three or more months.

And there's chronic insomnia disorder, which is probably affecting maybe fewer than one in 10, but insomnia symptoms, which may not necessarily meet these criteria, these strict clinical criteria are really common, maybe a third of adults have these and, and perhaps, maybe statistics show that maybe one in 10 may have symptoms of insomnia that are severe enough to cause daytime dysfunction. The third condition I mentioned was obstructive sleep apnea, which is characterized by repetitive obstructive events affecting the airway during sleep. And for older adults, this may occur in maybe as high as one in five, depending on the definitions, the criteria that are used.

And it can really have a significant impact on daytime function in terms of daytime function, people can get very sleepy during the day because they're really not getting good restful sleep at night during these obstructive events. And also, it can affect just the general sleep of the individual, as well as their bed partners who may be disturbed by snoring or sounds made

when somebody has these obstructive events. So those would be my top three. Maybe Brandon has some others.

BW:

No, that covers it.

SS:

Okay. Those are the biggies. So Brandon, and I'm hoping we can pivot a little bit, because I would really love to hear from you about your brain age index, which sounds to me like such an interesting way to think about our brains. So would you explain what it is and why it's a useful tool?

BW:

Sure. Yeah. I will tell you how we came up with it first. So this friend of mine, Matt Bianchi and a really fantastic post-doctoral fellow, Dr. Hauci Swun had just finished some work on automated sleep staging. We had really, we felt we had conquered that problem. We were able to show that, we could do the recognition of stages of sleep, as well as a person could do, but much faster and reproducibly.

We were thinking, what else would be interesting to do? And we thought, well, maybe he could predict how old somebody is from their brainwaves overnight while they're sleeping. And now just for fun and it turned out, you could do that really well. And we got this graph that showed actual age, chronological age versus what we call brain age, which was essentially how old you looked.

The way the model worked was that we had a collection of 10,000 polysomnogram at the time, many of which were from people who turned out to be relatively healthy and have normal sleep. So for every age, between 18 and 80, we were able to essentially extract what features are normal for each stage of sleep. And then using some artificial intelligence techniques, given a new EEG, we can say, you look mostly like a 50 year old.

Anyway, we had this graph that lined up really nicely with chronologic versus brain age. And so I went home and I told my wife, Emily, guess what? We can predict how old you are from just one night of sleep. And she rolled her eyes and said, well, there's easier ways to find out how old people are.

We started thinking, I wonder if this is actually useful for something, and it struck us that if you look older than you really are, maybe this is a sign of a problem or the opposite, maybe that's a sign of good brain health. And so we started investigating this and in every case we've looked at so far, it turns out to be correct

So if you take patients who have high blood pressure and say diabetes, and you look at them and compare them with patients who don't have who are otherwise similar in age and gender and other factors, on average, the patients who have these chronic diseases that affect the small blood vessels of the brain, and we know they can cause some cognitive impairment and decline, they have an older brain age than expected by several years.

And then we've looked at HIV patients with chronic HIV who, although our therapies are pretty effective nowadays, still there's some gradual cognitive deterioration that occurs in many of these patients for reasons of chronic inflammation or maybe virus is still hiding out in certain reservoirs. And we see elevated brain age in those patients.

And then as we looked at patients who have either worries about their cognitive health, but no diagnosis yet, patients who have mild cognitive impairment, which is, we think of as an early stage of neurodegenerative disease, and then Alzheimer's disease, there's this gradient where, as you go across those categories, the brain age index goes up.

So it behaves as an index of brain health. And so we're trying to understand better how to use this actually to measure, maybe to be able to detect disease before it can otherwise be detected clinically. One nice thing about this is that it uses a non-invasive, very cheap measurements, and there's increasingly wearables that you can use to do this at home potentially. And so, yeah, this is the brain age index in a nutshell.

I should also mention, we're doing a trial actually. We're starting to think about, can you make your brain younger, right? So we have a trial right now where people are exercising for 12 weeks who initially were not exercising. And we're hoping to see, we'll find out maybe in the end of June if you're able to, by doing this moderate intensity exercise, make your brain behave like that of a younger person.

SS:

I'm glad you brought that up because I was definitely curious, can you make it younger? It sounds a great article for Prevention. But I think it's so interesting to really hear that proof that sleep and the brain are so connected. And Connie, I'd love to turn to you because you've done research, and you've worked so much with older adults, right? So can you talk about how sleep changes as we age and to Brandon's point about making it young, can we try to counter them, do you think? Is that an issue that comes up in your work?

