Mind & Life Podcast Transcript
Jud Brewer - Changing Habits

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Opening Quote – Jud Brewer (00:00:04): *Mindfulness is really about understanding how our mind is working—seeing how we are habitually perpetuating unhealthy habits, and also seeing where we could potentially perpetuate healthy habits. Mindfulness training, and meditation being part of how we can do that, helps us provide this anchor point where we can start to see our minds in motion. We can do that in formal meditation, or we could even do that in the moment. Just providing that anchor point of being curious, like, "Oh, am I stuck in a habit loop right now?" So here, I see meditation and mindfulness as helping us see the patterns of our mind.*

Intro – Wendy Hasenkamp (00:00:45): Welcome to Mind & Life. I'm Wendy Hasenkamp. My guest today is psychiatrist, author, and contemplative researcher Jud Brewer. Jud is one of the leading figures in the use of mindfulness for addiction and anxiety, and his work emphasizes the brain's habit cycle and how to change it. He's also developed a number of research-backed smartphone apps to help deliver these contemplative interventions outside of the clinic.

(00:01:13) Our conversation starts with the story of his own use of meditation to relieve stress in medical school, and how that led to a career in meditation research. And Jud reflects on some of the shortcomings in traditional medical approaches to addiction (for example, the idea of using willpower to "just quit"). Then we get into the world of habits, talking about the pros and cons of the brain's habit mechanisms, and the key role of awareness in changing habits. Jud explores commonalities between Buddhist philosophy and modern psychology, and that gets us into the details of the basic "habit loop." We talk about seeing anxiety as a habit, and the role of mindfulness for habit change. Jud also discusses some of his research on the effectiveness of the app-based interventions that he's developed, and he reflects on next steps for digital therapeutics. We wrap up with some insights on communicating science to the public, and Jud shares a take-home message about the power of kindness and connection as the ultimate reward.

(00:02:21) I really appreciate how Jud makes these insights from the intersection of neuroscience, psychology, and Buddhism accessible to the public. He did a pretty amazing job during the pandemic, making resources available to folks to help with anxiety. You can find links for a lot of his work in the show notes, including some great short videos that explain the core concepts of how he approaches habit change. Jud's view of habits as underlying so many of our behaviors and thoughts—both good and bad—really resonates with me. And as you'll here, the implications of this perspective filter all the way up to the societal level. Whether you or someone you love is struggling with addiction, or you'd just like to work on changing a habit that isn't helpful to you, I think you'll find a lot of valuable information in

this episode. Okay, I hope you enjoy this conversation as much as I did. It's my pleasure to share with you Jud Brewer.

Wendy Hasenkamp (00:03:20): Well, welcome Jud Brewer. It's so great to have you. Thanks for joining us.

Jud Brewer (00:03:24): Thanks for having me.

Wendy Hasenkamp (00:03:25): There's so much I want to talk to you about, and we probably won't be able to get through it all, but I would really love to start with a little bit of your personal story. So can you share how you got interested in meditation to begin with, and this whole kind of work?

Jud Brewer (00:03:39): I'd be happy to. It was probably the summer before I started medical school. I was having a stressful time, and my first day of medical school I started meditating, figuring it was starting a new chapter in my life, and I thought I would add what I thought would just be maybe an appendix or a subsection of a small chapter... And then lo and behold, 25 years later, it's the major driving chapter in my life. So yeah, I started meditating. And I never had any idea about how little I knew about my own mind. And I was thinking I'd just meditate during boring medical school lectures or whatever, because it would at least pass the time. I found that it was really helpful for helping me be less stressed, and also it started helping me see a lot of the gaps that I had, and even I would say looking back, that the medical profession had around how the mind works, especially when it relates to addictions.

(00:04:44) So it was interesting to see that that kind of set me up. I meditated for probably about eight years or so, not ever thinking I would ever study it. But as I finished my PhD and finished my medical school, I started to see—especially when I was interviewing patients who were struggling with addictions—that they were actually using some of the same language that I was learning in my meditation and study of Buddhist psychology. And it really struck me, I was thinking, "This cannot be a coincidence." And that led me down this whole path of studying it, extending my personal study into professional and even into my clinical treatments.

Wendy Hasenkamp (00:05:32): So what are some of those gaps that you were mentioning in the way we think about the mind, or the way the medical profession thinks about the mind?

Jud Brewer (00:05:39): And I don't want to make this sound like the medical profession had no clue. But... You know, it's amazing how... I don't know where this started, maybe it was Descartes or something, where there was this real privileging of thinking and reasoning and willpower. And that's really been pervasive for hundreds of years, where it's just like, "Think your way out of anxiety." So I saw this in medical school, I learned to help my patients quit smoking, just give them a quit date and basically tell them to stop. Give them some medication to help with the withdrawal symptoms, but the main psychological approach was advise them when they fall down, and advise them that they are going to relapse, and advise them that this is going to be a problem, and basically just say, "Just do it. Just stop."

(00:06:34) And the same with basically all other addictions. I certainly learned about 12 steps and things like that, which are really helpful for people. Yet one of the things that they suggest is not taking a willpower-based approach. One of the tenants of AA is around being powerless. So here, I see this as a

fundamental difference (some might call it a gap) in modern day approaches toward addictions, and even habit change more generally.

(00:07:07) Another example was, as a psychiatrist I was really struggling with helping my patients with anxiety. And if you look at the best medications out there, the number needed to treat is 5.2, meaning that I have to treat five patients before one of them shows a significant reduction in symptoms. So I was basically playing the medication lottery there, and struggling. You know, I don't know who's going to benefit, and what I'm going to do with the other four out of five people that continue to struggle.

(00:07:37) And so there, I hadn't even learned in medical school or residency that anxiety could be driven like a habit. And so that was a big "aha" for me, and that started to link in both with the Buddhist psychology but also with some of the other habit change research that my lab had been doing around mindfulness—helping people with quitting smoking, and not overeating, and things like that.

