Brains On (APM) | Brains On! Joy Overload: The science of tickles and cuteness 01E5WWSGN7S13BMRGT49E1F2R9

ANNOUNCER 1: You're listening to *BrainsOn,* where we're serious about being curious.

ANNOUNCER 2: *Brains On* is supported in part by a grant from the National Science Foundation.

MARC: Ugh, I really need a good laugh. I wish I could just tickle myself. But that never works. Nope. There's got to be another way. Ah, I got it, a fake mustache, ah-hah. [SIGHS] Nothing. That usually makes people laugh. Oh, how about--

[BOTTLES CLINKING]

Come here, you banana cream pie with extra whipped cream. A pie in the face, never not funny. 3, 2--

[INHALES DEEPLY]

[PIE SPLATS]

Messy, ugh, delicious, mm, but no laughs. Also, note to self, try a little pickled juice in the next pie. This one is a little too, mm, banana-ey. Wait, bananas! The old banana peel slip and fall, that never fails. Oh, God, just toss this peel on the ground and take a few steps back until I can't see the banana peel. Now-- [HUMS] --walk like I don't have a care in the world.

[KNOCKS, DOOR OPENS]

MENAKA: Hey, Marc.

MARC: Huh?

MENAKA: Ooh, careful, there's a--

MARC: [SCREAMS]

MENAKA: Ooh, the bag of flour.

MARC: [GRUNTS]

MENAKA: [LAUGHS] Oh, yikes, Marc, are you OK?

MARC: Oh, hey. Hey, Menaka. Yeah, I'm fine.

MENAKA: Well, whatever you're doing in here, it sure is funny.

MARC: Really?

MENAKA: Yeah. [CHUCKLES] Just look at yourself in the mirror. I mean, you're wearing a fake mustache. You've got pie all over your face, and you're covered in flour. [LAUGHS]

MARC: I do look ridiculous.

[LAUGHTER]

Look, there's crust in my hair.

[LAUGHTER]

I've got crust dandruff. Hoohoo! [MUNCHES] Oh, tasty, though. Ha-ha!

MENAKA: Oh, thanks, Marc. I really needed a good laugh.

[LAUGHTER]

[THEME MUSIC]

[SIGHS]

MOLLY BLOOM: Welcome to *Brains On.* I'm Molly Bloom, and my co-host today is Coco from Minneapolis. Hi, Coco.

COCO: Hi, Molly. How are you?

MOLLY BLOOM: I'm good. It's a pleasure to talk to you today. So this episode is a double feature of giggles and adorableness.

COCO: I think all of us could use a cuteness overload right about now.

MOLLY BLOOM: [LAUGHS] Yes. I definitely could. So first, we're talking tickling. So Coco, I want to know, are you ticklish?

COCO: I'm, kind of, ticklish, but not really.

MOLLY BLOOM: Have you always not been really ticklish?

COCO: No.

MOLLY BLOOM: So tell me, when did you start being less ticklish?

COCO: Maybe when I learned more things to not be ticklish, I guess.

MOLLY BLOOM: So tell me what things you learned to not be ticklish.

COCO: I tried to hold my breath.

MOLLY BLOOM: So you found that when you hold your breath, you don't really get tickled when someone tickles you.

COCO: Yeah, you can't really laugh when you're holding your breath, so.

MOLLY BLOOM: Huh, so when you were younger, did you like being tickled or not?

COCO: Sometimes I liked being tickled. But sometimes I didn't.

MOLLY BLOOM: I do not like being tickled. I have not learned the tricks you have. And I don't care for it. We've gotten a lot of questions about tickling. But there's one tickling-related question that a lot of you want to know the answer to.

[UPBEAT MUSIC]

GRACE: Why don't you laugh when you tickle yourself?

AMELIA: Why when other people tickle you, it tickles, but when you tickle yourself, it doesn't?

CLAYTON: Why do you laugh when other people tickle you, but you don't laugh when you tickle yourself?

HENRY: I question is, why can't we tell ourselves?

CAITLIN: Yeah.

