

# Need to Quit Smoking? Study Finds Self-Control Deep in the Brain

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A war that consists of a series of momentary self-control skirmishes: That's how a new study describes the process of pursuing goals such as quitting smoking. But using a novel research approach, the authors—Elliot Berkman of the University of Oregon, Emily Falk of the University of Michigan, and Matthew Lieberman of University of California—have taken strides toward identifying what arms us to fight those battles. The paper is published in *Psychological Science*, a journal of the Association of Psychological Science.

Working toward goals, says Berkman, our brains, cognitive processes, and motivations collaborate to produce behavior. In the lab, scientists have isolated the brain regions enlisted in moments of “response inhibition”—the process of interrupting a habitual or unwanted behavior, and then stopping it. They've also measured the daily-life capacities that comprise self-control and the behaviors that help us succeed.

But “we haven't known whether those neural systems and processes observed in the lab are the same ones we use in real life,” says Berkman. To figure that out—and eventually aid people in achieving their goals—the team wanted to marry neurological and behavioral data, laboratory and life.

Twenty-seven heavy smokers who were enrolled in smoking-cessation program in Los Angeles participated in the study. In the first, baseline, portion, the participants were asked to perform a self-control task—pushing or pulling a lever in response to certain letters and refraining from doing anything in response to the letter X. The “go” letters appeared often and fast; the responses became habitual. The Xs required an effort to stop: the “response inhibition.” While the smokers worked, an fMRI machine scanned activity in their brains.

Afterward, they underwent smoking-related lung and urine tests and were questioned about their cravings and smoking habits.

Back in normal life, having embarked on the smoking-cessation program, the participants received eight text messages daily between rising to going to bed. Each time, they texted back answers to three questions: how many cigarettes they'd smoked since the previous signal; and—on scales of 1 to 4—how intense was their craving and how positive their overall mood. About a week after a 21-day period, they were called back for the same tests they'd undergone at the start.

How acutely did the smokers crave, and did they light up in response? The researchers analyzed these data from the text messages in relation to the levels of “response inhibition” brain activity recorded earlier in the lab.

Their conclusions: “The more you activate those three brain regions when you are engaging successfully in stopping,” says Berkman, “the more likely you are to successfully deal with your cravings in real

life.”

The findings, while specific to self-control of cravings, are promising both for researchers and smokers trying to quit, he adds. Bringing together these two kinds of data lets scientists see “there is information in the brain about self-control that we can’t accurately measure in self-reports.” As for meeting those tough goals, more work along this line might help clinicians “tailor” a program just for you.