Wendy Hasenkamp (00:08:03): Yeah. So let's get into some more of this about habits, because I love how you frame all of the issues that you approach coming out of that process of the way our mind forms habits—which is so foundational, right, to the way that we operate, for better or worse. It can have good and bad outcomes. So can you talk a little bit about the basics of habit formation and maybe even how that links up with Buddhist psychology? Because I know you've thought a lot about that too.

Jud Brewer (00:08:30): Yeah, I'd be happy to. So all of us, if I had to guess, probably 95 or more percent of our waking life is habit-driven. And probably 95% of that is helpful. Where if we had to relearn how to walk, how to put on our clothes, how to eat, we'd be exhausted by breakfast. So it would be really challenging if we had to relearn everything every day. So the first thing that I want to highlight, because often people think, "Oh, habits—BAD habits." But it's really... Habits are generally good, and there are a few pesky ones that kind of get in the way. *[laughter]*

Wendy Hasenkamp (00:09:06): Those are the ones we notice.

Jud Brewer (00:09:08): Yes, yes. But the process is set up really for survival. You know, as humans before we had refrigerators and ways of storing food, we had to go out and find food and then remember where it was, so we could go find it again. And we also had to remember where danger was in the process of finding food, so we could avoid that. And those two processes are... in modern day, we talk about those in terms of positive and negative reinforcement. But that's just scientific terms for: we learn to approach things, remember where things that are helpful are, so that we can do them again, and we learn where unhelpful things are, so we can avoid them. That's basic positive and negative reinforcement. And so that in modern day, was described well and probably the best-known person to do research on this was B.F. Skinner, but these processes were described back in the 1800s. And in fact, if you look back at the ancient Buddhist psychology, they were described before paper was even invented.

(00:10:14) So that's where I got really interested—when I was starting to look at these processes, when I was trying to figure out ways to help people with their habits, whether it was smoking or anything else. And then linking that up with my own personal practice and my own... I want to say understanding, but it was really my challenges with understanding some of the Buddhist psychology, because some of it can be pretty complex. So for example, there is this process that's called dependent origination. So these 12 links of dependent origination that are links, and they're kind of more of a web, but they're taught in kind of a linear fashion just to help people understand them a little bit more, et cetera. And this process

is said to be what the Buddha was contemplating the night of his enlightenment. (I say that because that indicates that this is kind of important.)

(00:11:10) And when I did some work with Jake Davis, who is a Pali scholar and a philosopher, and we looked at these links of dependent origination, and looked at modern day psychological processes around reinforcement learning, and it turns out that these two are basically talking about exactly the same thing. So just different language. The modern day doesn't have 12 links, it's a little more simplified... And we even published a paper on this a while ago showing that these are basically the same thing. So that the Buddhist psychology was describing reinforcement learning thousands of years ago. And it was not only describing it, but it was saying, "Hey, this is the key to enlightenment." If somebody believes in the process of enlightenment or awakening, they might study it that way, but it's also just as pragmatic as somebody trying to break a bad habit. They're saying, the habit of self is problematic, it causes suffering. And in modern day, we say the habit of being attached to anything—like smoking or overeating or even worrying—causes suffering. And both of those can be approached the same way, using awareness.

Wendy Hasenkamp (00:12:31): And with the underlying problem being the attachment part? Is that the similarity across all those?

Jud Brewer (00:12:37): Well I would say that's one of the similarities. Another is... The first link in dependent origination is described as ignorance. And so in modern day, we think of that as subjective bias, where we're biased based on our previous experience and we don't even know it. So we're kind of ignorant to that bias. So we might see the world through certain lenses, just based on our conditioning—ranging from somebody preferring one type of chocolate over another, they might have a chocolate bias, to implicit racial bias, where we can become conditioned societally just based on societal behaviors and conditions.

(00:13:15) – *musical interlude* –

Wendy Hasenkamp (00:13:43): So you mentioned awareness as the key to shifting this. Do you want to say more about how that works to shift the cycle?

Jud Brewer (00:13:52): Sure. So here, none of this is, I want to say... This is just me kind of pointing out things that other people have pointed out before. So this isn't like I'm coming up with some new theory. It's just been a very fun process over the last couple of decades to bring together, like, "Oh. The Buddhists talked about this. Oh! The psychologists talked about this. Wait a minute. Let's bring these together and see if these puzzle pieces fit. Oh, they do. Oh wow. They're the same thing." So I just want to highlight that, that what I'm going to talk about is just stuff that other people have already done, and it's just a matter of linking them. And then also doing the studies to see if they're actually true. So in modern day, we can do a bunch of experiments to see if these theories and if these psychological mechanisms are indeed true. So I mention awareness because... And it's also interesting I'll say that the more research I do, the simpler the answer actually gets. Which I think in science is probably a good sign.

Wendy Hasenkamp (00:14:57): That's a good sign, yeah.

Jud Brewer (00:14:58): Yeah. This idea of parsimony—the simplest explanation is usually the right one. And the more we have to add asterisks and footnotes, the more we're probably missing something. So

it's been really gratifying to see these things simplify and simplify and simplify. So I would go as far as saying for me, at least right now, it's simplified all the way to the level of awareness. Awareness, awareness, awareness.

(00:15:24) And by that... I actually wrote about this three-step process for changing habits in my *Unwinding Anxiety* book using anxiety as an anchor, but it just kind of highlights how we can do this with any habit. The first step is to bring awareness to our own habit loops. So seeing where we're caught in habitual behaviors, whether they're mental or physical. And this is really very much a way of describing what the Buddhist psychologists were saying—contemplate dependent origination as a way to see where your ignorance is, and see how you're caught up in your own identifications, your own habit loops.

(00:16:07) So as a concrete example, when I have a patient that comes into my office for an intake and I first get to know them, and they start describing whatever the problem is, then I will be listening through that lens of dependent origination. Like, "Okay, what's the behavior?" So to be concrete, let's just use an example of a patient with anxiety, for example. I can think of a bunch of my patients who come in, they get referred for anxiety. I'm thinking of one, this is a gentleman who is about 40 years of age when he was referred to me. He walks in the door, he actually looked pretty anxious. So that was pretty straightforward, but he was describing how he would get panic attacks based on driving on the highway. So he'd drive on the highway, feel like he was going to get in a car accident, and then he would have a panic attack, to the point where he avoided driving on the highway.

