The Sinister Science of Irresistible Junk Food

JANUARY 2017  MICHELLE CROUCH

That scrumptious crunch. The way it melts in your mouth. A delicious dusting of powder left on your fingertips. Read on to learn the secrets of junk food scientists, who were hired to get you hooked.

You’re starving, and the cheese puffs are staring at you from the vending machine. Your stomach rumbles in anticipation as you insert your money, grab the bag, and rip it open. Ahhh...

You inhale the tangy, cheesy scent, then reach in and pull out that first bright-orange puff. Your mouth waters, then the zesty cheese powder hits your tongue. Boom!

Almost immediately, the puff melts down to nothing in your mouth, so you reach for another one. And another one. Before you know it, you’ve finished the whole bag, yet you still crave more.

“Ugh,” you think aloud, pondering one of life’s greatest mysteries. “Why are these stupid things so addictive?” Food scientist Steven Witherly can actually answer that puzzling question, believe it or not. In fact, he can name 12 specific ways the puffs are designed to leave you wanting more. His favorite? That melt-in-your-mouth sensation. “It’s called vanishing caloric density,” he explains. “Because they melt so quickly, your brain goes, ‘Wait a minute. Where did it go?’ and it doesn’t register the calories. So you eat another one, and another one... until they’re all gone.”

The Science of Addictive Junk Food

Want to know even more dirty secrets about the junk food industry?

Yes, that’s right. What may seem like a simple snack to you is actually the result of decades of painstaking research, says Michael Moss, who spent three years investigating the food industry for his book, Salt sugar fat: How the Food Giants Hooked Us. The food industry has hired scientists like Witherly to engineer cheap foods designed to override your body’s natural feelings of fullness— and Americans have become hooked, with devastating consequences. Today, more than half of all calories consumed in the U.S. come from “ultra-processed” foods, and rising obesity rates have exploded in tandem with the packaged snack industry, experts say. That’s no coincidence.

“Obesity rates among children started to jump in the mid-1980s,” says Dr. Bruce Lee, executive director of the Global Obesity Prevention Center at Johns Hopkins Bloomberg School of Public Health. “That’s when we started eating more processed foods high in sugar, fat, and salt.”
THE TASTY TRIFECTA

Like any carefully engineered product, every chip and cheese puff can be reduced to a list of deliberate ingredients and scientific formulas. And it all starts with sugar, fat, and salt.

Food makers know that humans have been hard-wired since the Stone Age to crave those three key elements, says Moss.

Back in prehistoric times, these ingredients were so rare that gorging on them when they were available was important for survival. Today, however, artificially sweet, fatty, and salty foods are cheap and plentiful—so your primal instincts can set you up to binge again and again.

First, there’s the salt. Junk food manufacturers use it to add flavor and disguise the icky taste of the preservatives that keep processed foods fresh on the grocery store shelf. At 10 cents a pound, salt is a lot cheaper than fresh herbs and spices—plus it helps draw out the saliva that melts these delicious foods in your mouth.

Next, food makers add fat. It’s not a taste like sweetness or bitterness, but it produces a powerful sensation they call mouthfeel. “It’s the same tactile feeling you get when you bite into a warm, gooey grilled cheese,” Moss says. “It sends a strong pleasure signal to the reward center of your brain.” (Scientists have figured out that the most addictive foods get at least half of their calories from fats.)

Then there’s sugar—and you already understand how hard that is to resist. But junk food manufacturers also know that when there’s too much sugar in a product, your brain will signal you’ve had enough. So they bring in scientists to calculate just the right amount to make sure you keep on eating. They call that the bliss point: the perfect spot where your body craves more without registering that you’re full.

“These companies have marched around the grocery store and engineered bliss points for everything,” Moss says, “even foods that aren’t supposed to be sweet, like spaghetti sauce, yogurt, and bread.”

Snack Smarter!

How to outwit the sinister science of junk food

CHOOSE FRESH FOODS.

Keep fresh, easy-to-eat snacks handy, like fruit slices or baby carrots, so you don’t reach for the processed, packaged stuff.

CHECK THE SERVING SIZE.

That small grab-and-go bag of potato chips may look like a single serving, but it could actually hold two or three!

