ADHD TRAUMA:

WHAT'S KEEPING YOU FROM LIVING THE LIFE YOU WANT

DEC 20, 2024

TRANSCRIPT

Curiosity Killed the Adage

Image credits: Jared Bartman

*[**VOICEMAIL:** Hello, and thank you for calling customer service.]*

LATIF NASSER: Hi, it's Latif Nasser. So I know you already know this, but it feels like maybe you need a tiny reminder.

*[**CUSTOMER:** Yeah, hi. I was just calling because I was looking for a free subscription.]*

*[**CUSTOMER SERVICE AGENT:** Do you have a—I mean, do you have a promo code?]*

*[**CUSTOMER:** No.]*

LATIF: But the thing is that you enjoy the things that have value in your life.

*[**CUSTOMER SERVICE AGENT:** When you say a free subscription, what do you mean?]*

*[**CUSTOMER:** I would still just get everything that I already get, but I just wouldn't have to pay any money.]*

*[**CUSTOMER SERVICE AGENT:** Yeah. No.]*

LATIF: You have to pay for them.

*[**CUSTOMER SERVICE AGENT:** Let me connect you with a representative who can help with your request.]*

LATIF: And even things that you think, like, maybe you shouldn't really have to pay for.]

*[**CUSTOMER SERVICE AGENT:** I'm sorry.]*

LATIF: Well ...

*[**CUSTOMER SERVICE AGENT:** A plan where the electricity is for free?]*

LATIF: ... this is America.

*[**CUSTOMER SERVICE AGENT:** How can I help you today?]*

LATIF: It's gonna cost you.

*[**CUSTOMER SERVICE AGENT:** Sure. Let me find someone to help you.]*

LATIF: Gas.

*[**CUSTOMER:** I was looking to get the internet for free.]*

LATIF: The internet.

*[**CUSTOMER SERVICE AGENT:** I'm not sure what you mean by 'free.']*

LATIF: Your cell phone.

*[**CUSTOMER SERVICE AGENT:** Um, no.]*

*[**CUSTOMER SERVICE AGENT:** We don't have any free cell phone plans, no.]*

*[**CUSTOMER SERVICE AGENT:** Please hold.]*

LATIF: And I get it. You're probably sitting there thinking, "Well, you know what? I paid my taxes. I'm doing my part. I'm contributing to public radio." But you know how much of your personal federal taxes went to public radio stations last year? It was probably less than 50 cents. Two quarters for the whole year. That's what you contributed. That's what you paid for ...

*[**ARCHIVE CLIP:** Welcome to Science Friday.]*

LATIF: ... everything!

*[**ARCHIVE CLIP:** It's Notes From America.]*

*[**ARCHIVE CLIP:** This is the New Yorker Radio Hour.]*

*[**ARCHIVE CLIP:** Radiolab.]*

LATIF: Everything!

*[**ARCHIVE CLIP:** Brian Lehrer on WNYC.]*

LATIF: Everything you hear, you're basically getting it for free. And we wish we didn't have to, but we gotta say that's just not cutting it, folks. So please take a minute out of your day to support this thing that you mostly take for granted 364 days of the year. You can do that by joining The Lab, our membership program. The Lab is part of what powers all of this. Joining makes it possible for us to keep making these shows for you, and you get something out of it, too: exclusive merch, bonus content, ad-free listening. And if you join this month, a Radiolab poster. The poster's beautiful! It's by artist Tara Anand of a moonrise over the ocean, from our kids and family show Terrestrials. Our staff is obsessed with it right now. Go to Radiolab.org/join to check out the poster, or become a part of The Lab. That's Radiolab.org/join. And thanks.

[RADIOLAB INTRO]

LATIF: Hey. This is Radiolab. I'm Latif Nasser.

***ALEX NEASON:** All right.*

LATIF: And today, I'm just gonna kick things off with our editor ...

***ALEX:** Got levels on my side.*

LATIF: ... Alex Neason.

ALEX: Cool. Okay. So once upon a time, it was summer.

LATIF: Okay. [laughs] Okay. Hard to remember now.

ALEX: Hard to remember now.

LATIF: Yeah.

ALEX: And okay, so over the summer, as you know, I'm a runner.

LATIF: Legit runner.

ALEX: A legit runner.

LATIF: Like, you run marathons.

ALEX: So over this year, I decided to take the year off from marathons.

LATIF: Mm-hmm?

ALEX: And instead, I decided to tackle the one mile.

LATIF: Okay.

ALEX: And I was gonna try and beat my personal record. And so ...

ALEX: *Okay.*

ALEX: ... as part of doing that ...

ALEX: *Shoes.*

ALEX: ... last summer, every Tuesday, like clockwork ...

ALEX: *Oh, I need my watch.*

ALEX: ... I would drag myself out of my apartment, and head out into the city. And ...

ALEX: *Okay, watch set.*

ALEX: ... run from my house, which is about a mile and change away from Riverbank State Park in Harlem.

ALEX: *Okay. Gonna get hit by a car.*

ALEX: Over to this track.

ALEX: *Hey.*

WOMAN: *Hello.*

ALEX: *What up?*

ALEX: To meet up with some people from my running crew.

ALEX: *I'm okay. How are you?*

ALEX: And it depends on the night, but it's basically ...

ALEX: *Hey.*

MAN: *How was it?*

ALEX: *Ugh.*

ALEX: ... 10 or 15 people who all get together to do these track workouts together.

LATIF: And as somebody who is definitely not a runner, you prefer this? You like running with people more than running alone?

ALEX: Yeah. I mean, I do this because I can't be trusted to do it by myself.

LATIF: [laughs]

ALEX: Running is really hard, and having other people there with me to do it just makes me feel—it makes me feel like I'm a team. It reminds me of being on a track team in high school, where you show up for yourself and for the rest of the team, and you all do the hard thing together. And it's faster, it feels better. It's just the way that you get it done. So on this particular day, it was super hot. It was like the dead of summer. And ...

REPH: *Y'all can hear me over there?*

ALEX: ... Reph, our coach, tells us ...