MOLLY BLOOM: That was Grace from Halifax, Nova Scotia, Amelia from Wales, Clayton and Marcus from Toronto, and Caitlin and Henry from Clarendon Hills, Illinois. And we had a different kind of producer investigate this for us.

COCO: I'll just say it. She's a skin receptor, so a nerve cell in your skin that sends his touch.

MARLEY: Molly, Coco, I'm so glad you called. I have been wondering this same thing for ages, why can't we tickle ourselves? I had a hunch, who was behind this.

MOLLY BLOOM: We are so excited to hear about it. But can you introduce yourself first?

MARLEY: Oh, of course. I'm Marley. I'm a skin receptor. I sit in your skin and get signals from the outside world, maybe tomato sauce splashes onto your face when you're slurping spaghetti or a fly lands on your ear. Skin receptors like me sense those things. Then we tell the nerves we're connected to. We send a message down the line. That's our job. That's our job.

But me-- [CHUCKLES] I get curious about things. You might call me inquisitive. And I've noticed something pretty interesting. When I send messages about touches you've done to yourself, so yes, tickling yourself or a self-tickle, as I like to call it, those messages, they seem to get a little lost.

Not that you can't feel them, you can. But the strength of the message does not get through. So like you, Caitlin and Henry, I needed to know why. First, I called a friend.

[PHONE RINGING]

She's a nerve cell in the spinal cord. Since he's farther up the chain, I thought he'd be able to help.

KEVIN: Oh, hi, Marley. How's it going?

MARLEY: Listen, Kevin, I'm looking into some messages that I suspect are being intercepted. So when I send a message about a touch, do you know where it goes?

KEVIN: Well, you're a skin receptor. You sense the outside world first. You send a signal to a nerve, and nerves are basically strings of special cells that send messages throughout your body. Then eventually, most nerves lead to the spinal cord. That's where I am. It's a big bundle of nerves. It runs up the back through the backbones.

MARLEY: Any way of losing a signal there?

KEVIN: Everyone I know is pretty much just passing things along.

MARLEY: So millions of receptors, like me, send messages to other nerves. Those nerves send messages to you all at the spinal cord, then what?

KEVIN: From the spinal cord messages go straight to the brain. What kind of messages do you think are being lost?

MARLEY: Kevin, I can't tell you what I'm working on just yet. I have to go. But this is so helpful. [SIGHS] Thank you so much. I promise to fill you in later. It sounds to me like signals stay loud and clear until they get to one place, the brain. Like I said, I had a hunch. I thought the brain might be behind this. But who to ask? The brain is notoriously busy. No time to talk.

I went to the next best thing, a person with a really smart brain. Her name is Martha Flanders. I found her in a neuroscience lab at the University of Minnesota Medical School.

MARTHA FLANDERS: Minnesota Medical School. I study the somatosensory system, which means how we get information from receptors in the skin to the brain.

MARLEY: Perfect.

MARTHA FLANDERS: We have to have some sort of sense all the time of what's going on out there.

MARLEY: OK, the sense of what's going on out there. Me and other receptor cells, we provide that information by sending signals about what a body is feeling, which is obviously very important.

MARTHA FLANDERS: And your brain keeps track of the kind of sensory input you should expect from your own movement.

MARLEY: Aha! So there's a difference between self-movement and movement from other places, for the brain, at least. I was under the impression that all touches or sensory inputs carry the same weight. A tickle is a tickle. It is to me, at least, as a skin receptor. But that's maybe not true for the brain.

MARTHA FLANDERS: When you tickle yourself, your nervous system has canceled out the sensory input that was produced by you.

MARLEY: Canceled? But why would the brain cancel out valuable information?

MARTHA FLANDERS: Because your nervous system expected that pattern of sensory input because you produced it.

MARLEY: So a self-tickle, to me, a skin receptor, it still seems like news since I had no part in creating the movement. The brain, on the other hand, it does anticipate the self-tickle since it commanded the hand to tickle in the first place. And so the brain intercepts the message coming from me. It's the brain that's quieting the signals of touches you do to yourself, just as I suspected.

Apparently, canceling out self-tickles is a way to keep you alert. It helps you pay attention to touches that are important, like bugs landing on you or other people bumping into you. In the end, tickling yourself is predictable for your brain. It's not important.