(00:17:00) And so the first thing we did in that intake was to just map out his habit loops around panic. And it took us 30 seconds, right? I pulled out a blank piece of paper and I said, "Okay, what's the trigger, what's the behavior, what's the result?" And those three elements have been very nicely described—Charles Duhigg wrote a book about a decade ago called *The Power of Habit*, where he kind of made this process of reinforcement learning very simple for people to understand. Really well-written book. And he talks about a cue, I think he talks about... Maybe there are four steps in his book, I don't remember exactly. But the basic elements for any habit to form are a cue, a behavior, and a result—or a trigger, a behavior, and a result. So for example with my patient, his cue or his trigger would be that he would have a thought like, "I'm going to get in a car accident." His behavior became an avoidant behavior, where he would avoid driving on the highway. And then the result was that he could avoid having panic attacks, so there was that reward.

Wendy Hasenkamp (00:17:58): That was the benefit.

Jud Brewer (00:17:59): Yeah. Yeah. So that's where his brain had said, "Oh, do that again, so that you don't have to have more panic attacks." So that's really where awareness comes in as a first step is we've got to be aware of how our mind is working. If we don't know how our mind works, we can't work with it. And that's something that any of us can do basically for any type of behavior, we can check to see—what am I identified with, what's the behavior, and what's the result of the behavior?

(00:18:29) That also sets us up for the second step, which also is based on awareness. So in Buddhist psychology, they talk about cause and effect being really critical. It's the basis of karma, it's all this stuff. And why is that important for them, and why is that important now? Well cause and effect is basically the basis for reinforcement learning. I see this all the time in my clinic. A lot of people think, "Oh, if I can just figure out what triggered my anxiety or triggered my worrying, then I can just avoid those things and I'll be fine." But that's not how our brains work. Our brains work... they will reinforce a behavior

based on how rewarding it is. That's why it's called reinforcement or reward-based learning. The triggers or the cues are actually the least important part of the equation. And that's good to know because often we don't know what triggers a behavior, and we also can't avoid most of life, which can be triggering. So even dropping ourselves onto a desert island, who knows, maybe coconuts would trigger us at some point, right? So it's not about the triggers, it's really about the cause and effect relationship. And this is where it's really nice to see that the Buddhists and the modern psychologists completely agree again. It's like, "Oh, cause and effect."

(00:19:52) And by that, if we look at the modern day science, there's this formula called the Rescorla-Wagner reinforcement learning model. So these two researchers back in the 70s came up with this very simple formula that is still at play today, which basically says, "Hey, you're going to reinforce a behavior based on how rewarding it is, and you're going to keep doing it or you're going to change that behavior based on one thing, which is awareness."

(00:20:19) And by that I mean, if you pay attention to the behavior, you're going to see just how rewarding it is right now. And once you lay down that reward value, you can kind of set that as a habit and then you don't have to worry about it, you can not pay as much attention, you just do it as a habit, that's what habits are all about. So I think of it as set and forget. You set the reward value, you forget about the details. As an example, we probably learned the reward value of chocolate cake some time... Well, it probably starts at all the birthday parties we go to as kids. And that gets laid down with the fun, and the presents, and the ice cream, and the roller skating or whatever (we had roller skating parties when I was a kid). *[laughter]*

Wendy Hasenkamp (00:21:03): Me too.

Jud Brewer (00:21:04): Yeah. So we lay down that reward value and then our brain... We see some cake when we're not a kid anymore and our brain is like, "Ooh, cake, good." And then so it's like, go eat the cake. Yet we could probably eat cake for breakfast, lunch, and dinner when we were a kid. Well I certainly can't eat cake for breakfast, lunch, and dinner anymore. I get a sugar rush and I crash. It is not good for anyone. Yet if I had the habit of eating cake, the only way to kind of update that reward value is to pay attention. What do I get, what's the cause and effect of eating cake?

(00:21:41) And the terms might sound complex but it's actually relatively simple. So if we have stored the reward value of cake, for example, in our brain, and let's say a new bakery opens up in my neighborhood. And so if I go in the bakery, I don't know if their cake is any good. But I get a piece of cake, I eat it, and let's say it is the most delicious piece of cake I've ever had. My brain gives me... Rescorla and Wagner would call this a positive prediction error. I predicted that it would be pretty good, but it was better than expected. And what that does is helps me learn, "Oh, good bakery. Go get this cake again."

Wendy Hasenkamp (00:22:19): Mm-hmm (affirmative). I've got one of those around the corner. *[laughter]*

Jud Brewer (00:22:22): Perfect, perfect. So if on the other hand, a new bakery opened up and I went and ate the cake and I was like, "Meh, I've had better," I would get this negative prediction error where my brain would say it's less than expected. And I learn from that as well. Like, don't go back there, right? So this is all set up to help us learn. Learn go to that bakery, eat that amount of cake, or whatever. But if I don't pay attention, let's say I ate the cake and I was on the phone. And then I came home and my wife

says like, "Hey, how's the new bakery?" And I would have to say, "I don't know." It couldn't have been great or I'd remember it, because it would probably wake me up and be like, "Wow, hey, I have to get off the phone, this is really good." And it couldn't have been terrible because I would be like ugh, I'd remember that as well. But it's really critical that we pay attention, because these subtle effects are not going to be seen and they're not going to be registered in our brain unless we pay attention.

(00:23:09) Yet that is really, really, really critical for changing any behavior. I'll give you a couple of concrete examples. So my lab has done work with smoking cessation, for example. And what we do is we tell people to smoke which seems kind of counterintuitive—especially as a clinician, if I'm doing it on my clinic and telling my patients to smoke, they're like, "Is that malpractice?" But I know that the only way to get them to quit smoking is not through willpower, because they've all come in and tried that before. It would be great if I could just tell them to quit smoking, it would be one visit and we'd be done.