REPH: *Check it out. We're gonna do ...*

ALEX: We're doing 400s. The length of a track is 400 meters, so that just means we're doing one long sprint around the entire length of the track. And we're gonna do a lot of them.

REPH: *10 on and 10 off.*

MAN: *10 on, 10 off.*

REPH: *Yes.*

ALEX: And everybody sort of makes this collective sigh, and it's like, okay, okay. [laughs]

REPH: *You always want to be running the run. Don't let the run run you.*

WOMAN: *Yes.*

REPH: *Right?*

ALEX: So we get on the track, we warm up. We stretch, we do drills, kind of get loose. And then we toe the line and ...

ALEX: *[panting]*

ALEX: ... we start.

ALEX: *[panting]*

ALEX: Immediately out the gate I'm pumping my legs, swinging my arms, just sprinting for the entire length of this track. I cross the line, I take a little break, a sip of water, and then I'm sprinting again. And I do another lap. Rest. Lap. Rest. Lap. Rest.

ALEX: *How many more do you have?*

WOMAN: *60.*

ALEX: And that day I was struggling to breathe.

ALEX: *Come on. Come on. Come on.*

ALEX: My heart was beating super fast. It felt like it was coming out of my chest. And everybody else around me seemed to be settling into the workout. I don't know, it just felt like I just, like, couldn't get it together. And all of these very—all these, like, insecurities from, like, childhood came rushing back. Like, I was suddenly very aware that I looked like I was struggling, and there was all these other people around me who were just watching me struggle. And so I just wanted to disappear. And I wanted all the other people on the track to disappear. And I just felt like I was mentally spiraling because the whole point of this, of showing up at these group workouts, the whole reason why I started running with the crew in the first place was to avoid exactly this moment.

LATIF: Hmm.

ALEX: And there's this adage, "Misery loves company," that has been the sort of philosophy of my athletic career, if you will. The idea that if you are suffering through something and you're in the company of other people suffering the same misery, that it makes all of us a little more capable, that a burden gets lifted, and that you just ultimately—you can get through it. And here I was at this track workout that was especially miserable that day, but the burden wasn't being lifted. It felt heavier, actually. And after this workout, I remember walking home and just obsessing about this adage. And by the time I get back to my apartment and for days afterwards I had just really started to wonder, like, have I had this wrong the whole time? Maybe the thing just isn't true. Like, is it true or not? And I started to think about, like, okay, well I have to figure this out. [laughs] I have to figure out, factually speaking, does misery love company? Like, who can I call, what can I read, what can I do to get, like, real nitty gritty, real fussy, so that on the other end I can sort of like stand up and declare it is true that misery loves company. Or it's just not.

LATIF: You needed an answer.

ALEX: Yeah. Yeah, yeah, yeah. A definitive answer.

LATIF: So this quest that Alex suddenly wanted to embark on, we started talking about it at the show, about how there are these things that you hear in your life.

*[**ARCHIVE CLIP:** Well, you know what they say, it's the squeaky wheel that gets the grease.]*

LATIF: You hear them in the movies, on TV ...

*[**ARCHIVE CLIP:** Idle hands are the devil's workshop.]*

LATIF: Maybe from a friend, a parent.

*[**ARCHIVE CLIP:** Well ...]*

*[**ARCHIVE CLIP:** The early bird catches the worm.]*

*[**ARCHIVE CLIP:** Actions speak louder than words.]*

LATIF: These little sayings, these adages ...

*[**ARCHIVE CLIP:** What goes up must come down, Urkel.]*

LATIF: ... that are supposed to be these little bits of wisdom, these true facts about how the world works. And we just started to wonder, like, are they true? And could we take Alex's mission and start looking at other adages and just getting really in the weeds and being like okay, is there a way to objectively figure out whether or not an adage is true or it isn't? Could we put them to the test in some sort of scientific, rigorous kind of literal, almost to the degree of being absurd way to try to get an answer? So we picked some adages, and the staff basically fact-checked them. Starting with ...

*[**ANNOUNCER:** Number one: Misery loves company.]*

ALEX: Okay, cool. So, so, so, so, so, first thing I did ...

SIMON ADLER: *Right, right. Yeah.*

ALEX: *Here we go.*

ALEX: ... was rope in producer Simon Adler, and then I went on Google and typed in "misery loves company study." And to my surprise and delight ...

ALEX: *All right!*

ALEX: ... something popped up.

SIMON: *We are rolling. We are rip-roaring and ready to rock.*

ALEX: This paper, published in 2021. "Does Misery Love Company? An Experimental Investigation."

SIMON: *And Kate, could we just have you introduce yourself?*

KATE HASSETT: *Sure. Yeah, my name is Kate Hassett. I'm an environmental economist, and I'm interested in the factors that make us do what we do, or that make us tick, so to speak.*

ALEX: And by sheer coincidence ...

KATE HASSETT: *I know where you're coming from.*

ALEX: ... she's also a runner.

KATE HASSETT: *[laughs] When it comes to the particular kind of misery that long distance running can be sometimes.*

ALEX: But we are gonna move away from running.

LATIF: Okay.

ALEX: Because, you know, like, an adage should be sort of universal. Like, it should be true in multiple situations.

LATIF: Yeah.

ALEX: Several years ago, Kate set up a series of experiments.

KATE HASSETT: *In the first experiment, we wanted to know do people actually believe this?*

ALEX: Do people actually believe, like me ...

KATE HASSETT: *This adage to be true?*

ALEX: ... that being miserable in company makes the misery a little less miserable?

KATE HASSETT: *So we asked 100 people to complete a survey.*

ALEX: That said ...

KATE HASSETT: *Imagine ...*

*[**VOICEOVER:** (Gregory) Oh glory be!]*

KATE HASSETT: *... someone ...*

*[**VOICEOVER:** (Gregory) I just love my New York City lifestyle!]*

KATE HASSETT: *... who lives in an apartment building.*

*[**VOICEOVER:** (Gregory) But what I love most of all is ...]*

KATE HASSETT: *And ...*

*[**VOICEOVER:** (Gregory) ... my view of the park!]*

KATE HASSETT: *... they have this view of a green park.*

*[**VOICEOVER:** (Gregory) Yes, here from my window I can see all of the park in its glory. I can see the raccoons playing, the pigeons flying overhead, perched in their trees!]*

ALEX: But the survey says this person, and actually pretty much everybody in the building, is about to lose their view of the park.