MARTHA FLANDERS: But if someone else tickles you, you've had no way to anticipate that. And tickling is such an interesting signal that you would have no way to see that coming.

MARLEY: Well, as a skin receptor cell, I have no way to see anything coming, not just because I have no eyes, but also because the brain is keeping all kinds of information to itself. But I don't have time to stew over this. I have to call Kevin and fill him in. I'll talk to you all later.

MOLLY BLOOM: So tickling yourself isn't really a thing. But tickling other people definitely is.

AMELIA: Hello, my name is Amelia from Green, Ohio. And my question is, why do we laugh when we're tickled?

COCO: We want to know more about that.

MOLLY BLOOM: So we called up Susan Lubejko. She studies how our brains handle pain at the University of California at San Diego.

COCO: Welcome, Susan.

SUSAN LUBEJKO: Hi, Coco.

COCO: So I have a couple questions for you.

MOLLY BLOOM: Go for it.

COCO: First one is, how does pain connect with laughter or tickling?

SUSAN LUBEJKO: Our skin has receptors that feel a lot of different sensations. So one of them is light touch, like a tickle, a feather something brushing against your skin. And another one is for pain. And these receptors are all different from each other. And they send information to the brain, so you know what you're feeling.

And then once it gets to the brain, all of these things are sent to an area called the somatosensory cortex. And this part of the brain helps us make sense of all of this incoming information from our skin and even like the inside of our nose, anything where we're feeling a touch. But the difference when you're being tickled versus when you're feeling pain is another part of the brain is activated.

And when you're tickled, an area called the anterior cingulate gyrus is also activated. And this part of the brain is important for pleasure and positive reinforcement, which means if we do something that we like, we keep doing it. And so tickling activates this part of the brain. And it tells us that this is a good stimulus. And it's not something that we need to be scared of. And that causes us to laugh.

COCO: So what signals do neurons send to the brain when you're getting tickled?

SUSAN LUBEJKO: So this goes back to those receptors that are in the skin. So those are neurons. And neurons are our brain cells, but also the cells that make up the nerves that go to the rest of our body. And they send what are called action potentials back to the brain through a relay of neurons.

And so these are little electrical signals that tell the cells that they're active. And they make the next cell active and so on and so on. And so these little electrical activity in certain neurons are what allows our brain to understand what's going on in an area so far away, like our fingertips or our feet.

COCO: That's very cool. Why are some parts of the body more ticklish than others?

SUSAN LUBEJKO: This is a really interesting question. We would want to say, well, maybe there's more of these receptors in areas that are ticklish. But that's not always true. Think of your fingertips. We have really sensitive fingertips. They feel a lot of things very well. But they're not actually very ticklish.

So some scientists think that the areas of our body that are most ticklish, like our underarms and our feet and our stomach, are actually the areas of our body that we need to protect the most. And some neuroscientists think that tickling is a way for us to learn which parts of our body need to be protected in case a threat came into play.

But since we're kids and we're learning to do these things, it's more of a fun thing. But eventually, it'll help us.

COCO: Can you train yourself not to be ticklish?

SUSAN LUBEJKO: I'm pretty ticklish person. So I hope that it's a yes. One other related question that is really important to understanding this is why can't we tickle ourselves. And this is because there's an area of the brain called the cerebellum that helps us plan and execute our motor movements.

And so when you're trying to tickle yourself, your cerebellum realizes that your arm is moving towards your underarm or your foot or something. And it cancels out the ticklish signals that are coming from that area because it's saying, oh, I'm doing this myself.

So one strategy for being less ticklish is if someone's coming in, trying to tickle you, you can actually put your hand on their hand. And it helps your brain realize there's something coming. I know where it's coming from. And then maybe you'll feel a little less ticklish when it actually happens.

COCO: Wow. Just wow. [CHUCKLES]

SUSAN LUBEJKO: I know. It's a really cool field to think about, how your brain is doing all of these things.

COCO: Yeah, how have people studied tickling?