Wendy Hasenkamp (00:23:55): Yeah, what are the rates of that? Of just trying... Because I know it's not very effective. Do you know, is there data on -

Jud Brewer (00:24:03): Yeah, it's not... You know it's interesting because I just read a paper on eating, if somebody's trying to lose weight. And it's remarkable that these are basically the same. So it's about 5%, if somebody just goes and tries to quit smoking, the likelihood that they're going to stay quit is about 5%. And the same is true if somebody goes on a calorie restriction diet, the likelihood that they're going to have kept that weight off in a year is about 5%.

Wendy Hasenkamp (00:24:28): Okay, yeah, interesting.

Jud Brewer (00:24:30): Yeah, I found that really fascinating, like, "No way." Which basically says -

Wendy Hasenkamp (00:24:34): Same process. Yeah.

Jud Brewer (00:24:35): Yeah. Yeah. It probably says that about 5% of us are like Mr. Spock, like Vulcans. Who can be like, "Just turn that off, just stop doing it. It's logical to eat fewer calories." But that doesn't work for the majority of us. From a public health perspective, 5% is not a very good hit rate. So here, we can instead really just pay attention. So I have my patients pay attention as they smoke a cigarette. I remember one guy, he'd been smoking for 40 years. So the first thing we did in that first step was to map out his habit loop around smoking, and then calculate the number of times he had reinforced it. It was close to 300,000 times. It was like 293,000 or something like that, roughly, where just smoking a pack a day, if somebody smokes 20 cigarettes for 40 years, that's a lot of repetition. So he comes back and he says, "How did I not notice that?" He was referring to how crappy cigarettes taste. And he said, "I've been smoking all this time and I never noticed." So that's putting that Rescorla-Wagner model into practice, where you simply pay attention, you realize that cigarettes taste like crap, and you start to become disenchanted.

Wendy Hasenkamp (00:25:49): So for any negative habit that we're trying to break, I guess the point of the awareness then is to become more aware of the negative outcomes?

Jud Brewer (00:25:58): Yeah.

Wendy Hasenkamp (00:25:59): And so yeah, you're trying to reduce the reward. Because I'm thinking of some things that... well, they actually are pretty delicious or... It's harder to find the downside.

Jud Brewer (00:26:08): Yeah. Well we can go there in a second, because I think that's really important. When I first started studying smoking cessation, I was taught that, of the addictions, smoking is actually one of the hardest if not the hardest addiction to quit. You know, you're not going to lose your job if you smoke, you can smoke throughout the day whereas you can't drink throughout the day and operate heavy machinery. There are lots of things with other addictions where it's just really hard to keep doing it. And a lot of my patients say that smoking is their last addiction because they've quit heroin, they've quit drinking, they've done all these other things, largely because they've hit rock bottom. They've been fired, they've had family issues. But smoking is more of an annoyance in the immediate sense, as compared to operat[ing] heavy machinery in an unsafe manner.

Wendy Hasenkamp (00:26:54): Right, it doesn't ruin your life now, but the health outcomes later, yeah.

Jud Brewer (00:26:58): Yeah. So here with smoking, you don't have to smoke to survive, but I think as you're pointing out, eating might be a different issue. So we can pay attention, and it's also interesting that the Buddhist psychology, if you look in the Pali Canon, they describe this as well. Just to summarize, they talk about exploring gratification to its end. If I remember a quote correctly, it's kind of like, "It wasn't until I explored gratification to its end," this is the Buddha speaking, "that knowledge and vision arose." And he was talking about his awakening. And the idea is if Rescorla and Wagner were leading the Pali Canon, they'd be like, "Oh, that's what we're talking about." It's like pay attention and see if an unhelpful habit, how unhelpful it is. And you start to become disenchanted. So the Buddha was talking about disenchantment. Rescorla and Wagner were talking about disenchantment, and in my clinic, I'm seeing people become disenchanted. Very different than telling themselves that they should quit smoking.

(00:27:56) So how about something like eating? Because we have to eat to survive. So here, you can apply the same process, and I think of it as finding that pleasure plateau. So our body, if we are short on calories in any one day, our body's going to say, "Hey, give me some calories." So we might eat some... let's say, eat some pizza or eat some cake. Yet for many people, they don't pay attention to how much they eat. So with pizza for example, on the East Coast, New York style pizza, a lot of people love New York style pizza, it's very addictive. The carbohydrates, the fat, it's just like a perfect combination. And so often people will eat beyond satiety, they'll eat beyond when they're full.

(00:28:38) And so here we can apply the same principles—explore gratification to its end—where I have people pay attention as they eat, with each bite, and ask themselves, "Is this more rewarding, less rewarding, or the same as the last bite?" And so they can kind of map it out and see where they've actually had enough, and that helps them not go over that cliff where they've overeaten. In fact my lab just published a study on this. Veronique Taylor was the lead author on that—she's done a lot of great work with reinforcement learning—where we have this app called Eat Right Now, and we embedded this craving tool where we had people basically do a mindful eating exercise every time they had a craving. And what we found [was] 10 to 15 times of people paying attention as they overeat—I'm going to say that again, because this blew my mind: 10 to 15 times—[and] that reward value drops below zero, and they shift their behavior.

(00:29:34) Now if we can look back on this, it makes sense because, from an evolutionary perspective, we don't have 20 times to be chased by some dangerous animal to learn, "Oh, that's danger." We have to learn that pretty quickly. So our brains are amazingly plastic, as long as we pay attention. That's the key ingredient. So whether it's overeating, whether it's worrying... You know, people learn pretty quickly

that worrying isn't actually very rewarding, as much as their brain tries to convince them that they're solving their problems or it's giving them a sense of control, it's not actually helping them control.