KATE HASSETT: *Because of a construction project.*

LATIF: Hmm.

ALEX: Like a big highway's going in across the street.

LATIF: That sucks.

ALEX: So the survey asks: imagine you're like the landlord and you have to go tell one of these tenants that they're gonna lose their view.

KATE HASSETT: *If you want to minimize this person's disappointment ...*

ALEX: Their suffering.

KATE HASSETT: *How would you inform them?*

ALEX: Would you A) ...

[knocking]

*[**VOICEOVER:** (Gregory) [sighs] Who's there?]*

ALEX: ... go knock on their door?

*[**VOICEOVER:** (Gregory) Oh, it's Tony. [door unlocking] What can I do you for, Tony?]*

*[**VOICEOVER:** (Tony) Hey, Gregory. I'm sorry to give you the bad news.]*

KATE HASSETT: *And just simply inform them ...*

*[**VOICEOVER:** (Tony) They're gonna be doing a construction project across the street. They're gonna put up a highway. It means it's gonna block your view of the park.]*

*[**VOICEOVER:** (Gregory) [gasps]]*

KATE HASSETT: *... that they'll lose their view of the park.*

*[**VOICEOVER:** (Gregory) Not my view of the park! Tony, I live for my view of the park.]*

ALEX: So that's option A. Option B ...

[knocking]

*[**VOICEOVER:** (Tony) Gregory, it's Tony.]*

ALEX: ... everything's the same.

*[**VOICEOVER:** (Gregory) Tony!]*

ALEX: You tell them look ...

*[**VOICEOVER:** (Tony) Big highway outside.]*

ALEX: ... construction is gonna block the park view. But this time you tell them ...

[VOICEOVER: (Tony) It's gonna block everybody's view of the park. The whole building.]

ALEX: ... you're not the only one who's gonna be affected by this.

[VOICEOVER: (Tony) No one's gonna be able to see the park anymore.]

ALEX: Your neighbors are gonna be losing this, too. And so if you want to make this person feel better, which one do you do: option A or option B?

LATIF: B. It's gotta be B.

ALEX: Yeah, exactly. That's what I said. And when Kate gave out the survey, almost 70 percent of people said they'd choose B.

LATIF: So huh! But there were still 30 percent who didn't, but ...

ALEX: Yeah.

LATIF: Sociopaths or something. [laughs]

ALEX: I know. Right. Like, I honestly don't know why you wouldn't go with B.

KATE HASSETT: *I would—I would definitely be one of the 70 percent.*

ALEX: But Kate says, you know, 70 percent, it's a big number.

KATE HASSETT: *You know, we took this to mean that people do by and large believe that misery actually does—does love company. It can, you know, alleviate suffering.*

ALEX: However just because you believe something is true for everyone else doesn't mean it's true for you. So they did this second experiment.

KATE HASSETT: *We tried to make it as similar as possible to experiment one.*

ALEX: Everything was basically the same. There's a person in an apartment with a view, but this time, the survey said put yourself in the shoes of the person who's gonna lose the view. And then one group of those people was told you were gonna lose the view of the park, while a second group was told ...

KATE HASSETT: *For your information, 85 percent of the other people in your building will also lose their view of the park. And then we asked them ...*

ALEX: Both groups, alone or in company ...

KATE HASSETT: *... please rate how disappointed you expect that you would be in this situation.*

ALEX: So ...

LATIF: Okay.

ALEX: ... when they looked at the results, they actually found that both groups were miserable.

LATIF: [laughs]

ALEX: Everybody was just miserable, regardless of whether or not their neighbors were gonna be miserable or not.

LATIF: What? I would not have thought that.

KATE HASSETT: *Yeah, we didn't find evidence that misery actually does love company.*

ALEX: What they found is that people believe misery loves company, but it just didn't seem, like, true that misery loved company in practice.

LATIF: Hmm.

ALEX: However, they did find strong evidence for something that they weren't actually looking for, and that I think was, like, way more interesting, which is that happiness hates company.

LATIF: [laughs] What does that even mean?

ALEX: Okay. So one of the things that they found is that if you're one of the lucky ones, if you have a great view of the park from your window, according to the survey results, you don't want anyone else to have it.

LATIF: Wow. You want to be the lucky golden ticket winner. And it makes it better—it makes the golden ticket better if nobody else has one.

ALEX: Yes.

LATIF: That's sick! We're sick people.

ALEX: Right?

LATIF: We're sick. Like, what does that say about us? I don't like that. I really don't like that.

KATE HASSETT: *I hear you. It's—it's kind of a tough finding. But we're social beings. I think it's just the way we're—we're wired that, you know, what's going on with other people, you know, it's not irrelevant, you know?*

ALEX: I realized what Kate is getting at is the fact that we're always keeping track of what we have, of what everybody else has. And that's asking questions about, like, equity and envy and fairness. But I think I was actually asking something even simpler than that, which is just, like, when you're running with a group of people and everybody is suffering together, does that fact that we're together and suffering do something for us? Is it helpful?

ALEX: *Svenja. Hello!*

SVENJA WOLF: *Hi.*

ALEX: *It's so nice to talk to you.*

SVENJA WOLF: *Yes, it is.*

ALEX: And I felt like I really started to get an answer to that when I found Svenja.

SVENJA WOLF: *Svenja Wolf. I'm an assistant professor of sports psychology at Florida State University in Tallahassee, and I research anything that has to do with group and emotions in sport and in other performance domains.*

ALEX: *Amazing.*

SIMON: *Beautiful.*

ALEX: *Beautiful. Beautiful. I guess, like, I'm curious about this in your professional opinion, and also in, like, your opinion as a runner. Like, does misery love company?*

SVENJA WOLF: *Yeah, there is a good body in research out there. And it's really—it depends. That is the answer. Not every misery loves every company. That's kind of what it comes down to.*

ALEX: Misery brought on by fear, she says ...

