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Trying to quit smoking? First strengthen self-control

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The desire to quit smoking--often considered a requirement for enrolling in treatment programs--is not always necessary to reduce cigarette cravings, argues a review of addiction research published July 30 in *Trends in Cognitive Sciences*. Early evidence suggests that exercises aimed at increasing self-control, such as mindfulness meditation, can decrease the unconscious influences that motivate a person to smoke.

Scientists are looking to the brain to understand why setting a "quit day" isn't a surefire way to rid oneself of a cigarette habit. Recent neuroimaging studies have shown that smokers have less activity in the brain regions associated with self-control, raising questions around whether targeting these neurobiological circuits could be a way to treat addiction.

"We are interested in trying to probe how repeated use of drugs ultimately influences our ability to control our desires," says senior study author Nora Volkow, Director of the U.S. National Institute on Drug Abuse. "We are starting to work through how drugs affect areas of the brain that normally enable us to self-regulate, to create goals and to be able to achieve them, and how those changes influence the behavior of the person addicted."

One study highlighted in the review explored how improving self-control can help smokers with their cravings. Texas Tech University and University of Oregon researchers recruited 60 undergraduate students (27 cigarette smokers and 33 nonsmokers) to participate in an integrative body-mind training program that included relaxation training techniques. Each of the students came into the program expecting to learn meditation and relaxation techniques for stress reduction and cognitive improvement. The students were split into two groups so that half received mindfulness meditation training (e.g., becoming self-aware of one's experience) and half received relaxation technique (e.g., relaxing muscle group).

Before and at the end of 2 weeks, after 5 hours of 30 minute sessions, the students received brain scans, filled out self-report questionnaires, and received objective measure of carbon monoxide on their smoking amounts and habits. Even though many of the students said they smoked the same number of cigarettes before and after the training, for those who received mindfulness meditation, an objective measure of carbon dioxide percentage in their lungs showed a 60 percent reduction in smoking over 2 weeks after the study.

"The students changed their smoking behavior but were not aware of it," says lead study author Yi-Yuan Tang, a Professor of Psychological Sciences at Texas Tech. "When we showed the data to a participant who said they had smoked 20 cigarettes, this person checked their pocket immediately and was shocked to find 10 left."

"We then measured intention to see if it correlated with smoking changes and found there was no correlation," he says. "But if you improve the self-control network in the brain and moderate stress-reactivity, then it's possible to reduce smoking."

Other studies showed how integrative body-mind training could decrease participant's levels of the stress hormone cortisol, as well as increase immune reactivity. Specific changes in the brain have also been identified, showing stronger connectivity between regions linked to self-control.

Mindfulness meditation is of course one strategy to strengthen self-control. While this is early evidence that such programs can change the brain so people are less motivated to smoke, there are still unanswered questions about how often this therapy would need to be conducted, how long the benefits last, and whether some individuals benefit more than others. We also need to learn whether such treatments can be applied to other forms of addiction, such as over-eating or drinking.

"Even though one therapy works on something, you cannot say this therapy is better than others," Tang says. "We can only get a full picture through systematic research and practice but I think this is a field with a lot of promise and that we should be open minded."

"Mindfulness meditation, as well as other strategies that are aimed at strengthening self-control, are likely to be useful for the management of addiction, but not necessarily for everybody," Volkow adds. "However, understanding how our brain works when we do interventions that strengthen self-control can also have multiple implications that relate to behaviors that are necessary for health and well-being."

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Trends in Cognitive Sciences, Tang, Y.Y., et al.: "Circuitry of Self-control and its Role in Reducing Addiction" <http://dx.doi.org/10.1016/j.tics.2015.06.007>

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