Wendy Hasenkamp (00:30:09): Yeah, I was just thinking about that, because I love the way you brought anxiety into the same pattern as well. Because [it's] something that I have certainly personally experienced and struggled with a bit, so it does seem to... It gives you, I guess, this false sense that the worrying or the thinking through everything is going to help you be prepared, or fix it, and then... So where is the link? If it's not…

Jud Brewer (00:30:35): Well I'll jump in there, because this was something that probably of all the things that I've learned, this was the one that blew my mind the most. And I have to say, I just love my job because I get to learn all this crazy cool stuff, and link Buddhist psychology to neuroscience to even, as a clinician, trying to help people. So I've been very privileged, very lucky to be able to study these things. But I have to say, the thing that was the biggest aha was seeing how these folks like Thomas Borkovec and others had described anxiety as this negatively reinforced process back in the 80s. I just never learned it until I started looking it up, when I actually had people saying, "Hey, anxiety is driving me to stress eat. Can you help me with that? Can you create a program for anxiety?"

(00:31:25) So it turns out that our survival brains, so these ancient habit mechanisms, they now pair with a more modern mechanism of planning for the future. As we developed the capacity, I don't know, some time in the last million years, developed this capacity to think and plan for the future, that thinking and planning helps us survive. And so like you're saying, problem-solving, planning, all of this is helpful. Yet our brains take, to be able to plan, we tend to take previous scenarios and simulate future based on past experience. Yet if there is not enough accurate information to simulate what might happen, it doesn't stop our brains from trying. And so we start to simulate all the worst... Like, "What if this? What if that? What if this? What if that?" And we get stuck in these worry habit loops. That instead of saying, "Well let me check the probabilities," (our brains are terrible with dealing with probabilities) they're just like, "Oh, this could happen," and then we get stuck in, "Oh yeah, it might happen. Oh, it would be terrible if it happened!" And then we're galloping off into the future, worried about everything.

(00:32:38) Ironically, the worrying makes survival less likely. And by that I mean it doesn't help us think and plan. And in fact, anxiety is... it's anti-survival, it leads to physical problems, anxiety itself is an emotional -

Wendy Hasenkamp (00:32:56): When it's extended over time. Yeah.

Jud Brewer (00:32:58): Yeah. Well I would even argue that anxiety itself, there is no... There has been no shown... Nobody has shown that anxiety is actually helpful.

Wendy Hasenkamp (00:33:08): Right, I guess maybe there's a definition. I was thinking of the acute stress response as helpful.

Jud Brewer (00:33:14): Oh yeah. Yeah, those are different, absolutely.

Wendy Hasenkamp (00:33:15): Yeah, right. How do you define anxiety, actually?

Jud Brewer (00:33:17): Well if you take the dictionary definition, they talk about this feeling of worry or nervousness or unease about an imminent event or something with an uncertain outcome. So anxiety

tends to be a feeling, yet worry can not only be a feeling but it can also be a behavior, worrying. We worry about something.

(00:33:37) So especially with the worrying, worrying has... It shuts down our thinking brain, it makes it harder for us to think. And also, it raises our blood pressure and makes us more anxious. So that's where, definitionally I'm talking about that. In terms of acute stressors, if we have a fight or flight response, obviously that's helpful. And also a fear response—we can learn through negative reinforcement—that's also helpful. So fear is a helpful survival strategy. Fear of the future is not, because we're not actually in danger. And if we're just afraid of the future, we're not going to actually be able to work with what might happen, and plan for it so that we are less likely to be in danger in the future. Does that make sense?

Wendy Hasenkamp (00:34:23): Yeah. Yeah, that's helpful.

Jud Brewer (00:34:25): So the biggest habit loops around anxiety are that anxiety itself, as a feeling, triggers the mental behavior of worrying. So somebody starts to worry. And the worrying gives people that sense of control (generally a false sense of control), and then feeds back and makes us more anxious. Because it doesn't solve a problem, it doesn't keep a family member safe, it doesn't do what our brain has promised that it will do.

(00:34:51) *– musical interlude –*

Wendy Hasenkamp (00:35:10): So with the awareness—and then of course this is where meditation comes in, and all your experience with that—how do you view a spectrum... Because what you were describing, in terms of how you work with your patients and clients, you can just kind of "in the moment" become aware of something... and then what's the spectrum of that, to a full-on meditation practice? It seems like there's nothing magical about meditation, but is it more just a practice part?

Jud Brewer (00:35:38): It's a great question, and I agree, there's nothing magical about meditation. And in particular I can speak for my own experience, I didn't really understand what the purpose of meditation was. I'd just heard, being in medical school, "Oh, try meditating. It might be good for you." And especially these days, people learn... they hear a lot of this science around, "Oh, meditation could help with this or that." But they don't really understand what it's there for. So I think of meditation being kind of a smaller subset of mindfulness training in general. So you can meditate to learn, to train yourself, to learn mindfulness. And mindfulness is really about understanding and learning our minds—seeing what's happening, seeing how we are habitually perpetuating unhealthy habits, and also seeing where we could potentially perpetuate healthy habits. It falls more into the third step, and we can talk about that in a minute.

(00:36:35) So here, I think of mindfulness training, and meditation being part of how we can do that, as a way to help us see these habitual patterns of our mind. So whether we're sitting down doing some formal meditation on a cushion, or doing walking or whatever, it helps us provide this anchor point where we can start to see our minds in motion. It makes me think of high school physics when I learned if something is moving at a certain velocity, and something else is moving at the same velocity, they look like they're at rest relative to each other, as long as they're moving in the same direction. And so if our mind is constantly moving, we don't actually see that it's in motion, because we're just used to it. It's like, "Oh, that's my mind."

(00:37:20) So if we provide an anchor point where we can start to see, "Oh, this is my mind doing its thing," we can start to see the mind is in motion. And here, this is where this first step can be so helpful. Just providing that anchor point of being curious, like, "Oh, am I stuck in a habit loop right now?" for example. We can do that in formal meditation, watch the mental habit patterns of our minds, or we could even do that in the moment. It doesn't really matter. And some of the research that my lab had done 10 years ago now actually found that the informal mindfulness practices were even more helpful than formal mindfulness practices in helping people quit smoking. Both of them were helpful, but the informal, like "in the moment" practices were really helpful. They moderated decoupling of craving and smoking and all this stuff.

