



The science behind picky eating

Why do some people — especially kids — piddle with, wince at and despise the very foods that science tells us are most healthful? Here's how to get finicky types to give meatloaf and other 'yucky' food a chance.

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Robin Chenoweth: Because we're human, and every mouth is different, most of us have foods we find, well, distasteful.

Jeff Carpenter: Pickles. If a pickle is anywhere near me, ugh. I will tell a restaurant, I'm like, "Do not put them on or even near my plate." I'll tell them, sometimes, I'm just allergic to them just to make sure they don't. But if it comes out with pickle on it, I will send everything back. I don't care if it's touched anything or not: If I've seen a pickle on my plate, all the food goes back because it might have pickle juice anywhere on it. I just can't stand the smell of them.

Robin Chenoweth: Some people go far, carrying food aversions into adulthood. But in general kids take the cake when it comes to picky eating. Just ask Josie, Jember and Zemen.

Josie: Cooked Brussel sprouts. I tried it to get a toy. And I gagged.

Jember: I don't like lettuce, and tomato.

Zemen: I don't like tomato either. Disgusting.

Marius: Things that I do not like: Shrimp, meatloaf, cabbage, burgers, ketchup, mustard, spaghetti sauce, mac and cheese, french fries, fish and chips, most types of fish, olives, potato salad, pasta salad, most cheeses. And lamb.

Robin Chenoweth: (Laughing) I've never met a kid in my life who does not like french fries. Ever. Why don't you like french fries?

Marius: Uuuhhh, they're a little too crunchy.

Robin Chenoweth: That's Marius — who loves ham but has a list of foods that won't cross his lips, including beans and many proteins. So, at the behest of Marius' mom, this episode of Inspire considers the science behind picky eating. Why do so many kids — and even some adults — pick at, piddle with, wince at, gag over and generally dislike the very foodstuff that other people are so obsessed with? We talk to researchers at Ohio State's Sensory Evaluation Center about their work studying "mouthfeel" and hypersensitive food receptors that might run in families. And we get tips from a human nutrition expert on how you can — just maybe — get a picky eater in your life to like something as unlikable as meatloaf. This is the Ohio State University Inspire Podcast. I'm Robin Chenoweth. Carol Delgrosso is our audio engineer. Meghan Beery is our student intern. Inspire is a production of the College of Education and Human Ecology.

Robin Chenoweth: In solidarity with finicky types, I am a reformed picky eater. My ultimate food loathing, still, to this day: fish sticks — stinky breaded fish parts, compressed, frozen and reheated. As a kid, I was imprisoned in my chair until I ate more. And to be fair, I refused a lot of food. But if I waited until mother got up to clean dishes, I could sneak those fishy chunks under the table to my cat, Jingles, who waited opportunistically at my feet. Sorry, Mom, you had to find out this way. But food is supposed to nourish people. Fuel them. Doesn't it make sense that people would crave the things that help their bodies? Leafy greens, blueberries, fish? What goes wrong, that so many people reject those very things that our bodies need? And why do some people — especially kids — reject food more than others?

Chris Simons: There's this concept called negativity bias. People are influenced to a greater magnitude by things that are perceived as negative than they are by things that are perceived as positive. For instance, we work harder to avoid things we don't like, than we do to seek out things that we do like.

Robin Chenoweth: Associate Professor Chris Simons studies sensory evaluation and psychophysics at the Ohio State University's Sensory Evaluation Center at Ohio State.

Chris Simons: In some cases, it's probably protective. You know, infants and small kids, especially when we were cave people, things that were sweet things, that were high fat, salt — these provided the calories and the nutrition that we needed to survive. Things that were bitter, those were often poison. So, avoid those things. It just so happens that a lot of things that are good for us, a lot of these plant-based foods, they have these bitter polyphenols, they have a lot of these compounds that are actually quite healthy, but they taste bad.

Elodie: I don't like eggplant that much.

Jaden: I don't like tomatoes; I don't like carrots.

Carlotta Penn: Zemen, what did you tell me the spinach tasted like, when I made spaghetti with spinach?

Zemen: It tasted like boiled rotten eggs!

