

## Smokers not very receptive to shocking images

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### **Researchers from the University of Bonn find decrease in activity of the brain's "fear center"**

A team of researchers led by the University of Bonn found clear changes in how emotions are processed in smokers. After an abstinence period of 12 hours, the brain's fear center was mostly out of commission in addicts. The researchers assume that a campaign using images of smokers' lungs as deterrents on cigarette packs – as both the US and EU are currently planning – will hardly have an effect on this group.

The study, which was supported by the German Research Foundation, brought together scientists from the Universities of Bonn and Köln, as well as from the Charité in Berlin. 28 younger persons who had been smoking for quite a number of years and an equal number of non-smokers participated in this study. Each of the subjects was shown photos of happy, fearful and neutral faces while their brain activity was recorded. The researchers were particularly interested in the amygdala – a structure the shape and size of an almond. "It is the brain's fear center," said Privatdozent Dr. Dr. med. René Hurlmann, Oberarzt at the Klinik und Poliklinik für Psychiatrie und Psychotherapie des Universitätsklinikums Bonn.

The amygdala was always active when the participants were shown fearful faces. "Initially, there were no differences visible between smokers and non-smokers," reported Dr. Özgür Onur, the study's principal author and neurologist who used to work at the Universitätsklinikum Bonn and is now employed by the Universitätsklinikum Köln. "So, the processing of emotions in the brain worked in a similar manner in both groups." This was always the case when the addicted participants were allowed to smoke sufficiently. The study's subjects, who ranged in age up to their late twenties, consumed an average of 17 cigarettes a day, and had been doing so for nine years.

### **Lower amygdala activity after abstinence**

However, when the smokers came off a 12-hour abstinence period, the picture changed. "After only a few hours of abstinence, the activity of the fear center was far lower, as compared to the earlier state," said Onur. "They simply were indifferent to images of fearful people."

This lack of fear is problematic. "The amygdala is prevented from performing its natural function," explained Hurlmann. "Fear is an archaic instinct that protects us from doing things that are dangerous." Smokers who have recently been abstinent do not show this natural response pattern – they are not afraid of the consequences of smoking. "It seems that they are mentally caught up in their addiction, resulting in a lowered receptivity for fear-inducing stimuli," said Onur. "It seems that smokers need nicotine in order to maintain the normal function of their amygdala."

Hurlmann doubts that the shocking images of smokers' lungs and tumors on cigarette packs, which are in the works in the US and also under consideration in the EU, will have much effect on the majority of addicts. "In those who stop smoking, the activity of the fear center has been lowered so much that they are not very receptive to the scary photos," said Hurlmann.

### **Half of all smokers die early**

"There are 1.2 billion smokers worldwide," said Hurlmann. "Statistically it can be assumed that about half of them will die early from consequences related to smoking." That is why it was important to ask how these people could be helped, he added. "Maybe we should invest more in therapy measures for smokers and into research to find the optimum smoking cessation methods for different types of patients?"

In non-smokers, however, the amygdala is active, which is why in his opinion, shocking images will be effective for

them. "Those who do not smoke yet can probably be kept from smoking by such scare tactics," Dr. Özgür Onur concurred.

Publication: Oezguer A. Onur, Alexandra Patin, Yoan Mihov, Boris Buecher, Birgit Stoffel-Wagner, Thomas E. Schlaepfer, Henrik Walter, Wolfgang Meier und René Hurlemann: Overnight Deprivation from Smoking Disrupts Amygdala Responses to Fear, Journal "Human Brain Mapping,"

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