SUSAN LUBEJKO: Probably the very first thing is, we did a lot of observation. So scientists looked at people-- different types of people, how ticklish they were, where they were ticklish. And then there's also been other really cool studies. We can look at primates, like monkeys and apes. And then also one more recent study has shown that even rats like to be tickled. So we've been able to also look at animals to understand how tickling works.

COCO: What do rats and those other animals do when they're being tickled?

SUSAN LUBEJKO: They actually laugh, and they enjoy the experience. They run around in their little enclosure. They come back to the experimenter's hand because they want to be tickled again. But it's really interesting because they do seem to laugh the way that a human does.

COCO: Thank you, Susan.

SUSAN LUBEJKO: Thank you, Coco.

[MUSIC PLAYING]

MOLLY BLOOM: Now, a tickle for your eardrums. It's the--

[MYSTERIOUS MUSIC]

COCO: Mystery sound.

MOLLY BLOOM: So Coco, you are very ready for this mystery sound, I know, because that stinger we just heard, the mystery sound stinger that plays every time we do the mystery sound, that is actually your voice.

COCO: Yes, it is.

MOLLY BLOOM: How old are you when you recorded that?

COCO: I think I was four.

MOLLY BLOOM: Oh, my goodness, that's a long time ago. And we've known you for so long because your dad, Marc Sanchez, works on this show.

COCO: Yes, he does.

MOLLY BLOOM: Are you ready for the mystery sound?

COCO: Yes, I am.

MOLLY BLOOM: All right, here it is.

[STATIC SOUND]

COCO: I've three guesses.

MOLLY BLOOM: All right, tell me your three guesses.

COCO: A radio, somebody running, or an airplane.

MOLLY BLOOM: A radio, somebody running, or an airplane, I like-- those are very vast and diverse answers. Well, you're going to have another chance to hear it and guess again in just a bit.

(SINGING) Ba, ba, ba, ba, ba, ba, ba, ba, ba, ba, ba, ba, *Brains On.*

Before we close out the tickle-tastic part of this episode, one more thing.

COCO: It has to do with if you get tickled a lot, a lot, a lot.

MOLLY BLOOM: And you laugh really, really, really hard.

COCO: You have to start to pee.

MOLLY BLOOM: Or you might even pee.

COCO: Here's what's up with that phenomenon.

RENA MALIK: Hi, I am Rena Malik, and I am a doctor that takes care of the kidneys, the ureter, and the bladder. So basically, everything that makes urine is something that I take care of. And I'm the plumber of all that. So I fix anything that's wrong with the plumbing.

MOLLY BLOOM: Here are the basics of that plumbing.

RENA MALIK: So a bladder is like a big balloon that's inside your pelvis right in the lower part of your belly. And that's where you hold urine. So when you drink and eat, your body processes all the fluid and all the nutrients that go in your body. They go through your kidneys, which are these two little bean-like organs on either side of your back.

And then they go down these little tubes called ureters. And the urine goes down those tubes and into this balloon-like structure, this sac, essentially. And that's what holds your pee. And so that's called the bladder. And the bladder is connected to the outside of your body by the urethra. So that's where you pee from. That's called your urethra. And inside the urethra, there are what's called sphincters. And these are muscles that contract or squeeze to keep your urine in.

COCO: So to recap, your pee starts in your two kidneys. Then whoosh, it travels down to two tubes called the ureters. Then splash, two tubes dump the urine into the bladder where it waits until zoom, the sphincter opens and the urine flies through the urethra and into the world.

MOLLY BLOOM: You actually also have other sphincter muscles that have to do with pooing and swallowing, different muscles, same name, sphincter. Anyway, your brain helps squeeze these muscles to keep the brakes on and stop you from peeing if you don't want to.

RENA MALIK: And when your bladder gets full, it sends an urge to your brain, which takes off the brakes.

COCO: That usually happens when you're in the bathroom, ready to pee.

MOLLY BLOOM: So that's a normal situation. In a tickle situation--

RENA MALIK: When you're laughing you actually increase the pressure in your belly. So you're laughing so hard. That increases the pressure on your bladder or that sack of urine and at the same time, your sphincter can weaken a little bit, or that tight muscle can relax a little bit, allowing some urine to leak out.

