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Can Eating Junk Food Really Be an Addiction?

By Maia Szalavitz

In 1982, *Scientific American* published an article suggesting that snorting cocaine was no more addictive than eating potato chips. People continue to use when the stuff is around, and simply stop when it's gone, the researchers argued. The paper was later widely denounced for minimizing the risks of what soon became known as the most addictive drug all. Cocaine, that is, not Fritos. ([See pictures of what makes you eat more food.](#))

The funny thing is that the same headlines are still making news — except written in reverse. On March 29, the *New York Daily News* declared: "Fatty foods may be just as addictive as heroin and cocaine: study." Indeed, a look at Americans' collectively expanding waistline — with two-thirds of adults qualifying as overweight or obese — would suggest that the *Scientific American* article may have actually understated the addictiveness of junk food, not cocaine. Some addiction researchers might even argue that potato chips — and other high-fat, high-calorie foods — are more effective than a crack pipe in terms of keeping "users" hooked long-term.

The most recent study to examine the addictive quality of fattening foods was published online March 28 by the journal *Nature Neuroscience*. For the paper, researchers at the Scripps Research Institute in Jupiter, Fla., examined three groups of lab rats that were fed various diets for 40 days. One group was given typical rat chow only; a second group was offered rat chow, plus a buffet of bacon, sausage, cheesecake, chocolate frosting and other delectable goodies for one hour a day; and a third group was allowed extended access to the fatty buffet for up to 23 hours a day. ([See the 10 worst fast food meals.](#))

The extended-access group began consuming twice as many calories as the other rats, and, not surprisingly, became obese. The limited-access rats, meanwhile, developed a binge pattern of eating, consuming most of their daily calories during the single hour they were allowed in the junk food "cafeteria."

But what shocked the researchers was that extended-access rats also showed deficits in their "reward threshold." That is, unrestricted exposure to large quantities of high-sugar, high-fat foods changed the functioning of the rats' brain circuitry, making it harder and harder for them to register pleasure — in other words, they developed a type of tolerance often seen in addiction — an effect that got progressively worse as the rats gained more weight. "It was quite profound," says study author Paul Kenny, an associate professor of neuroscience at the Scripps Research Institute. The reward-response effects seen in the fatty-food-eating mice were "very similar to what we see with animals that use cocaine and heroin," he says.

Kenny's study did not include rats exposed to drugs, making direct comparison tricky, but other studies have found that chronic cocaine or heroin exposure leads to reductions in reward thresholds of 40% to 50%. ([See nine kid foods to avoid.](#))

The extended-access rats also showed a lowered level of a certain type of dopamine receptor in the brain, which is thought to contribute to pleasure-seeking behavior in humans. "Human cocaine addicts, people who are obese, alcoholics and heroin addicts also show a down-regulation of this dopamine D2 receptor," says David Shertleff, director of the division of basic neuroscience and behavioral research at the National Institute on Drug Abuse. "This system is geared toward motivating behavior normally, but what's happening here is, with chronic exposure to highly fatty and sweet manufactured food, you're actually getting to a pathological state."

That is, the down-regulation of D2 receptors seems to turn normal desire into compulsion. In Kenny's study, the rats that had been given extended access to junk food for 40 days were later willing to continue seeking fatty foods at the risk of getting a painful electric shock to the feet. Limited-access and chow-only rats, however, were significantly put off by the threat of shock, and stayed away from the junk-food buffet.

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But the question is, does this data really show that the ubiquity of cheap junk food will turn us all into junkies? Not really. A closer look at certain key elements of this study and of prior research helps clarify who — mouse or man — is most likely to get hooked and who isn't, and why addiction involves a lot more than mere exposure to a substance.

While Kenny's research can be read to suggest that simple long-term exposure to enticing foods leads to obesity and reduces the ability to obtain pleasure, there's actually at least one other major factor at play. Consider the living conditions of the rats in the study: solitary cages. Like humans, rats are highly social animals that suffer when deprived of contact with others. But in the experiment, the rats were not only isolated from other rats, but were also given no toys or exercise wheels; their diet options were either monotonous rat chow or cheesecake and bacon. ([See a special report on the science of appetite.](#))

The human equivalent would be to study whether prisoners in solitary confinement choose to subsist on bread and water or eat junk food to excess. In such a situation, human obesity and overindulgence in the only source of environmental pleasure would be no surprise.

In one classic rat study by Bruce Alexander, emeritus professor of psychology at Simon Fraser University, researchers measured the impact of the social and physical environment on the risk of morphine addiction. They found that rats kept in small, isolated cages readily chose to self-administer high, frequent doses of morphine. But rats that lived in "Rat Park" — an earthly rat paradise with plenty of friends and potential mates, nesting materials, toys and room to run and play — voluntarily took significantly less morphine, preferring activity with friends and family to getting high. Under some conditions, Rat Park rats took 20 times less morphine than caged rats. And some rats that had been forcibly made physically dependent on morphine chose to suffer withdrawal symptoms while in Rat Park rather than seeking the drug. ([See the top 10 bad beverage ideas.](#))

"We showed that an enriched environment made drug use less likely. I think from human research we can say clearly that enriched environments reduce all kinds of addictions, not just to drugs or alcohol," says Alexander, author of *The Globalization of Addiction* and designer of Rat Park.

The new study did not measure stress in rats, but Kenny concedes that their living environment could have affected their response to junk food. "In some ways, you could draw parallels to humans," he says. "Some people live in enriched environments. They're well educated, have good backgrounds and have other sources of reinforcement. People who come from an impoverished background don't have the same access to sources of [meaning and pleasure]. They tend to migrate toward [things like junk food] that are now readily available and very cheap." ([See 10 myths about dieting.](#))

Past studies have found that socioeconomically disadvantaged people and others in high-stress situations with little social support are at much greater risk for both addiction and obesity. For example, people who were displaced for more than two weeks after hurricanes Katrina and Rita were 56% more likely to have a substance abuse disorder a year later, compared with those who survived the hurricanes but were not displaced. Overall, about 1 in 8 people who lost their homes — and who were also much more likely than the general population to be poor and unemployed — suffered from substance abuse disorders, compared with about 9% of the general U.S. population.

"All of these factors — environmental exposure, environmental stress — can have an impact on the vulnerability to obesity or drug addiction," says Shertleff. Whether or not cheesecake is as addictive as crack, "what this research is really showing us is that we can learn something about compulsive eating from the addiction world," he says.

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