Robin Chenoweth: The mom there is Carlotta Penn, director of community partnerships and engagement in the College of Education and Human Ecology. She has three kids 6 and under, and Jember and Zemen are not thrilled about how she doctors up the spaghetti sauce. That's typical for kids their age, Simons says.

Chris Simons: When you're young, most of those responses are really based on our hardwired, our innate sort of responses to those types of sensations. But we can learn to like these things. I've learned to like beer, it's bitter. I've learned to like coffee, it's bitter. A lot of times those things have pharmacological aspects to it as well: caffeine and coffee, which helps you learn to like them. But you can learn to like vegetables.

Robin Chenoweth: You study psychophysics. I'm curious as to what that is.

Chris Simons: Psychophysics is just a term that we use for measuring the sensations that people experience when evaluating stimuli. So, it doesn't have to be food, or taste stimuli, it can be light, it can be noise, and so forth. ... A lot of it's around thresholds. We're not all clones of one another, right? There's variability in our perception. ... For me, bitter coffee, like french roast, super strong, is totally tolerable. But for, you know, my students are like, "Oh, this is horrible. How can you drink that?" So, biology underpins a lot of that.

Robin Chenoweth: It's just how your mouth or your taste buds are different than other people's?

Chris Simons: Exactly right. It's all controlled by genes. And, so, people have different receptors that are more or less sensitive to different types of compounds. So, there's some people that tend to be more sensitive to bitter compounds. And as you can imagine, these people really don't find vegetables particularly tasty because they're super bitter. And as a consequence, they avoided them.

Robin Chenoweth: Simons just received a grant to study taste and the tactile underpinnings of picky eating. He will do the research with Praveen Goday, director of Nutrition and Feeding Programs at Nationwide Children's Hospital and also a clinical professor at Ohio State. Goday works with kids who have extreme feeding problems but will focus on typical picky eaters in this research.

Praveen Goday: Nobody's ever looked at the sensations in these picky eaters and compared them to — I'm going to call them typical leaders to distinguish them from picky eaters. And, so, we decided we would do that. But we now want to take it a step further. We all have different

tastes, perceptions, and some of that is based on our genes. There are these single nucleotide polymorphisms...

Robin Chenoweth: Single Nucleotide Polymorphisms, or SNPs, for short. They're the most common kind of genetic variation in people, and scientists have found 600 million of them across populations. And one or two of them might just be an answer as to why some people crave some foods and detest others.

Praveen Goday: And, so, one nucleotide is off in a particular portion of a gene, and it makes us taste sweet more, or bitter less, or whatever combination of that. So, we want to test these polymorphisms in these children and see if it's one of the reasons that they are picky. So, if this kid doesn't eat vegetables at all, is it because there's something with his genes that's making him more likely to do that?

Robin Chenoweth: So, this has never been done before.

Praveen Goday: This has not been done before. These genetic studies have been used to compare cardiometabolic risk factors and in adults. And so, for example, if you have less sweet sensation, you don't taste sweet very much. You may love donuts, or whatever else is really, really sweet. And you need more of that to stimulate your tastebuds. And that could cause excess weight and all of the problems that could perhaps result from that.

Robin Chenoweth: Now, is this an issue with your tastebuds per se? Is it more of a brain thing?

Praveen Goday: No, it is your taste receptors don't get stimulated. And so your brain doesn't get the input.

Robin Chenoweth: And the taste receptors are in your tongue, in your tastebuds?

Praveen Goday: Right, they are in your tastebuds, yes.

Robin Chenoweth: So, if they're sort of dulled down compared to another eater, you may need more of the sugar in order to be able to feel like you like it, or enjoy it.

Praveen Goday: Exactly. The opposite is true for bitter. So, if your bitter taste receptors are heightened, because of these polymorphisms, then even things that are not bitter to other people may taste bitter to you.

Robin Chenoweth: It might seem strange to some people, because we do have such an obesity issue in our country, but we also have food deserts. Is this a universal thing that people experience? Or do families experience this across cultural and socio-economic levels?