COCO: So there you go.

MOLLY BLOOM: Laughter, kind of, pushes on your bladder. So it's a good idea to take a break from tickling to take some of that pressure off your bladder.

COCO: Spare shorts never hurt anybody, either.

[MUSIC PLAYING]

MOLLY BLOOM: Hey, we know a lot of you are home from school, which means you're getting creative to pass the time.

COCO: So we want to know what's the most fun thing you've done during your quarantine.

MOLLY BLOOM: Have you found a really cool way to study science?

COCO: Or baked an epic cake.

MOLLY BLOOM: Or picked up a new skill, like learning duck calls.

COCO: Quack, quack, quack.

MOLLY BLOOM: Oh, good duck calls, Coco. Record yourself telling us about one cool thing you've done and send it to us at brainson.org/contact.

COCO: It could land in an episode.

MOLLY BLOOM: Just like this question.

TATE: My name is Tate from Saint Paul, Minnesota. And my question is, can the moon have a moon?

COCO: We'll answer that at the end of the show in the Moment of Um.

MOLLY BLOOM: And I'll read the latest names to get added to the Brain's Honor Roll.

COCO: So keep listening.

MOLLY BLOOM: You're listening to *Brains On* from American Public Media. I'm Molly.

COCO: And I'm Coco.

MOLLY BLOOM: It's time for us to change gears, from tickle tempo--

COCO: To cuteness hyperdrive!

[UPBEAT MUSIC]

MOLLY BLOOM: Let's look at some cute stuff to get ready. So Coco, you recently got a new puppy, which seems like a really good place to start. What is her name, and what does she look like?

COCO: She is a Goldendoodle, and her name is Ella. I'm going to show you a picture.

MOLLY BLOOM: Oh, it's a little fluff. Look at that little fluffy face, oh.

COCO: She's so cute.

MOLLY BLOOM: Well, I think we are definitely connected to our inner cute-o-meters now.

COCO: Yeah, ready to carry on and answer this listener question.

SAMUEL: Hi, my name is Samuel.

ADRIAN: And my name is Adrian.

SAMUEL: And we are from Juana Diaz, Puerto Rico.

ADRIAN: And our question is--

SAMUEL: Why do people find cute things cute?

MOLLY BLOOM: Excellent question, Samuel and Adrian. We all know cute things when we see them. But why do we react to a baby that way--

[BABY MUMBLING]

--and not a grown up?

SPEAKER 1: Gu-gu, ga-ga?

MOLLY BLOOM: Or a kitten--

[KITTEN MEOWS]

--but not a flower?

SANDRA PIMENTEL: The answer seems to be in evolutionary biology.

MOLLY BLOOM: That's psychologist Dr. Sandra Pimentel. And she explained that the reason we find some things cute and not others is hardwired into us.

SANDRA PIMENTEL: So if we think about evolution, our goal as a species as humans is to survive and to pass on our genes.

MOLLY BLOOM: And the way we pass on our genes is by having babies. But you may have noticed that babies can't do much on their own. They need us to take care of them and keep them alive. That's where the cuteness comes in.

SANDRA PIMENTEL: By finding things cute, we're more likely to want to take care of them and protect them. They're more likely to look vulnerable and remind us like, hey, take care of me. [CHUCKLES] I'm helpless here.

COCO: So it's no surprise then that the features that we humans think of as cute are the features that babies have.

MOLLY BLOOM: These features were dubbed "Kindchenschema" by the psychologist who first studied them, which by the way, can we say that word a few times?

COCO: Kindchenschema.

MOLLY BLOOM: Kindchenschema, it's a mouthful. Anyway, the features of-- [CLEARS THROAT] --Kindchenschema are--

COCO: Big head relative to body size.

[BABY MUMBLES]

MOLLY BLOOM: Larger forehead.

[BABY MUMBLES]

COCO: Large eyes.

[BABY MUMBLES]

MOLLY BLOOM: Round cheeks.

[BABY MUMBLES]

COCO: Small chin.

[BABY MUMBLES]

MOLLY BLOOM: And a small nose.

[BABY MUMBLES]

COCO: In other words, a baby face.