CF:

Yeah, so there are some changes that have been observed with age, and really, with age sleep becomes lighter and more fragmented. And actually a lot of these changes occur earlier in adulthood into middle age and plateau to some degree in an older age. So a lot of the changes are occurring much earlier than older adults.

And there are some changes as well with the biological clock, there been some observations of shifts to some degree in sleep timing to early hours, earlier hours. So people may feel sleepier a little bit earlier in the evening and this has been observed with age. And there's also perhaps a smaller time window each day with older age when some of the sleep promoting signals are stronger in older adults. And so maybe this, perhaps this explains to some degree, some of the disruptions in the early morning hours that some older individuals might experience.

So they may be more vulnerable perhaps to some environmental disturbance, things like that. And especially this may be true if there is some reduction or decrease in the factors that signal

the body to sleep. So these are some of the changes in sleep. Although I really think that there's still a lot to be learned about how much of this is just with aging and how much of this is some of the co-morbidities that come and track with older age.

SS:

Interesting. So I think a lot of people are probably nodding and thinking, that sounds like me, the different changes that you're talking about. And then I think a lot of us want to turn to trying to figure it all out. So Brandon, could you speak to how helpful do you think it is for people to track their sleep? Can we all become sleep experts of ourselves?

BW:

I hope so. In the future, I think that's definitely possible. Like I mentioned earlier, there are a lot of different wearable devices now available. And I guess I'll just make a couple of comments. So the amount of research that's been done on these trackers that most of them are not FDA approved. I'm not sure if any are actually and so they're often studied less, they're marketed and before they're really well studied.

So I think probably for healthy people with relatively normal sleep, they're probably reasonably accurate. And it's certainly useful for looking at trends. I think as a way of detecting sleep problems and making a very accurate diagnosis, there's more work to do before you could just say, well, don't worry unless this thing sends you an alert that says there's something wrong.

And then I guess also, many of these devices are indirect, right? So for example, the watches, they don't measure your brainwaves, right? They can measure your heart rates or your heart rate variability, things that measure just your movements. Well, that's a different signal and those are related to sleep, but they're not exactly the same thing as what your brain is doing.

For example, if you have, say a lung disease, then things that are based on breathing would be messed up, or if you have an arrhythmia or heart failure, I wouldn't something based on heart rate variability to provide the same information that we would get from say, a typical sleep study that measures your brain activity. And then the brain age thing really, we've tried actually and it doesn't work if you can't measure brain waves.

So I think we have a lot to learn about exactly who they work for, what kinds of questions they can actually tell you, what their statistical properties are with for each disease that we might want to know about, how accurately can they warn you? How often are they falsely positive or falsely negative, that kind of thing. But in general, I think it can be useful just as long as you use them with an understanding that they are limited and there's more research in that.

SS:

Good to hear. Interesting to hear. Connie, another thing that I think some people might turn to or wonder about is sleeping pills, and I know that you do work about sleeping pills a bit and also other sleep aids that maybe aren't prescription. But are these tools that can be helpful? And what do we know about using them properly? Because I know some of your work is about getting away from them.

CF:

Yeah. So I think in general, for individuals who have chronic insomnia disorder, the recommended first-line therapy is cognitive behavioral therapy for insomnia rather than sleeping pills. And I would say the case for this non-medication approach is particularly strong for older adults who may have co-morbidities that may make them more vulnerable to the risks and side effects of sleeping pills and to other sleep aids.

And cognitive behavioral therapy for insomnia or CVTI, it's not sleep hygiene alone, which I often hear healthcare providers or patients equate the two, thinking, okay, if I just have healthy sleep habits, this is going to be the same as going to six successions of CVTI. And it's really not the case, I would say sleep hygiene is more like brushing your teeth and flossing, and you should definitely engage in these healthy sleep promoting behaviors.

However, if you had a cavity or two sepsis, brushing is not enough. And so you need more definitive treatment, and that definitive treatment, I think everyone deserves a try at cognitive behavioral therapy for insomnia before turning to sleeping pills or sleep aids if one has chronic insomnia disorder.

And there are variety of sleeping pills and sleep aids. And I think some are more well studied than others, some of the most common prescription sleeping pills are benzodiazepines. It's a class a drug that is works for sleep and related to, they're often called Z drugs. They're benzodiazepine receptor agonists, they work on similar types of receptors in the brain.