SVENJA WOLF: *Where I'm fearful because the situation's dangerous.*

ALEX: In that case, you probably do want to be around other people.

SVENJA WOLF: *Maybe make it less dangerous. So I want company. If I am sad ...*

ALEX: She says with sadness, you're often feeling a sense of loss. So you want company.

SVENJA WOLF: *To reconnect with others, to kind of, like, get security again.*

ALEX: But the one emotion she said that kind of struck me was ...

SVENJA WOLF: *Shame.*

ALEX: ... shame.

SVENJA WOLF: *That is something where I don't want other people to witness that. So that's something where I don't want company.*

ALEX: And I think for me ...

ALEX: *[panting]*

ALEX: ... that day on the track, I think a part of me was feeling that. Like, I felt sort of out of shape, like I wasn't doing well. I felt slow, like I was dragging.

SVENJA WOLF: *You're really getting into that rabbit hole, of like ...*

ALEX: I'm not good enough. I'm pathetic.

SVENJA WOLF: *And then the last thing we want is other people witnessing this. But even in that situation where we want to be alone, when we want to withdraw from others, sharing the emotion ultimately makes us feel better.*

ALEX: Svenja says this has been studied with groups of people on stationary bikes, with teams that have just lost big games. And no matter the setting, when people feel miserable together, it helps them perform better. Like, they pedal faster on the bike. And it also helps them feel better.

SVENJA WOLF: *That's at least what the research suggests. So to me, the way, like, this resonates the most is if I'm in a miserable state, I'm yearning for company. I am like, I want—like, that's what I want. I want other people to comfort me. I want people to reach out to me. And sometimes I don't have the energy to reach out, but I want that sense of, like, recognition and validation and, like, that somebody cares for me. So maybe I might rephrase it to "Misery can create company."*

WOMAN: *How do you feel?*

ALEX: *I feel okay. I—we can slow down because I'm definitely going too fast.*

WOMAN: *Yeah?*

ALEX: *Yeah, I'm definitely gonna slow down. I feel like I'm trying to make sure I'm not in anyone's way.*

WOMAN: *No, you're fine.*

MAN: *You're better?*

ALEX: *Yeah, I feel okay. I was—I'm so sorry. When I woke up this morning ...*

LATIF: We have to take a break, but that gives you plenty of time watch a pot boil, hold some horses, wait for a shoe to drop. We'll be right back.

*[**ANNOUNCER:** Number two: An idle mind is the devil's workshop.]*

LATIF: I always heard it as the idle hands are the devil's workshop.

SINDHU GNANASAMBANDAN: Yeah. Idle hands, idle minds. Like, people say it all sorts of ways. We're just gonna go with idle minds.

LATIF: Okay.

SINDHU: And I picked this one because ...

LATIF: Wait, wait, wait. Just tell everyone who you are first.

SINDHU: Oh, yes. Okay. I'm Sindhu Gnanasambandan. I'm a producer here. And I picked this one because it's always felt pretty true to me.

LATIF: Huh! How—like, how so?

SINDHU: Well I mean, of course the mind is never, like, idle-idle, but when I think of a mind that's, like, not focused on anything, like it's just sort of, you know, wandering around, that's what I'm thinking of as an idle mind.

LATIF: Yeah.

SINDHU: And I, like, try to avoid that mind as much as possible.

LATIF: Huh!

SINDHU: Part of it is that I just feel guilty for not being productive.

LATIF: Same.

SINDHU: But also when I just sort of like, sit around idle ...

SINDHU: *Oh, it'd feel so good if I was in a bath right now.*

SINDHU: *I wonder what Marcello's up to?*

SINDHU: All these thoughts start flooding in.

SINDHU: *How do ants, like, always seem to know exactly where they're going?*

SINDHU: Some of them are fun or helpful.

SINDHU: *Did I leave the stove on?*

SINDHU: But, like ...

SINDHU: *That joke I made last night was so stupid.*

SINDHU: ... others ...

SINDHU: *I don't think anyone even smiled.*

SINDHU: *Did you have to say something?*

SINDHU: *Was it offensive? I bet it was. I bet that's why he's not texting me back.*

SINDHU: *I always do this.*

SINDHU: ... can really suck. Like, almost like the devil's in there, trying to make me miserable.

LATIF: Hmm.

KALINA CRISTOFF HADJIILIEVA: *Yes. So a lot of religious writing tends to regard the wandering mind as something that's not particularly desirable.*

SINDHU: This is psychology professor Kalina Christoff Hadjiilieva.

KALINA CRISTOFF HADJIILIEVA: *I study spontaneous thought, and in general how people think.*

SINDHU: And when I called them to ask about this adage, they said it's deeply rooted in our culture.

KALINA CRISTOFF HADJIILIEVA: *This industrial kind of capitalist, work-based environment. There's this sense that there is a right way and there is a wrong way, and when you wander, you depart from the right way. And that's sometimes how we think of our own minds as "time on task."*

SINDHU: Like, if I'm focused on something, that's good.

KALINA CRISTOFF HADJIILIEVA: *Am I tasking right now or am I not tasking? And if I'm not tasking, therefore I'm mind wandering.*

SINDHU: And that's bad. But Kalina says ...

KALINA CRISTOFF HADJIILIEVA: *That's not necessarily a very rich way of looking at mind wandering.*

SINDHU: That's the wrong way to think about it.

LATIF: Huh. Why?

SINDHU: Well, first of all, you know that, like, devilish part I was describing of my mind, where it can start to just, like, obsess and, like, ruminate over things?

LATIF: Mm-hmm.

SINDHU: Like, Kalina says that stuff isn't actually mind wandering anymore.

KALINA CRISTOFF HADJIILIEVA: *No. No. For me, that's the opposite of mind wandering.*

SINDHU: Because when you start to obsess, you're back to a task of sorts. Like, you're trying to solve some puzzle that your mind made for itself.

LATIF: Hmm.

KALINA CRISTOFF HADJIILIEVA: *So that's how people can get into, like, mental ruts, right?*

SINDHU: But Kalina says when a mind truly wanders, like, when it's free of any task ...

