The craving brain

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"All I want is a huge steak. I must need more iron." Chances are you, too, have uttered similar words, and quickly proceeded to a local steakhouse for dinner.

For years, popular belief has held that our cravings indicate what is lacking in our diet, that cravings are our bodies' way of telling us what they need. While not entirely false (there is research connecting cravings to certain nutritional deficiencies), it is not the whole story.

Most of us have food cravings. In fact, 97 percent of women and 68 percent of men who participated in a study published in the journal *Appetite* reported experiencing them. Cravings are motivational states that give us the urge to seek out and consume a particular food. You know the feeling—no matter what you eat, you're not satisfied until you eat that one, specific snack.

Some cravings shed light on what's missing from our diet. A desire to chew ice, for example, has been linked to iron deficiency. If you are severely lacking in sodium—and few Americans are—you will seek out salty food. But plenty of people who eat high-sodium diets still crave potato chips and popcorn. And if our bodies could so easily tell us their nutritional needs, most Americans would have overwhelming hankerings for kale and brussels sprouts.

They don't, of course. Professor Susan Roberts, director of the Energy Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts, has researched the kinds

of foods that people crave most often. In a study she conducted with 32 overweight women who were put on a diet, some of the most commonly craved foods were salty snacks, such as chips and french fries, or sweets that were high in sugar and fat, such as chocolate. The most identifiable thing about the foods people crave, she says, is that they are high in calories.

A monotonous diet—and not a nutritional gap—may be more to blame for your yen for a certain food. In a study published in the journal Psychology & Behavior, healthy young adult men and women followed a diet that met all of their nutritional needs but consisted only of nutrition shakes for every meal for five days. People on this one-note diet reported significantly more cravings than they did on a varied diet.

In fact, some research shows that cravings have less to do with biology and more to do with psychology. In a study published in *NeuroImage*, researchers used MRIs to investigate which areas of the brain are involved in food cravings. Participants were given a nutritional drink (to eliminate hunger during the test), and then asked to think about the taste, smell and texture of a favorite food to prompt a craving.

The MRIs, completed during the induced cravings, showed that the parts of the brain involved in food cravings—the hippocampus, caudate and insula—are identical to those involved in drug addiction. The hippocampus is important for memory, which helps reinforce the reward-seeking behavior that causes us to crave. The caudate also plays a role in these reward mechanisms, and it helps us to form habits, including food-related ones. The insula contributes to the emotional connection between food and cravings.

Triggers of Yearning

Hormones are also involved. As an enjoyable food is consumed, the

pleasant feeling of the experience is determined in part by hormone receptors. Over time, these receptors may become less sensitive to the hormones produced when we enjoy a particular food. Eventually, we may need to consume more and more of that food to have the same pleasant experience, similar to the reward circuit seen in drug and cigarette addictions.

It seems that various mechanisms, including hormones and memories, create a Pavlovian response—a sensory cue that causes us to crave. Everyone knows that food is strongly tied to our emotions and memories. This is why a simple image or smell—such as the aroma of baking bread or a photo of a Thanksgiving turkey in a magazine—can cause us to crave a food.

Other things that can send you on an M&Ms run to the vending machine include stress, being in a particular place and reaching a particular time of day. Perhaps not surprisingly, research done at the Medical University of South Carolina and the University of Chicago indicate that these conditioned responses are stronger when we are hungry or dieting.

But do those diet-induced cravings stick around? Maybe not. Research from the HNRCA suggests that cravings may peak during a diet. In a study published in the October 2013 issue of *Appetite*, participants reported the frequency and intensity of their cravings during a weight-loss program. At the beginning, they reported desiring sweets, carbs and fast foods. However, as participants lost weight, their hunger levels decreased, along with their cravings.

The good news? Understanding that memory and hunger have such large roles in eliciting cravings makes creating a toolbox to manage them that much easier. Next time you have a craving you want to beat, try one of these tricks:

Picture, if You Will

How many times have you lost focus on a task because of an intense food craving? Cravings are shown to interrupt cognitive functioning, partly because they use the same parts of the brain. In other words, you can't focus on writing that important email because your craving is monopolizing the machinery.

Try beating the craving at its own game. Cravings use working memory, specifically the parts of the brain involved in sights and smells. Visualizing a vivid picture, such as a detailed rainbow, uses that same working memory. A study at McGill University showed that engaging in memory activities that use the imagery sections of the brain reduced cravings. Using imagery was key: Visualizing a favorite activity worked for the participants, while saying the alphabet backward did not.

Aromatherapy

Smells are strongly tied to our memories and emotions. When you smell something that is associated with a happy time, the brain perks up. The smell cues a desire to experience the pleasure again, and we may consequently crave an associated food.

Fortunately, we can outsmart our brains here, too. It seems that smelling a nonfood odor may help to defeat that craving. A study from Flinders University in Australia showed that after smelling jasmine, college-aged women reported their craving for chocolate lessened. The theory is that smelling a pleasant—but not mouth-watering—odor may once again monopolize the working memory.

Just Run Away

For this trick, you can accomplish two healthful things at once: calm the craving and get in a workout. A British study in the journal *Appetite* showed that women who walked on a treadmill when a chocolate craving hit reported a reduction in their desire for the sweet. This supports the idea that engaging in any physical activity will help curb cravings.

The Chosen Few

Roberts suggests including only a few unhealthy items in your diet to help control cravings. "Pick the ones that you love and have [just] them, not a wide variety. And then have them occasionally, not all the time."

In fact, surrendering every now and then may be beneficial—if you do it the right way.

"The best thing is to have a similar flavor that addresses the cravings, but in a food that is more satisfying," says Roberts. She explains: "Our hypothesis is that cravings are maintained by the neurological reward that you get from ingesting a lot of calories. So when you have a lower-calorie, more slowly digested food, the metabolic stimulus that maintains the craving is reduced."

The next time you just have to have chocolate, she suggests melting a small piece of it over some high-fiber cereal: "You use less chocolate and fill up on fiber."

Provided by Tufts University