As far as whether they're helpful, some people may have some benefit but then they also may carry a significant amount of risk, risk of falls and hip fracture and some of them have been, people will do things while they're sleeping, complex behaviors, we call them parasomnias where they might start preparing meals, might get out, go outside and start walking around, and those, of course can be dangerous.

So my general approach is that, try cognitive behavioral therapy for insomnia first, and let's see how far we can get with that because there's a lot of success with that. And for many people, they have the tools in their body. We need to put the behavior and the cognitions and all of this together, and it can actually improve people's insomnia substantially.

BW:

Can I just add one comment, another interesting thing about some sleeping pills, they're not all the same. They have different mechanisms, but some of these, like the Z drugs actually will change the nature of what's going on when your eyes are closed and you're laying still. We call it sleep still, but if you measure the micro structure of sleep as opposed to how long you spend in each stage, but just what the brain waves look. They actually are altered by certain drugs the Z drugs.

And so it's not clear that you're getting the same benefit as you do from normal sleep. So I completely agree with Connie. And there've been a couple of studies where you just sort of do testing of how well people perform on cognitive tests in the morning after having natural sleep versus sleep with one of these drugs, from the outside they look the same, but people perform

worse after these drugs. So there's certainly a role for them, but I agree that you should try other things before.

SS:

Speaking of trying other things before, and that was such a good point Connie made that CVTI does not equal sleep hygiene. But Brandon, is there anything you'd add about sleep hygiene itself that you, because you've studied a lot of people with normal.

BW:

I agree. So if sleep hygiene doesn't work for you, you need to see someone like Connie or a specialist. But I think my sense is that most people like me, my main improvement I've made that selflessly is sleep hygiene. I think that you just do the most good for the most people, sleep hygiene is where to start. So just very simple things like not drinking caffeine too late in the day. Maybe it's common sense, but a lot of people do it and then they wonder why they don't feel refreshed in the morning, trying to maybe not have habits watching television in bed or things that get keep your mind in the awake mode. So I think sleep hygiene is actually pretty effective for a lot of people and maybe all they need to do, but if those things aren't working then yeah, you need to try something else.

SS:

All right. Good. Thanks for that addition there. In a few minutes, we're going to go, we're getting a lot of really interesting questions coming in, so I want to be sure we get to those, but let me ask you guys a couple more things before we do. One is, I'd love to know what you're excited about in the area of sleep research. What's happening, what's coming that we should know about? Connie, do you want to take that?

CF:

Yeah, I think one of the most exciting areas is in circadian rhythm research, and really being able to measure individual patients' circadian rhythm. This is not necessarily an area of my focus in sleep research, but I think we need a better understanding of how disruptions in circadian rhythm affect our risk for various diseases and perhaps some of the interactions with medications. So this is an area that I think is really exciting. And I think looking into the future, perhaps we'll have some changes to our approach to diseases and medication dosing.

SS:

That's exciting. Great to hear. Brandon, what about you? What are you excited about?

BW:

Well, I'm excited about moving sleep medicine into the home and then making it just accessible to even for people who don't have a diagnosable sleep problem, just as a routine tool for measuring and tracking brain health, making it easy. And then I'm also interested in seeing whether some of the theories that we have about the role of sleep in long-term brain health are actually true, right? So the way to test those ideas, that sleep is important for brain health are to intervene and improves sleep, and then see if we actually can maybe protect people from say neurodegenerative disease or cognitive decline in a way that we can actually measure.

SS:

That's great. Great. All right. Any additional final thoughts before the questions on what we can tonight to get a good night's sleep? We talked a little bit about sleep hygiene, but what would you both recommend that we take away?

CF:

I like to think about sleep each night as if you were dining at a fine restaurant lightly. And so during the day, you want to build up your collection of sleep coins so that you have enough to spend a night when you want to sleep. And you earn your sleep coins by being awake, minute after minute, hour after hour. And if you have a lot of sleep coins, it is going to enable you to have the best sleep meal because you're going to have a really full piggy bank filled with sleep coins.

And in addition, you want to try to keep a regular wake up time. So if you have this nightly fine dining experience, you want to show up at the restaurant nightly when it's open and leave when it's closed, right? So wake up at a regular time daily and try to be in bed only when your asleep restaurant is open for business. So those are my thoughts.

SS:

I love it. That is an amazing analogy. I can totally wrap my mind around it. Brandon, what about you, what should we take away?