LATIF: Mm-hmm?

SINDHU: ... this isn't the devil's workshop at all. It's actually a place where something pretty beautiful is happening, like an act of creation.

LATIF: Wow!

SINDHU: And it starts deep inside the brain with these ...

KALINA CRISTOFF HADJIILIEVA: *Bursts of neurons firing called a sharp wave ripple.*

SINDHU: ... sharp wave ripples.

LATIF: Whoa, never heard of that.

SINDHU: You heard of these?

LATIF: No, never.

SINDHU: Okay, well let me tell you, Latif.

LATIF: Yeah, ripples. I love the sound of that!

SINDHU: [laughs]

SINDHU: *All right, so we're in the lab.*

GYÖRGY BUZSÁKI: *We are in the lab.*

SINDHU: So I went to go see one of the world experts on these ripples.

GYÖRGY BUZSÁKI: *I'm György Buzsáki. I'm a professor of neuroscience at New York University.*

SINDHU: He showed me around his lab. Room's filled with wires and mazes and boxes of Froot Loops.

GYÖRGY BUZSÁKI: *Rats and mice love Froot Loops.*

SINDHU: *Is that part of the experiment, or just because you want to give them something nice?*

GYÖRGY BUZSÁKI: *They will not have a good rapport with them. They wouldn't want to be friends. They are pets.*

SINDHU: *Your colleagues!*

SINDHU: And one of the things he does in his lab is he listens to, like, the brains of these animals, specifically the hippocampus.

LATIF: Mm-hmm?

SINDHU: And the way he does this is he, like, sticks these little electrodes into it so that he can see—or really hear—these sharp wave ripples.

LATIF: Okay.

SINDHU: So let's say he takes a rat and plops him into a maze. And maybe we can, like, play a song to represent just, like, the various neurons firing here and there as he, like, moves through and, you know, experiences, like, a turn over here.

LATIF: Okay.

SINDHU: Runs straight down this path. Like, you know, I don't know what else happens in a maze. Like, whatever.

LATIF: Yeah, yeah.

SINDHU: Looking up at the researcher, maybe? Like ...

LATIF: Yeah. And maybe you're smelling something and it's behind this wall, but I can't get behind the wall!

SINDHU: Exactly. That's nice. And the rat makes it through the maze. He gets to the

When all of a sudden, there's this burst of activity. Like, tens of thousands of neurons fire all at once in this coordinated explosion.

GYÖRGY BUZSÁKI: *Extraordinary powerful synchrony.*

SINDHU: And then it happens again.

SINDHU: These explosions of activity, these are sharp wave ripples. And they're the biggest, most synchronized firing of neurons that happen in our brain short of, like, a seizure.

LATIF: Wow!

SINDHU: And György says, like, when you look at them closely ...

LATIF: Mm-hmm?

SINDHU: ... you see ...

GYÖRGY BUZSÁKI: These are snippets that are compressed versions of learned information.

SINDHU: They're actually just little sections of what the lab rat just experienced getting replayed, but super fast, something like 10 to 20 times faster. It's like bloop-bloop.

LATIF: It's like instant replay?

SINDHU: Bloop-bloop!

LATIF: It's like sped-up instant replay.

SINDHU: Exactly. Exactly. And not the whole thing but, like, little parts of it, basically.

LATIF: Yeah, yeah, yeah. Highlights. Highlights reel. Yeah.

SINDHU: Highlight reel. And these sharp wave ripples, György says, they're basically the very beginning of memories being formed.

GYÖRGY BUZSÁKI: They select which information will be remembered and which will go to the trash can.

SINDHU: And he's not, like, consciously experiencing this.

LATIF: Oh, so this is even—this is below consciousness.

SINDHU: This is all subconscious.

LATIF: Wow!

SINDHU: And when the rat goes to sleep that night ...

LATIF: Yeah?

SINDHU: ... those ripples that played earlier, they just keep rippling. And this is where the memory's, like, actually getting made, where it consolidates into something that lasts.

GYÖRGY BUZSÁKI: How is it possible that I experience something once and I will remember it forever? And the answer is that you experienced it consciously once,

but the rest of the brain will experience snippets of it during the sharp wave ripples, a thousand times every single night.

LATIF: Wow!

SINDHU: Yeah.

LATIF: Huh.

SINDHU: There's more. The next day—we're gonna stay with our rat, our little lab rat.

LATIF: Mm-hmm.

SINDHU: Wakes back up and, you know, a post doc carries him back to the same maze.

LATIF: Yeah.

SINDHU: And now when he's just sitting there—and again, just, like, sort of resting before starting the run ...

LATIF: Mm-hmm.

SINDHU: ... guess what we see?

LATIF: Uh, oh the same. The same—the song playing not as replay but as pre-play.

SINDHU: Yeah, exactly. A sharp wave ripple. And actually, his lab has found that, like, the direction of the ripple coincides with whether it's, like, a memory or, like, a planning ripple.

GYÖRGY BUZSÁKI: *When the selection is backward, we are talking about memory. When the selection is forward, we are talking about planning.*

LATIF: No! That's crazy!

SINDHU: Yeah. Yeah.

LATIF: Wow, that's so literal! Huh!

SINDHU: Yeah. So all this stuff that he described happens in rats, it happens in us, too. And you know that experience when you can't seem to solve a problem or, like, there's this word you really want but, like, it's just not—it's on the tip of your tongue.

LATIF: Right.

SINDHU: You don't have it. And then you just sort of like, walk away from it and all of a sudden, like—bam!—it's there?

LATIF: Right.

GYÖRGY BUZSÁKI: *This is the time the sharp waves come very handy. You disengage, and then a couple of sharp waves occur in your brain, they prime the circuitry for you and then you can recall it.*

SINDHU: Like, you've left the task, but these, like, little, you know, subconscious neural things are just working for you.

LATIF: Yeah.

SINDHU: I also asked him how these sharp wave ripples connect to, like, mind-wander-y thoughts.

LATIF: Mmm.