(00:38:07) So here, I see meditation and mindfulness as helping us see the patterns of our mind. And I also see mindfulness... And if you think of mindfulness as this curious awareness, it's awareness that's often described as nonjudgmental. If you positively frame that, you can think of it as being curious—not assuming we know what's happening, but really being curious, "Oh, what's happening?" And there we can bring that curious awareness in, in that second step, and I like to make it very pragmatic. So I'll have my patients just ask themselves, "What am I getting from this?" If they're worrying, they can ask themselves, "What am I getting from worrying?" And that helps them map out these habitual patterns, but also see that cause and effect relationship. "Oh, worrying is not solving the problems." If I have a patient who is overeating, I can have them ask themselves, "How little is enough?" and pay attention to each bite. That brings a mindful awareness in, they can find that pleasure plateau, they can start to become disenchanted with the overeating. So there, that curious awareness helps people really see very, very clearly how unrewarding unhelpful habits are.

(00:39:18) It can also help them start to see how helpful some other habits are. And this is where I think of this third step. I think of it as finding the BBO, the Bigger, Better Offer. So if our brains are set up to form a reward hierarchy, to prefer cake over broccoli or whatever, we can also help our brains see if they have a natural reward hierarchy toward different emotional states. So my lab hasn't published this yet, but we did a study with several hundred people, where we just had them categorize a bunch of different emotional states, like anxiety, frustration, curiosity, kindness, connection, things like that. And we had them just rank what they preferred, like which ones were more preferable than others, to get a rough estimate of reward value. And we found, probably not surprisingly, that people prefer curiosity to anxiety. They prefer kindness to disconnection or frustration, and things like that. And so here that suggests that our brains have these natural preferences for things like connectedness as compared to divisiveness. Which is promising... You know, it doesn't sound like modern day where we're kind of getting stuck in these local energetic minima around divisiveness and tribalism. But that's just because people can't see the greater joy that comes with connection.

Wendy Hasenkamp (00:40:42): Oh interesting. So could you even think of that—disconnection and divisiveness—as a bad habit, right? Where it's like there's some immediate reward, but it's not actually helpful?

Jud Brewer (00:40:53): Yes, it's like sugar. It gives us this sugar high and then we want more of it, because to be divisive, you have to perpetuate divisiveness. As compared to connection—when somebody tastes the joy of connection and kindness, it's a no brainer. You don't have to convince yourself, or get riled up, or get a bunch of likes around this. It's just like, "Well of course. Of course!" And so the nice thing about that is when somebody can actually taste that, really from their own direct experience, their brain naturally prefers it. We could get into the edge cases around sociopathy and things like that but let's just say for 99.9% of us, if we really pay attention and we compare being a jerk

to being nice, it's really a no brainer. In fact, Jake Davis wrote his entire PhD thesis on Buddhist ethics, suggesting that simply paying attention will help us develop, and I would say, tap into our inner ethics that our brain has already set up, as compared to the shoulds—the Ten Commandments or the "Thou shalts"—that all the mostly dead white men came up with. This is really about seeing how rewarding it feels to be kind, to be connected, to be generous. And in fact even if you look at the graduated teachings in Buddhism, generosity is the first step. And some argue that they're trained that way, you start with generosity, because it's the easiest to see how rewarding generosity is.

(00:42:30) So I think of those as the Bigger, Better Offers. So for example, if we're worrying, we can compare worrying to being curious about what the feelings of anxiety feel like. Curiosity feels better than worry, so we can start to not only step out of the worry habit loop, but also start to change our relationship to the feelings of anxiety itself. If something is unpleasant, our survival brain says, "Hey, make that go away as quickly as possible!" And so we worry, we procrastinate, we drink, we eat, we go on social media, we do all these things that just perpetuate the process, and get us stuck in these identifications with whatever those behaviors are. But in fact, if we get curious, we can start to notice, "Oh, this is a physical sensation. Oh, my head's not going to explode." I've had patients actually say I feel like my head is going to explode. And we dive into that in the moment and we get curious, and they see their head doesn't explode. They change their relationship to these things, they start to see that they're impermanent. Does that sound familiar, right? Buddhist psychology, impermanence, they're selfless. And that just by seeing these things, again awareness, can become that Bigger, Better Offer where we can start to see, "Oh, these are physical sensations. They come and go. I can be with them. I don't have to do anything to make them go away."

(00:43:52) That is a huge insight for so many people. And I'll even say as a scientist, I'm easily biased because I started meditating in medical school... I could be missing something, which is why we have to do these randomized controlled trials. And so we can go into it as much or as little as you'd like, but we've done a bunch of clinical studies. In fact, we just published a study... So we developed this Unwinding Anxiety app to train people in these three steps.

Wendy Hasenkamp (00:44:21): Yeah, yeah. What have you found?

Jud Brewer (00:44:22): And we started with people, as in doctors, anxious physicians, because, I can speak from my own experience 1) we don't learn good coping mechanisms in medical school, and 2) we do learn to be martyrs. It's like don't take care of yourself because you could be spending that time saving lives. You know, it's very dramatic. Yet the irony is, we can't save anybody's life if we're burnt out, and we can't even help them in our outpatient clinic if we're burnt out. So we did this study of anxious physicians, it was just a small single arm trial, we wanted to see if we could get an effect. Okay, we got a 57% reduction in clinically validated anxiety scores. So that was an eye-opener for us. We also got a 50% reduction in certain aspects of burnout, like being callous toward patients. So that was enough to get NIH funding. We did a randomized controlled trial with people with generalized anxiety disorder. And here, 67% reduction in anxiety.

Wendy Hasenkamp (00:45:20): Wow, and how long is the program?