BW:

Yeah, I agree with what Connie said. I guess I would just add that there are lots of different pieces of advice that you can get and many of them sound crazy and probably don't work for most people, but I think if you can be systematic about it, I guess it's testing out what works for you. So maybe this is where wearables will have a role in the future. If you can objectively measure your sleep, track how you feel and then relate it to what you're doing. And try one thing consistently, compare that to your baseline and in objective way. And if it works, then keep doing it and enhance it, if it didn't, throw it away, I think there's a lot of variability in what works for different people. There's some general principles, and then there are these individual things. And so yeah, I think being objective and quantitative is a good way for individuals to improve their sleep.

SS:

Great. Thank you both. It's so fascinating. And I think our audience is super interested too, judging by all these questions that I'm seeing. So I want to start with the question someone's asking about a bad habit. Well, we'll find out if it's a bad habit. They say listening via earbuds to NPR in the night and falling asleep. So falling asleep with the radio on. So the question is, is this akin to the waking brain and therefore no benefits, they're not getting deep restful sleep with the voices coming into their heads?

BW:

Well, listening to NPR while you're asleep?

SS:

Yeah. So you're falling asleep, but it's still on.

BW:

It's still on? I think if you're falling asleep, that's probably okay. I not sure I'd have any real answers to that. If it keeps you awake, then don't do it, but I think your brain is pretty good at shutting things off. For some people, white noise is good, maybe NPR is white noise to some people, I'm not sure. Connie, do you have an opinion on this? Is that doesn't seem bad to me.

CF:

Yeah. I think that if there's a lot of fluctuation in the decibel, I guess in sounds, and sometimes they, this is different from TV, but some of the flickering lights, I think can be somewhat disruptive. But particularly, I guess if it turns off after a certain amount of time, a lot of times these, they're on for a little while and then it can shut off. So it's not playing all night.

BW:

I recommend not listening to books on tape because you miss part of the story.

SS:

Right. That practical aspect of it right. Then it becomes a part of your dream maybe, and even NPR listeners will hear the news in their head. Connie, I wonder if you have an answer to this, is there any relation between diet or dietary timing and sleep or Brandon too, but I would just in context of your coins that were collecting for our sleep, this diet plan.

CF:

I think you don't want to be too full, but you don't want to be too hungry either. So it's sort of a happy medium. And yeah, I think caffeinated food products and if you have too much in terms of liquid and sometimes that can be disruptive because then there's a need to get up to use the restroom in the middle of the night. So if Brandon has other thoughts?

BW:

No, I agree with your comments.

SS:

Then Brandon, this is for you for. For people interested in your study, exploring if exercise can make the brain younger. Can you explain the study in more detail and can people participate in the research?

BW:

Oh, wow. Yeah. It's almost over this first phase, but there'll be a second. So I'll tell you about the study and then what we might find it. So the study was designed, so you have to be over 50 years old to participate and you have to be what we're defining as sedentary, essentially meaning you don't do regular exercise at the beginning of this study, but of course, if you're signing up, it's because you want to turn over a new leaf.

And so at the beginning of the study, we measure, we do some cognitive testing. We actually have to do an exercise test as well to measure your aerobic fitness and just sort of how well you... And then you do a sleep study, and then we send you home with some devices that measure your heartbeat continuously your activity levels, we have a sleep tracker action EEG that you wear at home twice a week.

So we measure you pretty intensively. And then you have a prescription is that to do at least five days of exercise per week, at least 30 minutes per day to get your heart rate up to a certain target level. So this is designed so that if you do it, you should be in better aerobics shape by the end.

And in previous studies, we know that this can make your brain objectively healthier as measured by MRI, bringing us some parts of your brain get thicker. And then people, in some studies have done better on cognitive testing after this kind of exercise routine, but it's a pretty mild exercise. And so at the end, you do these more intensive measurements.

Again, we repeat your aerobic fitness tests, your cognitive testing, and the formal sleep study. And then what we hypothesize is going to be true is that to the extent that you increase your aerobic fitness, so that's on the X axis, your change in this thing called VO2 max to the extent that you improve that, we expect that your brain needs will go down, right?

That your brain will generate waves that look like those of a younger person. Again, I don't, we don't have the final results yet, but that's what we hope is true. My guess is I think, I'm 50-50 on whether it's going to turn out as we suspected. One thing that we think though from looking at some of the data, is that maybe this exercise routine is not quite intense enough.

And so, we're planning a follow-up where we are a little more strict about how much exercise we get and have people push themselves a little bit more, it's a three-month study, which is fairly short time to change the health of your brain. But yeah, that's what the study is about and we hope that we find a positive result.