Praveen Goday: The simple answer is yes. The more complex answer is, what percentage? If you look at kids above the age of one, it's anywhere between 15% and 50% of children, depending

on your definition. In my own mind, I think about probably 10% to 20% of children, young children are picky eaters. Then there's a little bit of a controversy about whether these children outgrow this picky eating or not. And it's not clear. There are as many studies which suggest that picky kids continue to remain picky adults, but some suggest that these numbers go down with time.

Robin Chenoweth: The other issue with picky eaters is what Chris Simons calls “mouthfeel.” It’s just what it sounds like — the way a particular food feels in your mouth and how you react to it. Simons will delve into this in the new research project.

Chris Simons: We think it contributes to picky eating in particular but it's kind of wild west. We don't really know. ...But texture and mouthfeel are ... it's a tactile sensation. So, it's the same sensation— touch — that you feel with your fingers. How the mouth is actually perceiving these different tactile sensations is still something that we're studying and trying to get a better hold on. It seems to be different than how we perceive with our fingertips; there's different receptors in our oral cavity. And one of the things that my group has found, which I think is fascinating, is that, in particular, the tongue seems to be the most sensitive, tactile organ in our in our body.

Robin Chenoweth: Which might explain why my young friend, Elodie, dislikes one particular food *sometimes*.

Elodie: I like cheese that is not melted.

Robin Chenoweth: She likes the cheese flavor, but when it’s melted, cheese is a no-go.

Elodie: I don't like most normal pizza because it has cheese on it. So, I take it off and I make my dad eat it because he loves mozzarella.

Robin Chenoweth: Simons’ former graduate students, Amy Andes and Gabriel Hutchings, conducted a study that explored textures that 8- to 12-year-olds often don’t like. The ones that most kids found most unacceptable? Rubbery.

Jaden: I don’t like mushrooms. I don't like shrimp.

Robin Chenoweth: Slimy, like Elodie’s melted cheese, or ripe bananas. Fuzzy, like peaches or edamame. Sandy or gritty, like panko chicken or a dusted cornmeal crust.

Chris Simons: So, the hypothesis was that people that were super sensitive to texture and tactile sensitivity in their mouth would avoid food or would be more picky with foods because they're overstimulated.

Robin Chenoweth: The study was done during the COVID-19 pandemic, so it was not possible to bring children to the sensory lab. So, a correlation between tactile sensitivity and pickiness could not but made.

Chris Simons: What we did find — and it was sort of consistent with this idea of negativity bias — what really drove people's food related behaviors were their desires to avoid the things they disliked, in particular, the textures.

Robin Chenoweth: So, if someone dislikes chunky peanut butter, they probably aren't going to like chunky salsa or chocolate chip cookies with nuts.

Chris Simons: It just so happened that picky eaters had a lot more types of textural sensations that they sought to avoid.

Robin Chenoweth: But for the upcoming study, kids will be monitored in the lab to determine how they react to food texture. So, we decided to visit, too. Ada, who is 6, sat in a room with a wall of video screens, watching a semi-surround scene from a Mexican restaurant while she munched chips and guac.

Ada: I like the chips and the guac.

Chris Simon: So, in this particular lab, we can modulate what people see. So, the videos. What people hear. And then we can pump aromas into the room, as well. So, what people can smell.

Robin Chenoweth: The labs are more often used to do product testing. An even more immersive testing experience uses virtual reality headsets — with hand tracking technologies and training for participants so that people like Ada don't accidentally dunk their hands in the guacamole bowl.

Chris Simons: Because, when we typically do sensory types of studies, we stick people, you know, we isolate, and we stick them in a booth, right? We turn on a red light leads; gloved hands push these yogurt cups through, right, and so, that's just... it's not how we eat food. ... When we test people in a contextually relevant scenario, like a restaurant, like a coffee house, like a wine bar, or whatever... people's opinions of the products change. So how you like that product, what you perceive in that product, isn't only dependent on the product. But it's dependent, as well as everything else that's going around with you, who you're eating with, the environment in which you're eating.

Robin Chenoweth: The same goes for picky eaters and the foods they choose to like or dislike. Environment matters. Context matters, and in ways that can be challenging. Here's Chanel Elisson, Jaden's mom.