SINDHU: *Out of seemingly nowhere, I have this, like, memory of my mom cooking a specific meal or something like that. Is that connected at all to this sharp wave ripple activity?*

GYÖRGY BUZSÁKI: *I never measured it. I don't know. But I bet yes. So the sharp wave ripples are good candidates for that.*

SINDHU: And actually, like, there was a Nature paper earlier this year that made this exact connection, that these, like, sharp wave ripples seem to be the brain mechanism underpinning those, like, thoughts that seemingly pop out of nowhere.

LATIF: Huh! So how often do these ripples happen?

SINDHU: Yeah, so he says that they can happen once every 10 seconds or even once a second. But the one time they definitely do not happen is, like, when your mind is focused on something.

GYÖRGY BUZSÁKI: *If you are listening to me now, I guarantee you you don't have a single sharp wave.*

LATIF: Hmm.

SINDHU: These ripples only happen, György says ...

GYÖRGY BUZSÁKI: *When we are idling, when we are not focusing on something, when we are not attending.*

KALINA CRISTOFF HADJIILIEVA: *It's almost like a digestion, right? So you go around acquiring experiences. If you don't have a digestion system, you're not going to extract anything from all these experiences. [laughs] Right?*

SINDHU: So in other words, without idling ...

GYÖRGY BUZSÁKI: *You are nobody. You're a zombie.*

LATIF: Okay. So where does this—where does this all leave us with our adage?

SINDHU: I just—I'm realizing how off I was about it. Like, idling is pretty important. It picks our memories, like ...

LATIF: Yeah.

SINDHU: ... solidifies our memories, imagines new things. So yeah, I guess, like, it is a workshop, just like not for the devil. It's like a workshop where we make our sense of our world and who we are.

LATIF: Yeah! Beautiful!

LATIF: Let that mind of yours idle for a bit. We will be right back.

LATIF: Hello. Welcome back. This is Radiolab. I'm Latif Nasser. We have already covered two adages today. One was mostly true, one was definitely not. And so for

this third and final adage, we decided to take on one that it seems it just has to be true.

*[**ANNOUNCER:** Number three: What goes up must come down.]*

LATIF: And fact-checking this one, we have ...

ANNIE MCEWEN: Okay, here we go. Here we go.

LATIF: ... producers Annie McEwen ...

MARIA PAZ GUTIÉRREZ: It's irrefutable.

LATIF: ... and Maria Paz Gutiérrez.

MARIA PAZ: This is a part of our lives.

LATIF: It's basically a law of physics.

MARIA PAZ: Right. I mean, for example ...

ANNIE: *Okay. Ready?*

MARIA PAZ: ... if you take an egg ...

ANNIE: *One, two, three.*

MARIA PAZ: ... and you throw it up ...

ANNIE: *Up.*

[splat]

ANNIE: *Okay. [laughs]*

MARIA PAZ: ... down it comes.

ANNIE: *Definitely came down.*

LATIF: Yeah. Feels very inevitable.

ANNIE: *Came down confirmed!*

MARIA PAZ: But as we stood there looking down at our egg on the ground we thought wait a minute. From a journalistic, fact-checking perspective, all this proves is that when an *egg* goes up it must come down. In this case there were 1.8 seconds between the ...

ANNIE: *Up.*

MARIA PAZ: ... and the down.

[splat]

LATIF: Okay.

MARIA PAZ: And we started to wonder, like, what if we could find something that doesn't come down, like right away? Like, maybe there are things out there in the world that test this adage. And if we can find those things, is there a chance, a teeny tiny chance that we could disprove it—even just a little bit?

LATIF: Okay. Well, what kind of things?

ANNIE: *Ah, the sweet sounds of New York.*

MARIA PAZ: Well, we went outside to get inspired.

ANNIE: *I wonder if that's blood or ketchup?*

MARIA PAZ: And after a bit of haphazard research into things that go up, in which ...

ANNIE: *Okay, there's a pigeon on the ground.*

MARIA PAZ: ... we chased pigeons.

MARIA PAZ: *She's flapping her arms.*

MARIA PAZ: You chased them.

ANNIE: I chased them.

ANNIE: *Hello. We're here to look for balloons.*

MARIA PAZ: Got some helium balloons.

LATIF: Uh-huh.

MARIA PAZ: And then ...

ANNIE: *They're all dudes with their big pants.*

MARIA PAZ: ... Annie even tried to talk to some skateboarders.

ANNIE: *Excuse us. Can we talk to you for a second?*

MARIA PAZ: About jumping.

ANNIE: *Excuse us. Excuse us. Will you talk to us? Can we ask you a question? You guys don't wanna talk to us? No? Okay.*

MARIA PAZ: But then ...

ANNIE: *It's a really pretty sunny day.*

MARIA PAZ: ... as we were looking up at the sky ...

ANNIE: *Fluffy clouds.*

MARIA PAZ: ... we thought: clouds.

ANNIE: *It looks like The Simpsons.*

MARIA PAZ: *It does look like The Simpsons.*

MARIA PAZ: They're basically just water that is up. And so we wondered how long does it take for water to leave the ground, rise up into the air, become a fluffy white cloud, and then come back down as rain? We looked it up, and the average is about 10 days.

LATIF: Really? That's the lifespan of a cloud?

MARIA PAZ: Yeah.

LATIF: I never thought of that, the lifespan of a cloud. That actually doesn't seem that long.

MARIA PAZ: Well, but there are a bunch of things that stay up in the air longer than clouds. Like, small particles of dust blown by the wind into the sky can stay up there hanging out in the atmosphere for around 20 days.

LATIF: Hmm.

ANNIE: And then there are these spiders that do this thing called 'ballooning,' where they shoot out these long threads from their butts, and using the wind and the Earth's electric field, they lift off the ground and fly through the air for hundreds of miles, traveling across cities, across deserts, across oceans. And we don't really know how long they stay up there, but we do know they can only go without eating for about 25 days, so they do have to eventually come down to land on top of your head.

LATIF: [laughs] Thank you. But okay, so max 25 days between up and down?

ANNIE: No, Latif. No, no. Because then there's this bird, this little bird that can do something so amazing it is just ridiculous.