But even if the results are, they look promising basically on our initial peaks of the data, but I suspect that exercise is something where if you do more of it, you get more benefits. And so that may be the result is, learn some lessons and do it in an even better way.

There's other types of interventions that we may be able to study in the same way. I see some questions about meditation, and there's certainly some reasons to believe that very intensive and serious types of meditation over a sustained period may have measurable effects on brain health. There's questions about diet. And so, one of the messages, I guess, from at least my work is, I think we have a way to measure this now, right? Not just, how do you feel? But physiologically, we have a thing that we can measure to see if the interventions are working.

SS:

All right. Thank you for addressing that. We've also had a number of questions about therapeutics, like melatonin CBD. Do either of you have an opinion to share on those?

BW:

My opinion is that I don't know if they work: they probably work for some people and some don't need them. And this was my comment about there's all kinds of things that some people find helpful, but whether they work better than not using them for an individual, I think varies from case to case. And you can sort of do your own experiments as long as they're safe things, but you may have some more experience treating people with these.

CF:

Yeah. I think with melatonin, I would say, if you are able to address some of the factors through non-melatonin supplements, so it's still something that is medication-like, and if you're able to get benefit without melatonin, then I think that's the optimal approach. But I think with melatonin, for some people they, they do find some improvement in sleep as far as if they have difficulty initiating sleep, that it improves that aspect.

Some of those, the studies where they've looked at this in comparison to other types of treatments, the amount of benefit is really small. And if you look across some of these trials, perhaps there are some medications that interfere with melatonin, for example, there's common heart medication class, you've beta blockers that can affect melatonin.

So maybe there are subsets of patients who would benefit, but I think one concern though, is that these are unregulated. So there was one study when they looked at melatonin supplements and examine exactly what was in the bottle. And they found that some of the melatonin supplements didn't have any melatonin at all, even if they're labeled as melatonin. And some had much larger quantities than what was stated on the bottle. So I think one concern, of course is, you're not always sure what you're getting when you take these supplements.

SS:

That's a good point. Yeah. Thank you. Before I move on to the next, few people are wanting to know, how can they get involved in a sleep study, either Brandon yours, or are there specific or general feedback you can give people who want to be a part of this research.

BW:

So if you want to be involved in the... So we are doing some other studies, so feel free to, I guess email me, and then I'm happy to tell you what we're doing. But I think most, I imagine there's people who live all over the place out in the audience. And so most medical centers are doing research studies and you can contact them to find out what's going on.

SS:

Okay, great. So contact your local medical-professional or doctor. Here's something we haven't talked about, which is naps. So someone wants to know, other than a nap, how can I have more energy in the afternoon and are naps important otherwise? And thank you for asking this question because I would really to like to know.

CF:

My thought on naps is, if you take a nap and you sleep okay at nighttime and it gives you energy, then it's fine, continue with it. I think if individuals have trouble sleeping at nighttime and they're napping, then that may be the time when we want to examine the length of the nap, the time of the nap. So I think it depends on whether an individual has trouble sleeping at nighttime.

BW:

Yes.

SS:

What about feeling fatigued then during the day, is there something else maybe just outside of what you both do, but is there something else that people should know, if they nap but then they don't sleep well at night, is there a missing piece there that you can help us fill in?

BW:

I think there could be a lot of reasons for feeling fatigued. So that's a pretty nonspecific complaint. I think I'd echo some of the earlier comments about, there are some pretty common, those top three that Connie mentioned, are very common, right? So if you're not giving yourself an adequate opportunity to sleep every night, that's the thing you can change. Certainly, if you snore or if your bed partner notices that you stop breathing at night every once in a while, or if you have, well, sleep apnea is very common and addressable, no reason for feeling tired in the daytime. But there are other reasons for feeling fatigued as well, that's sort of just exercising regularly can address that. But if you can take a nap, that's great. There are some places where... So when I lived in Taiwan at one point, and it was routine for people to take a nap in the afternoon and if you can do that, I don't think there's anything wrong as long as you can sleep at night again, and it's a good way to recharge. Connie, what would your advice be about if somebody feels fatigued, what should they think of?

CF:

Yeah, fatigue is a symptom that could be result of a lot of different factors, which maybe a health condition or maybe not be a health condition. So I think, yeah, fatigue, there's a lot of things that can contribute to that. From a sleep perspective, I think those are the ones that you mentioned, certainly examining how much sleep you're getting at night. And other is this phenomenon that sometimes is termed "social jet lag," where people have a schedule perhaps Monday through Friday. And then on the weekends to different schedule. And I think that's another common type of sleep condition that can result in people feeling not very well rested the next day. And a fix there is to try to really maintain more of a regular schedule even on weekends, although it can be challenging because of various responsibilities.