Jud Brewer (00:45:22): In the physician study, we looked three months out, and then in the generalized anxiety disorder study, we looked two months out. So the modules, there were four core weeks and then there were a bunch of theme weeks. So people can get basically about six months of training if they want to go straight on. But basically we wanted to see... two months out is a pretty decent time

point. And here we're seeing, compared to usual care and this is where medications come in, one in five patients and all of that. Not great, usual care we got about a 14% reduction in anxiety. So something was moving in the right direction which is good, but 14 versus 67%…

Wendy Hasenkamp (00:46:00): Amazing. Yeah.

Jud Brewer (00:46:01): Yeah. Yeah. And so we could even calculate the number needed to treat, so with medications 5.2, in this study, 1.6.

Wendy Hasenkamp (00:46:09): Wow. And were any of those folks in the study also on meds? Or I guess you probably couldn't control for that...

Jud Brewer (00:46:16): Yeah. So the nice thing was because it was a randomized controlled trial, and both groups got usual care, any effect of medication would be controlled by the randomization. I don't remember us looking carefully at that to see if there were any... Well we might have looked to see, if there was any significant difference between the groups in terms of medications, we would have noted that. But the fact that I don't remember that suggests that there probably wasn't a big difference.

Wendy Hasenkamp (00:46:42): Right, right. Yeah, I'm just thinking, you were saying earlier, with using anti-anxiety medications... That's kind of the standard treatment from the medical and psychiatric community, right? There aren't these really behavioral methods.

Jud Brewer (00:46:59): Well some people use cognitive behavioral therapy (CBT), that's kind of the gold standard in general across the board for anything. So that, CBT is gold standard, so I'm not saying it's... And I actually learned CBT in residency. The problem there is scalability. So we have a huge shortage of healthcare providers in the US, and so referring somebody for CBT, making sure that they take that person's insurance, that the person can go to the 12 or 16 sessions or however many sessions are set up, et cetera, it can be really challenging. So I would say just from an access standpoint, that can be challenging. That's also why we created an app-based mindfulness training program because most people have smartphones.

(00:47:46) So I would say there are other treatments out there, like cognitive behavioral therapy. They're not always accessible, and unfortunately not all therapists are created equal. Some therapists are going to be better than others. So folks tend to have to find a good fit for a therapist. So we were looking from a public health perspective, like how could we move the needle at a population level? And that's where I think digital therapeutics can provide a really good treatment for these types of things, because anybody can use an app.

Wendy Hasenkamp (00:48:21): Yeah, yeah. So what do you think are next steps, either getting this more widely available or... yeah, the frontiers of this kind of habit work?

Jud Brewer (00:48:31): Yeah, that's a good question. So here I would say there are a number of things. So one, there are a bunch of meditation apps out there for people. And so I think it's important for clinicians as well as consumers to really be able to differentiate just an app for meditation, of which there are a gazillion, versus something that is really designed and developed for clinical use. Whether it's mild to moderate to severe anxiety. So I think I just read that it was only 19% of apps designed for depression or anxiety had the involvement of a clinician at all. And so when you look at it, I think that... What's the saying... "Buyer beware." Folks just need to know what they are exploring.

(00:49:22) So here, the future is, I would love to see a number of digital therapeutics be developed that are based on psychological mechanism, that involve clinician and ideally end-user experience to really help them make sure that they are most accessible and most helpful for folks, and then most importantly for there to be randomized controlled trials to show whether they actually work or not. So those trials tend to be very expensive, they take a long time, and that's very different than a company saying, "Hey, I'm going to develop an app and market it." So I think that's important, where we have evidence-based digital therapeutics coming down the road.

(00:50:00) And I think the other thing that we can start to look into is how to personalize things. For example, my lab just did a study, we haven't published this yet, but did a study where we could start to explore baseline psychological phenotypic characteristics of people, to see which ones are going to benefit most or least from a digital therapeutic. I won't go into the details because it's still under review, but the data suggest that we can, with as few as 19 questions, so like three minutes, we might be able to determine somebody's baseline psychological phenotype, and personalize or sort them into... suggesting, "Hey, you try this treatment versus you try this treatment."

(00:50:57) So I think that's coming down the road, the more we understand the mechanisms to be able to ask the right questions, to be able to get good baseline psychological phenotypes that really differentiate folks. And I think that's a really exciting development because from a genotypic standpoint, medicine has been trying to do this just in the realm of psychiatry for years. Like what medications -

Wendy Hasenkamp (00:51:21): Yeah. Individualized medicine.

Jud Brewer (00:51:22): Yeah. And that's, you know... There have been some successes, but nothing that's been able to be rolled out at a large scale. In my clinic, I don't have folks getting their whole genome sequenced to figure out what medications they might benefit from. Down the road, I think we'll see cost-effective versions—probably you won't need your whole genome to be sequenced for an anti-depressant medication, but you get the idea. Here I think if we are very savvy about what the psychological mechanisms are, we can zoom in and you can ask... You know, having somebody fill out a web-based questionnaire that gets cloud computed and beamed to the electronic medical record—that's basically pennies, or a penny. It's basically no cost and instant results, that by the time somebody goes from the waiting room into seeing their clinician for the first time, the clinician could already have those results. So I think there are ways to take the same approaches where we don't have to be as tech heavy and genetics focused. We can really look at psychology, and learn a lot from that as a way to personalize medicine. So I think that's a really exciting field to be exploring as well.

Wendy Hasenkamp (00:52:40): Yeah. That is super exciting. So you have three apps now that are available based on this approach?

Jud Brewer (00:52:48): We do. So we have one called Craving To Quit for smoking, and then we've got one for eating, for overeating and emotional eating called Eat Right Now, and then one for anxiety called Unwinding Anxiety.

Wendy Hasenkamp (00:53:03): Awesome.

Jud Brewer (00:53:04): Yeah. Oh in fact, there's another one that just came out that's kind of an overview, like helps people understand how their mind works just called Unwinding, by Sharecare I think.

Wendy Hasenkamp (00:53:14): Oh, great. Are there specific outcomes that are hoped for in that one, or is it more just educational?