SCOTT WEIDENSAUL: *It is ridiculous. It is. So here's the thing about swifts.*

ANNIE: This is natural history author Scott Weidensaul, who told us about the common swift.

SCOTT WEIDENSAUL: *They are the most aerial of birds.*

ANNIE: They're blackish-brown, could fit in the palm of your hand. Have wings shaped like a boomerang. And they do basically everything in the air.

SCOTT WEIDENSAUL: *They eat nothing but flying insects.*

ANNIE: It's thought that the two hemispheres of their brains take turns sleeping so they can sleep while they fly.

SCOTT WEIDENSAUL: *They are the only group of birds that mate on the wing.*

LATIF: Wait. It has sex in the air? How does it do that? Are they both flying?

MARIA PAZ: Oh, yeah. I mean, pictures on the internet seeing they're just stacked on each other.

LATIF: They're just stacked.

MARIA PAZ: Stacked. Yeah.

LATIF: Okay.

SCOTT WEIDENSAUL: *And if they could figure out a way to carry an egg and incubate it on the wing, I'm sure they would do it.*

LATIF: Oh, because you can't lay an egg while you're ...

ANNIE: Exactly.

MARIA PAZ: [laughs]

LATIF: That would be a mistake.

[splat]

MARIA PAZ: Yes.

SCOTT WEIDENSAUL: *And when they migrate to Africa, from the moment they leave their breeding grounds in central Europe all the way south to Africa, through the entirety of the winter in Africa and all the way back on their spring migration, they never touch ground.*

ANNIE: These birds lift up off the ground, and don't come down again for 10 months of the year!

LATIF: Ten months of the year?

ANNIE: Yes. It flies—it flies for 10 straight months.

SCOTT WEIDENSAUL: *They only come to the ground for the shortest period of time that they possibly can manage. They have stretched the thread connecting them to the ground absolutely to the breaking point.*

ANNIE: *Wow!*

ANNIE: And these birds, because they don't often need them, have very tiny legs and feet. So tiny that ...

SCOTT WEIDENSAUL: *They can't walk. All they can do is cling.*

LATIF: Wait, they can't walk at all?

ANNIE: No. And it made us think, like, just like that fish that long ago pulled itself out of the ocean and became a creature of land, maybe the common swift is on its way to becoming a creature purely of the sky. But then we thought ...

*[**ARCHIVE CLIP, NASA:** T minus ten, nine ...]*

ANNIE: ... what about us?

*[**ARCHIVE CLIP, NASA:** Excellent.]*

ANNIE: Like, we have astronauts.

*[**ARCHIVE CLIP, NASA:** You know the drill.]*

MARIA PAZ: Astronauts, unlike eggs or clouds or birds, they have rockets. Rockets that have taken them farther than any other species have gone before. And then once they're up there, they can just stay up there.

*[**ARCHIVE CLIP, NASA:** We have a really cool, big space station that you can fly around in.]*

MARIA PAZ: Just totally floating.

*[**ARCHIVE CLIP, NASA:** Whoo!]*

MARIA PAZ: Defying our adage with ...

*[**ARCHIVE CLIP, NASA:** I'm gonna get Tim to spin me around.]*

MARIA PAZ: ... somersaults.

*[**ARCHIVE CLIP, NASA:** Olympic-caliber flip technique.]*

MARIA PAZ: Backflips.

*[**ARCHIVE CLIP, NASA:** So then you can come right back up again.]*

MARIA PAZ: They are truly up.

[ARCHIVE CLIP, NASA: Like Superman!]

MARIA PAZ: And theoretically, if they had enough food and supplies, they could stay up there forever, never coming down again.

ANNIE: And so in conclusion, we have found something that disproves the adage, and therefore the adage is incorrect!

LATIF: Okay.

ANNIE: We are done here.

MARIA PAZ: Yes. At least that's what we thought. Until ...

MICHELLE THALLER: Um ...

MARIA PAZ: ... we talked to Dr. Michelle Thaller.

MICHELLE THALLER: I am an astronomer. I'm a science communicator.

MARIA PAZ: Who told us that ...

MICHELLE THALLER: Well, you see ...

MARIA PAZ: ... although it might look like the astronauts up there are floating ...

MICHELLE THALLER: No.

MARIA PAZ: They're not.

LATIF: They're not?

MICHELLE THALLER: Absolutely not. No.

MARIA PAZ: They're not flying, they're not weightless. They're not in zero G, but instead, up there in the Space Station ...

MICHELLE THALLER: The reason you can put your pen right beside you and it'll just float when you let go of it, the pen and you are falling towards the Earth at exactly the same rate.

MARIA PAZ: What?

MICHELLE THALLER: *They're falling.*

ANNIE: *They're falling?*

MICHELLE THALLER: *Yes! Every second of every day they're up there, their whole space containment, their capsule, their space station, everything's falling. They're freely falling towards the Earth.*

ANNIE: *Oh my God!*

MICHELLE THALLER: *I mean, if you've ever been on, like, a really great roller coaster that drops, that kind of thing, I mean, that is what they feel. They feel like they're falling.*

MARIA PAZ: *Ugh, that's nauseating!*

MICHELLE THALLER: *Oh, yeah. Some people get very sick. [laughs]*

LATIF: But then why—why don't they fall straight down and just smack into the Earth?

ANNIE: Well, Michelle says that these astronauts and the Space Station, they're not falling, like how an egg falls ...

ANNIE: *Ready?*

ANNIE: ... when I throw it ...

ANNIE: *One, two, three. Up!*

ANNIE: ... straight up in the air.

[splat]

ANNIE: But more like if I took that egg and just ...

[heaves]

ANNIE: ... threw it as hard as I could. As it's traveling, it is technically falling. It's being pulled down towards Earth, but it's also zooming forward. And so it travels a certain distance before it inevitably ...

[splat]

ANNIE: ... comes down.

ANNIE: *[laughs]*

ANNIE: Okay now, imagine the egg is a space station, and it's just been thrown by rockets upwards and curving away from the Earth into the sky, going so fast.

