

Graphic cigarette warnings trigger brain areas key to quitting smoking

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Credit: Vera Kratochvil/public domain

Viewing graphic anti-smoking images on cigarette packs triggers activity in brain areas involved in emotion, decision-making and memory as observed via brain scans. Researchers from Georgetown University Medical Center and Truth Initiative reported their findings online this week in *Addictive Behaviors Reports*.

The brain scanning study, the first to be conducted in young adult smokers, suggest these images could effectively warn smokers about cigarettes' health consequences, says the study's co-lead author, Darren Mays, PhD, MPH, an assistant professor of oncology at Georgetown Lombardi Comprehensive Cancer Center in Washington, DC.

"What we found in this study reinforces findings from previous research where scientists have asked participants to report how they think and feel in response to graphic warnings on cigarettes," says Mays, a researcher who studies cancer prevention behaviors including tobacco use interventions. "This study offers us new insights on the biological underpinnings for those responses, bolstering evidence for how these warnings can work to motivate a change in behavior."

When the 19 study participants were shown images such as one of an open mouth, revealing rotted teeth and a tumor on the lower lip, with the text: "WARNING: Cigarettes cause cancer," key [brain areas](#) showed notable responses, says cognitive neuroscientist Adam Green, PhD, the study's other co-lead investigator.

These areas were the amygdala and the medial prefrontal region, says Green, who administered functional magnetic resonance imaging (fMRI) to the volunteers.

"The amygdala responds to emotionally powerful stimuli, especially fear and disgust. And experiences that have a strong emotional impact tend to impact our decision-making," says Green, an assistant professor in the department of psychology at Georgetown. "The medial prefrontal region that responded to graphic warning labels in this study has been previously associated with self-relevant processing. When we find information to be self-relevant, that may increase how impactful it is for our life decisions."

Other studies have indicated that activation in both the amygdala and [medial prefrontal cortex](#) might impact future health-related decisions and attitudes, Green says.

"Regulators can and should use this research to craft more effective warning labels and messages to smokers that both deliver facts about the negative effects of smoking, and trigger thoughts and actions that move smokers toward quitting," said Raymond S. Niaura, PhD, senior author of the study and director of Science at the Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative. "Tobacco is still the leading preventable cause of death in the U.S. and the growing body of research showing the effectiveness of warning labels should energize policymaking."

Participants were shown 64 images of a cigarette pack for four seconds each. Among the images used were some displaying the graphic [warning labels](#) proposed for use by the U.S. Food and Drug Administration that communicate the smoking-associated risks of lung disease, cancer, stroke, heart attack and reduced life longevity.

Some of the test images were not graphic, intended to serve as control stimuli to compare brain response. After each image was shown, the volunteers, smokers who were between 18 and 30 years old, used a push-button control to report how much each image motivated them to quit, from 1 (not at all) to 4 (a lot).

Researchers found that self-reported motivation to quit was significantly greater for graphic warning images than to the control warnings—as was also seen from scanning results. They also found that so called "plain packaging" - packs with no brand names or imagery such as those being used in Australia —did not change participants' responses.

Similar fMRI results have been reported in brain studies of adolescent

smokers and older smokers, says Mays.

"As more evidence like this is published, the case grows stronger that graphic warnings are important and can make a difference in terms of motivating [smokers](#) to take steps to quit," Mays says.

More information: Adam E. Green et al, Young adult smokers' neural response to graphic cigarette warning labels, Addictive Behaviors Reports (2016). [DOI: 10.1016/j.abrep.2016.02.001](https://doi.org/10.1016/j.abrep.2016.02.001)

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