Jud Brewer (00:53:19): That one's more educational. So we haven't done any clinical studies to look at it specifically, but it has... for example, helps people understand habit loops around procrastination. So there's a mini course on procrastination. So we haven't... I don't even know what outcomes I'd look at for procrastination. I could make a joke about I've put that study off, but... *[laughter]*. Anyway, so that's the idea is we have a Brain 101 mini-course where people can learn how their brains work. We have a procrastination one, we have one on anger, one on kindness. So just the general overview of helping people kind of get a sense for how their brain works, because that can be a real nice stepping stone for these other... you know, if somebody figures out, "Oh. I actually have pretty moderate to severe anxiety. Maybe this Unwinding Anxiety program would be more helpful." But everybody benefits from understanding how their brain works.

(00:53:43) – *musical interlude* –

Wendy Hasenkamp (00:54:42): I really appreciate all that you've done in terms of public education, and science communication around all of these topics. I think it's so important. Do you have any tips or insights or reflections for researchers on how to translate this kind of work in such an accessible way as you've done?

Jud Brewer (00:55:04): Yeah, it's a great question. So here I would say... Well, curiosity is key, but it's kind of key for everything, so that's a generic answer. But I would say being curious about how best something lands. So for example, in my clinic, I could tell my patients to do something, or I could get really curious and see how the way I explain something lands with them. And I could see if they actually can digest that, take that home and it shifts how they see their minds.

(00:55:38) So I do a lot of pilot testing with just languaging of things. It started in my clinic, and then even I think any researcher that gives talks or gives a lab meeting or just has a conversation with somebody else, it can be really helpful to kind of workshop that, and iterate, like, "What am I trying to say, and is the way I'm saying it the best way to say it?" As compared to... It's kind of like, if somebody doesn't understand what we're saying, there's this habit to just say it again, but louder. Which probably isn't that helpful. But that's where we're kind of stuck in, "Well, they didn't understand what I was saying, so it must be their problem, and I'm just going to say it again." Here, it's very humbling, I have to say. It's like, "Oh!" We could go, "Oh, what I said didn't... They didn't get it, oh, that's their problem, I'm going to say it again." Or I could go, "Oh... That didn't work. What can I learn from that?" And I can be curious and then ask them, "Well what didn't land well, or what did you understand? What didn't you understand?" And that helps me workshop the language to really explain it in a way that they're going to get. Because at the end of the day, it doesn't matter whether I can say it with some multi-syllabic words or with some jargon. It really matters, can I communicate the concept to somebody else so that they can learn from it? That's our job as scientists, is not just to do the science for science's sake. That's part of it, it's really fun to do that. But also to be able to communicate this, so that people can benefit from the results and the findings that we have. If people can't benefit from them, we're probably wasting most, if not all of our time.

(00:57:23) So here I would say humility, curiosity, and a lot of conversations. Really just having conversations, and listening to how we say something, to see if there is a simpler way to say it. For me, I find it very helpful to find analogies that fit. It's kind of like, explaining positive and negative reinforcement. I'm terrible at math and so I could look at the Rescorla-Wagner model and say, "Well, it looks kind of Latinish to me and Greek, there's a lot of Greek in there." So I could look at that or I could say, "Well what is this trying to convey?" and then explain it through the new bakery analogy. And so that is a pragmatic example of how Rescorla and Wagner modeling works, and so that example can hopefully help people understand it (it certainly helps me understand it), and convey those concepts without all of the jargon, without worrying about, "Oh, there's this error term, and what's the alpha mean?" and all of that stuff. At the end of the day, my brain pays attention, does it like cake or not? And we get the idea.

Wendy Hasenkamp (00:58:31): Right. That's awesome. Well yeah, I really appreciate all of your efforts—in all of this, and on that front too. I wish this were more a part of scientific training. As you and I both know, it's definitely not.

Jud Brewer (00:58:44): Yes, I agree. It would be great if there were courses on conveying scientific concepts. Courses on speaking to media, understanding kind of what are they trying to get from having an interview with a scientist, so that we don't inadvertently fall into a miscommunication trap, where they're looking for a sound bite and we get angry because they take something out of context, when in fact it's not their fault that they're just trying to get a headline. That type of thing.

Wendy Hasenkamp (00:59:14): Yeah, yeah. Well, I know we're coming up on our time, so I want to thank you so much for spending all this time with us, and for all your work. Do you have any big picture take-homes, or anything that you want to share that we haven't touched on?

Jud Brewer (00:59:28): Well the one thing I would say, we touched on it a little bit with these Bigger, Better Offers, is just really... I would say for me, right now, just emphasizing how important the power of kindness and connection are. I feel like today, it is so critical that we... You know, even in having conversations with folks that might have different views than we do, really bringing that curiosity in, and really trying to understand what the conditions are that lead to them having that viewpoint. And the same for us—what are the conditions that lead me to having a certain viewpoint—really can be helpful for developing connection and seeing... It seems ridiculous when I say it, but remembering that we're all human. We're all in this together. And it feels like we're doing all this infighting as humans, when we could all be banding together to help all of us live better lives, and really help our planet not get destroyed. Yet we're kind of, all these shiny objects around greed and anger and all this stuff are really keeping us from banding together to do that. So I just want to highlight how critical it is for all of us to pay attention to how rewarding it is to be kind—even to folks who we might not agree with. It's really about... It all comes back to being human.

Wendy Hasenkamp (01:01:05): Thank you so much. That's a wonderful, wonderful place to leave it. Deep gratitude to you for all of your work and thanks for joining us.

Jud Brewer (01:01:13): Thank you.

Outro – Wendy Hasenkamp (01:01:19): *This season of Mind & Life is supported by the Academy for the Love of Learning, dedicated to awakening the natural love of learning in people of all ages. Episodes are edited and produced by me and Phil Walker, and music on the show is from Blue Dot Sessions and Universal. Show notes and resources for this and other episodes can be found at podcast.mindandlife.org. If you enjoyed this episode, please rate and review us on Apple Podcasts, and share it with a friend. And if something in this conversation sparked insight for you, let us know. You can send an email or voice memo to podcast@mindlife.org.*

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