MOLLY BLOOM: And these features appear in baby animals, too, like puppies, kittens, bunnies, all elicit this sound.

SPEAKER 1: Oh.

SPEAKER 2: Mm.

MOLLY BLOOM: So how does our brain make us like looking at cute things? It rewards us with a chemical called dopamine. That can make us feel intensely happy.

SANDRA PIMENTEL: There's a study that had people looking at cute pictures. And what they found is that when people are looking at these cute pictures, their brain releases dopamine. And that's the same neurochemical-- brain chemical that gets released when we have something that we really enjoy eating.

And that happens when we see cute pictures, too. So our brain is sending this message that, yeah, this feels good. This is pleasing. Keep at it. Keep looking at these cute things.

COCO: Sandra said there are other studies that show our brains wants to give cute things extra attention over noncute things.

MOLLY BLOOM: Since our brains like cute things so much, it makes sense that these characteristically cute features, these Kindchenschema, show up in pop culture a lot, too.

COCO: We see this stuff all the time. Think about Mickey Mouse or Hello Kitty. Both have rounded features, big heads, large eyes. And lots of people find them pretty darn cute.

MICKEY MOUSE: OK, fellers!

MOLLY BLOOM: The Japanese word for cute is kawaii. It is everywhere. Kawaii has inundated Japanese culture. I talked to Ryuta Nakajima. He's an artist who currently lives in Duluth, Minnesota. And he's originally from Japan. He told me that kawaii characters have the same traits we've been talking about, big head, big eyes, little nose, rounded features. It really started to take off after World War II. But Ryuta sees it going back even farther than that.

RYUTA NAKAJIMA: The tradition of this Japanese cute thing probably go back way back to the scroll of a rabbit and a frog doing Sumo wrestling. So I think there's a sort of a longing and desire for something that's funny and cute. And that will allow you to forget about the hardship in life.

COCO: Many companies have kawaii mascots, as do cities and regions. There are kawaii versions of eggs, towers, and flowers, and the famous poop emoji.

MOLLY BLOOM: That's kawaii, too.

RYUTA NAKAJIMA: Anything can be turned into kawaii. That's the amazing thing about it.

MOLLY BLOOM: Some of the best known kawaii characters are from Sanrio, like Hello Kitty. And then there is--

[POKEMON THEME]

RYUTA NAKAJIMA: Every single Pokemon characters has a kawaii quality built into it. That is a lot of these 50 some years of Japanese anime engineering. It's not an accident those character looks so desirable, why Pikachu looks so desirable.

PIKACHU: Pika-pika, Pikachu.

MOLLY BLOOM: Think about that, Pokemon are engineered by top-notch talent just to make you go, oh. And because cute things demand our attention, these cute things are often used as a marketing tool to sell us stuff.

SANDRA PIMENTEL: There's a ton of psychology in marketing. We know this. And so these things are usually not by accident and what's going to make things more likely for people to buy them, whether with money or buy them with their time.

MOLLY BLOOM: So companies might use cute characters to market their products or make the products cuter themselves.

COCO: So cute can also be cunning when used as a marketing strategy.

CHILDREN: *Brains On!*

MOLLY BLOOM: Now, I have something else I want you to help me with. I want you to think of the cutest puppy, kitten, or baby you've ever seen. Now what sound do you want to make when you think of that cuteness? Is it more like an, aw, or is it something like, oh, I just want to eat you up. I want to take a bite out of you. You're so cute.

COCO: I think it's more of like a mix of the first one and the second one.

MOLLY BLOOM: Mm, so you have both. Well, those are both totally normal reactions to cuteness. But why? Why do we go, "Aw," or want to bite cute things? What is that about? Dr. Oriana Aragon from Clemson University wondered the same thing.

ORIANA ARAGON: I was watching late night television. And there was an actress on there. And she was talking about this really cute puppy that she saw--

SPEAKER 3 (ON VIDEO): And I don't know. I just want to squeeze something.

SPEAKER 4 (ON VIDEO): OK.