SS:

That's a good point though. Thank you. I'm seeing some things, some people who are having trouble staying asleep as long as they want in the morning, they wake up early. And then I also know there are people who say they don't need very much sleep. And people who need less sleep, they feel they need less as they get older. That's a lot of things to parse, but can we talk about that? Sleeping less than maybe you should or want to.

CF:

I really think individual sleep needs vary. And so I think a common myth is that people need, say eight hours of sleep. We do talk about the need to, as a society, allow people to sleep as long as they need to. And so we don't want to have people sleeping too short of amount of time, but everyone has their own individual sleep needs. And so I think the gauge there is, what does it take for you to feel good during the day? That's probably what you the amount of sleep that you need at nighttime.

BW:

Yeah, I agree. It can be complicated. I think sometimes people don't realize that they are getting there, sometimes people turn out to be getting more sleep than they think they are. It's possible to have misperceptions about how long you're actually asleep and sometimes I guess, getting formally measured and knowing that you're sleeping enough can be helpful. But I think in addition to just gaging based on how well you feel, I think in the future, it may be possible and maybe helpful for some people to be able to do some app test with what your reaction time is, for example maybe objectify the, am I doing as well as I can? I think that the move to quantify ourselves is maybe going to be helpful for and figuring out what your optimal amount is. But yeah, I agree, right now the best gauge is just how well do you feel

SS:

What if you're sleeping long enough, someone asks, but not feeling that long enough, like sleeping eight hours not feeling rested in the morning, does that have to do with the amount or does it have to do with something else, another factor?

BW:

Right. So again, not everybody needs eight hours, some people need longer. So that could be the issue, but there is, and I think we don't really fully understand what good sleep quality means, right? I think Connie alluded to this, there's some open questions. So even if you're sleeping long enough, that not all sleep is the same. And so there's this idea about, well, one of the open questions about sleep is, how do you really measure it? And we have these five stages that I've talked about earlier, but really that's pretty cool course. And so within one of those stages, some people are lighter or easier to wake up and maybe getting less restoration or less of what sleep is supposed to do for you than others. So I think we do have more things to learn about really what appropriate sleep quality is and how to improve it. That's part of why it's exciting to be involved in sleep research right now, I think with it, we're going to learn a lot more about that.

SS:

Great. We've actually gotten three or four questions about alcohol, about it making you drowsy. So is that good? Or should you stop at a certain time before you sleep? So I'm interested, so many of us are interested.

CF:

Yeah. I think with alcohol, during the first half of the night, you may be sleeping more, but then as it's metabolized and exiting the body, then sleep tends to be disrupted. So in general, if

you're having trouble with sleep and sound or something like that, then that's something where we would not encourage using alcohol to promote sleep or something like that, because it does disrupt sleep objectively as in the second half of the night.

SS:

Interesting. Right. So you're not, maybe not even aware that it's happening because you fall asleep, but yeah. I think we're getting pretty close to the end of our time here. Let me just see if there's anything we think we can, oh, let me just ask this about identifying whether you have an issue that maybe needs addressing beyond sleep hygiene. What do you consider a sleep problem? How should someone denote for themselves?

BW:

Yeah. And I think if you feel like you're not functioning well, it'd be because you're feeling tired all the time. That's a good reason to talk to your doctor. Again, some of these sleep problems that Connie mentioned are very common and easily treated or there are treatments that work. So I think if you have a question talk to your primary care doctor and say, you shouldn't have a high bar to do that.

SS:

Okay. Fair enough. Well, Connie, anything to add there?

CF:

Yeah, I would totally agree. I think any sort of effect on daytime function, I think, talk to your primary care doctor about any sort of sleep issues.

SS:

Great. Thinking about your day and how you're functioning. Great. Great. Well, I think we've all learned a lot today about... I love the mix here that you brought us of the understanding our brains and what's happening, and then giving us some great advice for our own sleep. So thank you to both of you and thank you audience for your attention and wonderful questions.

So please join us everyone, in July for our next Live Better Longer talk about the Dog Aging Project. It's going to be super interesting what we can learn from our best friends, about our own longevity. And follow AFAR and Prevention to get updates on our series, find out how to sign up and everything. So again, thank you to Connie and Brandon for your insight, wisdom, and thank you to all of you, and I hope everyone here has a good night's sleep. Thank you!

– END –

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