READ THE LABEL.

As a rough rule, choose packaged snacks with fewer than five ingredients, ideally ones you can pronounce.

DON’T EAT FROM THE BOX OR BAG.

Instead, measure out a serving and put it in a bowl. You’ll be more mindful of how much you’re eating.

PACK IN THE PROTEIN.

Studies have found that eating protein can help you feel full on less food. Try peanut butter on apple slices for a snack.

TAKE A QUICK WALK.

One study found that a brisk 15-minute walk will curb your cravings for sugary foods by 50 percent.
SNACK SECRETS

Messing with your fullness cues is not the only trick food scientists have up their lab-coat sleeves. In research labs around the country, they have performed thousands of experiments on everything from soft drinks to crackers. Their ultimate goal: to figure out how to engineer a sensory experience that will literally flood your brain with pleasure.

For instance, they know that you will crave a food even more if it leaves a dusting of powder on your fingertips, which you can lick to get a burst of flavor at the end. They know that you’re more likely to pick up a package that has bright colors like red, orange, and yellow. And they know that foods are more addictive if they don’t have a single overpowering taste. (Have you ever tried to describe the flavor of cola? You can’t—and that’s why.)

How do they know these things? Every new snack flavor or product line is subjected to intense analysis and hundreds of taste tests, says Michele Reisner, a food scientist who has worked for many different manufacturers. She typically recruits hundreds of testers and asks them dozens of questions: How does it look? What’s the aroma?

She has also asked kids to choose their favorite Disney character for a box of macaroni and challenged adults to distinguish between 60 different formulas of a new soda flavor, each only slightly different than the next.

And when humans aren’t testing products, machines are. Frito-Lay, the maker of Fritos, Doritos, and Lay’s, has developed a $40,000 device that looks like a big iron jaw. “They learned that potato chips will sell better the more noise they make,” Moss explains. “So they used it to figure out the perfect crunch point.”

JUNK FOOD’S WEIRDEST INGREDIENTS

If you’ve ever read the ingredient list on your favorite snack, you already know that it’s full of weird, unpronounceable words. That’s because some food makers pack processed foods with all sorts of stuff to cut costs, add flavor, and make products last longer on the shelf. We asked Lisa Lefferts, a scientist with the Center for Science in the Public Interest, to share some of the most disgusting (but probably safe) ingredients hiding in your favorite foods.

**CRUSHED INSECTS (Carmine or cochineal extract)**

Some food makers crush up the dried bodies of the cochineal insect and add the powder to yogurt, soda, and ice cream to turn them red.

**HAIR OR DUCK FEATHERS (L-cysteine or cysteine)**
An animo acid made from duck feathers, hog hair, or even, gulp, human hair, L-cysteine is used to prolong a food’s shelf life. Look for it in frozen pizzas, breads, pastries, and bagels.

**SAWDUST (Cellulose)**

Cellulose comes from wood pulp, sawdust, or cotton lint. It’s added to foods like shredded cheese to keep the particles from clumping. It’s also used to boost fiber content in certain foods.

**HOOKED BUT HOPEFUL**

So is junk food really addictive, like, say, alcohol? Food manufacturers don’t like to use that word, but neurological tests have shown that junk food lights up the same pleasure centers in your brain as cocaine. And in one study, rats allowed to gorge on junk food for a few weeks chose to starve themselves afterward, rather than eat standard healthy rat chow. (The rats were even willing to subject themselves to painful electric shocks just to get to the junk food!)

There is some good news, however. Many Americans are starting to care more about what they put into their bodies, which is forcing junk food companies to respond. Now they’re asking scientists like Witherly and Reisner to re-engineer foods to be healthier.

They’ve been able to reduce salt, for example, by putting more salt crystals on the outside of food instead of inside. Reisner helped create a frozen pizza with reduced fat levels. And Witherly says he’s using more natural flavorings like garlic, onion, and white pepper, which in preliminary studies have been shown to trigger the same reward center in your brain as sugar, salt, and fat.

“Nothing can top the cheese puff,” Witherly says. “But we’re trying to make healthy foods taste better.”

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*Note: This story contains annotations that are highlighted in blue, not orange, as the Annotated Reading Worksheet states.*

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