SPEAKER 3 (ON VIDEO): And I just--

ORIANA ARAGON: And she was gritting her teeth and clenching her hands into fists and making snarling faces when she was talking about the cute puppy. And I thought, wow, that's really interesting. If you looked at that on the surface, it doesn't look like something you would show on your face when looking at something cute.

And I talked with my dad about it on the phone. And he said, well, but you've got to think about grandma's and grandpa's will pinch a baby's cheeks, too, and say, oh, you're so cute. I want to eat you up. And I thought, wow, you know, you're right. But that's different.

And I'm a researcher, a psychologist by training, and I study emotions and how people express emotions. And so when I saw that. And it really occurred to me that it seemed an odd reaction. I decided that was something that I was going to study.

MOLLY BLOOM: And this cute aggression, the desire to bite, squeeze, or eat something because it is so cute is a common emotion. There are phrases to describe this feeling in all sorts of different languages. French--

SPEAKER 4: [SPEAKING FRENCH]

MOLLY BLOOM: Greek--

SPEAKER 5: [SPEAKING GREEK]

MOLLY BLOOM: Polish--

SPEAKER 6: [SPEAKING POLISH]

MOLLY BLOOM: Vietnamese--

SPEAKER 7: [SPEAKING VIETNAMESE]

MOLLY BLOOM: Italian--

SPEAKER 8: [SPEAKING ITALIAN]

MOLLY BLOOM: Czech--

SPEAKER 9: [SPEAKING CZECH]

MOLLY BLOOM: Dutch--

SPEAKER 10: [SPEAKING DUTCH]

MOLLY BLOOM: And finally--

SPEAKER 11: Gigil.

MOLLY BLOOM: That last one is Tagalog, the language spoken in the Philippines. It's a phrase that means the gritting of teeth and the urge to pinch or squeeze something that is unbearably cute. It's one of those excellent words that says in one, but takes us many to say in English.

So even though you might say, "You're so cute. I could eat you up," and you might grit your teeth and clench your fists, you're not actually feeling aggression. You're just expressing it. This is called dimorphous expression, when you're expressing something different than what you're feeling.

COCO: The same thing, dimorphous expression, is happening when you cry, when you're happy, or laugh when you're nervous.

MOLLY BLOOM: The same thing is also happening when you make this sound--

SPEAKER 1: Oh.

SPEAKER 2: Mm.

ORIANA ARAGON: And it comes with a pronounced frown, actually like a sad face. And it's another dimorphous expression.

COCO: So when you see something cute, you're filled with positive feelings. But they can come out looking like aggression or sadness.

ORIANA ARAGON: Let's say, a tennis athlete scores a victorious point on the court. They might clench their fist and make a growling, snarling face, and go, yeah, and express aggression for their happiness, or they might crumple down and start crying, if it's the end of the match, and just release. And you'll see tears of joy.

MOLLY BLOOM: Again, dimorphous expression. So why does this amorphous expression happen? Why can't we just smile and look happy when we're happy?

ORIANA ARAGON: We have some indication that when people do express this way, that they come down from that really strong emotion a little better. So it seems like it might help to regulate emotion, meaning help people to control their emotions.

MOLLY BLOOM: So it's possible these dimorphous expressions help us deal with overwhelming emotions.

COCO: But there's still more research to be done.

MOLLY BLOOM: Oriana can say that people who have dimorphous expressions recover more quickly from extreme emotions.

COCO: But she can't say if the dimorphous expression is the cause of the quick recovery.

MOLLY BLOOM: Or if people who do that just happen to recover faster, anyway. Oriana is excited to keep researching these reactions, these dimorphous expressions to understand them more.

ORIANA ARAGON: As a psychologist, I think about all sides. So I wonder also, what is that baby thinking because they encounter these little snarling faces-- [LAUGHS] --of people looking at them. We think they're adorable. And babies are soaking up information.

I wonder if in some way, it gives babies an idea that those faces can come about in a playful way. I wonder if it educates babies in any way about emotion expression.

MOLLY BLOOM: So next time you go-- [CLICKS TONGUE] "Oh," or want to nibble on a baby's cheeks or cry at a wedding or laugh when you're nervous, know that your dimorphously expressing yourself.

COCO: Expressing a different emotion than you're actually feeling.