Chanel Elisson: I can buy the exact same thing from the store, bagels and cream cheese, and he might eat like one bagel. But if we go to Starbucks or something, "Can I get a bagel?" "We have bagels at home." "It's not the same!" It's the exact same.

Robin Chenoweth: So how to deal with the whining. The moaning. The rolling of eyes — even by adults who never seemed to learn to eat a variety of foods? Some extreme cases might require the help from a doctor, Dr. Goday says. But for most, is there hope to expand the palates of picky eaters? Is there light at the end of the tunnel for their parents and significant others, who can be dealing with a houseful of finicky eaters.

Carlotta Penn: Don't you see, each one of them, what one likes the other one doesn't like? So, I can't cook one meal.

Robin Chenoweth: Take heart, says Julie Kennel, clinical associate professor of human nutrition in the College of Education and Human Ecology. Do what she does when dealing with her picky six-year-old, who recently objected when she told him they were having meatloaf for dinner: You have to think about the long game, she says.

Julie Kennel: The reaction is strong. And as a parent, that can be hard or disheartening — it can make you feel like, “Well, why am I making dinner in the first place? Why am I trying so hard to put healthful foods on the table?” And I just have to keep remembering that this is a, this is a lifelong process of a child being able to figure out what foods they like and do not like. And that takes a long time. A lot of times we think that happens the first time that a child is exposed to a food, but it doesn't. It takes, for children who are eight and under, it takes up to 20 times to be exposed to a food to really know whether we like it or not like for your brain to learn whether you like it or not. And when you're eight or over, it takes more than 20 times.

Robin Chenoweth: Really? So, as we age, it gets harder.

Julie Kennel: Right. Because we're already set in our thinking, or neurology is, more firm or confirmed. And, so, we have a certain palette that, when we veer from that, yeah, it takes longer to fully understand whether or not we enjoy that flavor.

Robin Chenoweth: So, it's kind of important if you're raising young children to it to expose them to as much as possible, right, so that they may like a lot of different foods.

Julie Kennel: Yeah, I think exposing them, but in ways that are more likely to be successful, rather than just pushing a variety of foods for the purpose of pushing a variety of foods. ... A lot of it comes down to the pressure a child feels to try a food and to accept food. They want to know that they have some power, say, in order to feel safe and comfortable at the table.

Robin Chenoweth: In fact, fear is a major component of people rejecting food. Oral motor development can play a big part, Kennel says, because kids aren't necessarily born knowing how to manipulate all eight muscles in their tongues or how to work their jaws to chew. One negative experience early on, with a carrot or a blueberry, can sour someone to that food for life.

Julie Kennel: Adults, it's not that different, really. We get foodborne illness or, we have that moment where we have a negative experience with a food. ... There are a lot of people who are like, "I'm never going to eat that food again." Because you always have this negative association with it. ... So, there's just a number of factors. It's a complex...it can be a complicated scenario to figure out why a child isn't accepting more foods.

Robin Chenoweth: So, keeping in mind that you're in this for the long haul, and it's been proven to take 20 introductions of a food to get even a young child to be comfortable with it, here's a plan. Take the stress out of the situation.

Julie Kennel: In nutrition, what we know is that there is a clear division of responsibility between parent and child. And this comes from the work of Dr. Ellen Satter. The parents' responsibility is to decide what is going to be offered and when it's going to be offered to the child. So, the what and the when. ...But the child has a responsibility to decide which of the foods they're going to eat, and how much. Using that division of responsibility, each person then comes to the table with some say, with some ownership.

Robin Chenoweth: That doesn't mean you plop a treat on the plate next to the vegetable. Here's Carol Delgrosso with her nephew, Tyson.

Tyson: I like broccoli, Dippin Dots...that's all.

Carol Delgrosso: So, when your mom says I'm gonna make something for dinner, you say...

Tyson: Broccoli and Dippin Dots.