MICHELLE THALLER: *17,500 miles an hour.*

ANNIE: And traveling so high and so far ...

MICHELLE THALLER: *About 200 miles up.*

ANNIE: ... that though they are falling, instead of hitting the Earth ...

MICHELLE THALLER: *You know, the Earth curves away as you fall, and you actually kind of keep curving around the Earth.*

ANNIE: And so every second of every day that it's up there ...

MICHELLE THALLER: *It basically keeps missing the Earth.*

ANNIE: Never landing. Forever coming down and around. And down and around, and down and around.

MICHELLE THALLER: *This wonderful kind of stable path called an orbit.*

LATIF: But haven't we also shot things into space that did not go into orbit? Like—like, we did the story on the Voyager probes, right? Like, we literally shot them out of the whole solar system. Like, can't you say that those are just going up and up and up? They're not falling.

ANNIE: Well, actually they are.

MICHELLE THALLER: *Yes.*

ANNIE: According to Michelle, everything is in some way going down and around.

MICHELLE THALLER: *The Earth is always falling towards the Sun. You know, the Sun is falling towards the center of the galaxy, which is a big black hole. We go around the center of the galaxy at about half a million miles an hour. So right now, you are freely falling towards a giant black hole at half a million miles an hour.*

MARIA PAZ: *[laughs]*

ANNIE: *You personally, Maria Paz.*

MICHELLE THALLER: *You personally.*

MARIA PAZ: *And what's the galaxy falling towards?*

MICHELLE THALLER: *The galaxy is also freely falling. You got it. The Milky Way galaxy is freely falling towards the middle of a galactic cluster at more than a million miles an hour. Don't you see? We're always falling. Nothing is holding you up. Always falling ... always falling ... always falling ... always falling ...*

MARIA PAZ: *I just feel like throwing up.*

ANNIE: *[laughs] Yeah, me too.*

MARIA PAZ: *I really, really feel like throwing up.*

LATIF: Whoa! Uh, so—so is this one true or no?

ANNIE: Well, I think yes it is, but it's different than what we originally thought. Like, when we started out we thought down was like falling on the pavement like an egg or falling to Earth as rain, or landing on a branch like a bird. Things go up and then they must come down. And then they're down. But what we found is that all that stuff that appears to be down isn't really down, but it's actually in a perpetual state of coming down. So maybe it's not "What goes up must come down," but really ...

*[**ANNOUNCER:** Everything that is must come down forever.]*

LATIF: [laughs] That sounds depressing!

MARIA PAZ: I don't know. I mean, like, I think it's really cool. Like, it's almost as if we're on this rock, but we're just like those astronauts.

*[**ARCHIVE CLIP, NASA:** Whoo!]*

MARIA PAZ: Floating and somersaulting and—and, like, flying.

*[**ARCHIVE CLIP, NASA:** Like Superman. Whoo! [laughs]]*

*[**ANNOUNCER:** Forever and ever. And ever. And ever. And ever. And ever? And ever? And ever? [clears throat] Necessity is the mother of invention. Yeah, I guess so, but let's think about all the things that were invented by accident, where, like, no one was even trying to invent shit that day, and they ended up making a new medication or discovering a new element or whatever.]*

LATIF: Big thanks to Chioke l'Anson, who performed our voice of wisdom for this episode.

*[**ANNOUNCER:** Morgan Freeman was not available.]*

LATIF: If his voice sounds familiar, it's because he does the underwriting for NPR.

*[**ANNOUNCER:** I spend most of my life as a disembodied voice. [laughs]]*

LATIF: Yeah, tell me about it. This episode was reported and produced by Alex Neason, Simon Adler, Matt Kielty, Sindhu Gnanasambandan, W. Harry Fortuna, Anne McEwen and Maria Paz Gutiérrez.

*[**ANNOUNCER:** Absence makes the heart grow fonder. What are you saying here? We need some space?]*

LATIF: It was edited by Alex Neason and Pat Walters. Fact-checked by Emily Krieger and Diane Kelly. And has original music and sound design by Jeremy Bloom.

*[**ANNOUNCER:** Good things come to those who wait. This one I hate. Awful things also come to those who wait. [laughs] So what are we doing here? What's happening?]*

LATIF: Special thanks to Pamela D'Arc, Daniela Murcillo and Jonathan Schooler, as well as Amanda Breen, Akmal Tajihan, Patrick Keene, Stephanie Leschek and Alexandria Iona from the Upright Citizens Brigade. To Alex's crew, We Run Uptown, and coaches

Reph and Patty from Circa '95. Julia Lucas and Coffey from the Noname program. Diane Kelly, Hilly Bressler, Kim Wardwong and Tom Friedman.

*[**ANNOUNCER:** I don't know that I would use any of these in my regular life. [laughs]]*

LATIF: And of course, thank you for listening. I'm Latif Nasser. This is Radiolab. We'll be back soon with more stories, more questions and if I'm being honest, questionable wisdom. But I can promise it'll be fact-checked. So until then.

*[**LISTENER:** Hey, I'm Lemmon and I'm from Richmond, Indiana. And here are the staff credits. Radiolab was created by Jad Abumrad and is edited by Soren Wheeler. Lulu Miller and Latif Nasser are our co-hosts. Dylan Keefe is our director of sound design. Our staff includes: Simon Adler, Jeremy Bloom, Becca Bressler, W. Harry Fortuna, David Gebel, Maria Paz Gutiérrez, Sindhu Gnanasambandan, Matt Kielty, Rebecca Laks, Annie McEwen, Alex Neason, Sarah Qari, Sarah Sandbach, Anisa Vietze, Arianne Wack, Pat Walters and Molly Webster. Our fact checkers are Diane Kelly, Emily Krieger and Natalie Middleton.]*

*[**LISTENER:** Hi, My name's Teresa. I'm calling from Colchester in Essex, UK. Leadership support for Radiolab's science programming is provided by the Gordon and Betty Moore Foundation, Science Sandbox, a Simons Foundation initiative, and the John Templeton Foundation. Foundational support for Radiolab was provided by the Alfred P. Sloan Foundation.]*

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