SPEAKER: Brains, brains, brains on.

MOLLY BLOOM: Now Coco, back to the mystery sound, are you ready to hear it again?

COCO: Yes, I am ready.

MOLLY BLOOM: Let's hear it.

[STATIC SOUND]

Coco, last time, you had a lot of different thoughts about what it might be. What are you thinking now?

COCO: So the same things and maybe like, in a video game picking up stuff, maybe.

MOLLY BLOOM: Like that's a sound for a video game of someone picking something up?

COCO: Yeah.

MOLLY BLOOM: I like the guess. Here is the answer.

SHIMPEI ISHIYAMA: So the sound you heard just now is a rat's laughter when rat was being tickled. And actually, this is ultrasound. That means it's so high that humans cannot hear. So the frequency is converted to lower pitch so that we can hear.

MOLLY BLOOM: So that's a cute little rat laugh.

COCO: Wow.

MOLLY BLOOM: Shimpei Ishiyama is a neuroscientist who studies brains and fun. And he does that by watching how rats react when they get tickled. Rat tickles have a lot in common with human tickles. They have their own kind of laughter.

SHIMPEI ISHIYAMA: It's pretty obvious they are having fun.

MOLLY BLOOM: And based on their laughter and brain scans, rats also feel ticklish just before tickling starts. They anticipate being tickled just like we do. Just like a lot of people, rats resist tickling while it's happening, then come back for more when it ends. Shimpei says it's really hard to know why rats or people are ticklish. But he's going to keep looking into it. And he has one idea to start out.

SHIMPEI ISHIYAMA: And we believe that ticklishless is a brain's trick to make us have fun more.

MOLLY BLOOM: We can't tickle ourselves because we always know it's coming.

COCO: But tickling from someone else probably will make you laugh, and it might help you bond.

MOLLY BLOOM: Tickles and laughter might also push on your bladder, so watch out.

COCO: Cute things have features in common, like big eyes and round cheeks.

MOLLY BLOOM: Our love of cuteness helps remind us to take care of little kids.

COCO: And cuteness might make you feel one thing and express another.

MOLLY BLOOM: That's it for this episode of *Brains On.*

COCO: It was produced by Marc Sanchez, Menaka Wilhelm, Sanden Totten, and Molly Bloom.

MOLLY BLOOM: We had production help from Ruby Guthrie and Christina Lopez and engineering help from John Miller. Special thanks to--

[LISTING STAFF]

COCO: Now before we go, it's time for the Moment of Um.

TATE: Can a moon have a moon?

CHANTANELLE NAVA: That's a great question. So my name is Chantanelle Nava, but I go by Chani for short. And I am a fourth year astronomy graduate student at Harvard. And I specialize in exoplanet research, so just like Earth-- here on Earth, we orbit the sun. When we look out in the night sky, and we see all those stars out there, they all have planets, too. And so those are what I study.

I actually had to do a little bit of thinking about this and a little bit of research myself because my initial response or thought was, yeah, sure, why not? I think a moon could have a moon. But we haven't actually observationally seen any moons that have their own moons. So in our own solar system or looking at exoplanet systems, which we haven't-- even with exoplanet systems, we haven't found any moons.

But in our own solar system, we're pretty sure that none of our moons have their own moons. That being said, there's really no reason to think that a moon couldn't have some other smaller rock orbiting it. And that's what a moon's moon would be, just another rock orbiting that moon, just like the moon is orbiting its planet.

Another thing I'll say about a moon orbiting a moon is it would have a very small signal. That would be very difficult to detect relative to, say, a planet signal or even a moon signal because if it's a moon orbiting a moon, it's going to be that much smaller. And so that might be another potential reason why we haven't detected any of these things yet is just that it would be a very small signal.

COCO: Um.

SPEAKER 12: Um.

MOLLY BLOOM: I'm so happy to be in the orbit of these wonderful listeners. It's time for the Brain's Honor Roll. These are the brilliant people who share their mystery sounds, questions, ideas, and drawings with us.

[LISTING HONOR ROLL]

Brains On will be back soon with more answers to your questions.

COCO: Thanks for listening.