Julie Kennel: The caregiver doesn't have to be deciding between a really sweet-tasting food and a vegetable. So, putting forward healthful choices, but then allowing the child to decide, am I going to taste this today? Am I going to eat this today? You know, maybe not today. And he caregiver, if they kind of remove themselves from the outcome, then you're more likely to long term have a better acceptance of all foods. A lot of times kids feel pressure at the table. And that's when they start to get more anxious. And that's when they start to get more fearful. And so, we want to find ways in which we're allowing the child to have choices and some say in what's happening at the table, and to not feel pressure to try and accept the food every time. ... I talk to parents about like, you know, it's a win, if you can put all the foods on a plate, and the child being okay with all the foods on the plate, and letting them see what the foods are, what different foods are first. And they can decide whether or not they're going to taste it. But if we force them to taste it, and it's not likely that they'll accept it. ... Sometimes a child will just say, I'm not gonna like that. And they've never tried it before. They're basing their decision on what it looks like. And so just working through that with them and trying, you know, to differentiate between, well, what does something look like versus, knowing whether you like something or not by its taste.

Robin Chenoweth: Are you trying to convince them to try it? Is that a good way to go?

Julie Kennel: Saying it once, inviting them. “Would you like to try that blueberry?” And then eating the blueberry yourself or other people at the table eating the blueberries can be very encouraging of getting them to try. But if you continue to ask the question, that pressure is going to build.

Robin Chenoweth: Indeed, when my daughter saw her younger brother stuffing his face with strawberries at the you-pick farm, she suddenly started eating berries — all berries — again.

Julie Kennel: Maybe they like it a half a dozen times that they try it, you know, and maybe they don't like it a half a dozen times that they try it. And it's, again, it's just always a way of like, you know, offering caregivers an opportunity to talk to their children about whether or not they really like a food, like using kind of that growth mindset, right, using the words like discovery and learning. ... Let's face it, like, every single blueberry tastes different.

Robin Chenoweth: Is pickiness universal?

Julie Kennel: Pickiness is universal.

Robin Chenoweth: So even a kid that might come from a background where there's not a whole lot of food on the table could still be picky.

Julie Kennel: Absolutely. ... Picky eating is not specific to one population or community. Picky eating occurs in all communities, regardless of culture, or background, regardless of income status. One of the challenges that parents often share is that they don't want to spend their resources or spend their money on foods that they don't know if their child will like or not. And the same thing for an adult. Like, should I spend my money on something knowing that I may not like it, can be a barrier to being more adventurous and open. ... Perhaps just starting with something small, starting with something that the child picks out, or the child seems interested in. ... Still trying to like keep it in the budget, you can still try a variety of different foods.

Robin Chenoweth: I'm wondering what happened with the meatloaf in your house?

Julie Kennel: Well, so, he very quickly ate the corn on the cob and asked for more corn on the cob, which is fine. And then he ate the meatloaf. ... This is a strategy we use in my house. When I'm having a food that I know he may or may not be accepting of, I make sure that I have a safe food, desirable foods, something that I know he really likes, on his plate. ... But in the meantime, “Yeah, well now I see everybody else eating it.”

Robin Chenoweth: The meatloaf.

Julie Kennel: And I know I've tried new foods in the past and I have liked some of them” — so he's willing to try it. He actually ate all the meatloaf that was originally on his plate.

Robin Chenoweth: Oh, no kidding.

Julie Kennel: I have to tell you this caveat because I don't want it seem all paradise at my house. So, he then asked for more meatloaf.

Robin Chenoweth: Oh, no! Wow, that's crazy.

Julie Kennel: Yeah, I know. And then I brought him some and then he noticed for the first time that there was cheese in the meatloaf. And he was done with it. He was like, "Oh, wait, there's cheese in this. I don't want this anymore."

Robin Chenoweth: One last note. I promised Elodie, the girl who likes cheese unless it's melted, that I would include this. She would not eat that meatloaf, and not only because of the melted cheese. When she was six, she and her family began raising chickens in their Columbus neighborhood. Then one day after soccer practice:

Elodie: We were going to eat chicken wings, but it's like, it's kind of weird eating chicken and having chickens. ... I was carrying Edna, which is one of my chickens. And it was like, why am I eating this? Does she know I'm eating meat? It's like, am I cannibal? ... It was a couple of days later that we decided that we're going to be vegetarian officially.

Robin Chenoweth: Sometimes, you just have to go with the flow.

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