

# Researchers Present New Ideas On How Smokers Get Hooked

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The smoker puffing away in the corner might be hooked on more than just nicotine. A 15-year study by University of Pittsburgh researchers suggests that nicotine also enhances the pleasure smokers get from their surroundings when they smoke and creates a psychological link between that amplified satisfaction and cigarettes.

The findings present new ideas about the way nicotine works and the reason people become addicted to cigarettes, said principal investigators Anthony R. Caggiula, professor and chair of the psychology department; Eric Donny, assistant professor of psychology; and Alan F. Sved, professor and chair of the neuroscience department, all in Pitt's School of Arts and Sciences. The ongoing research has yielded more than a dozen academic journal articles. One of the latest appears in the May edition of the journal "Neuropsychopharmacology."

Current ideas about cigarette addiction and cessation focus largely on a smoker's appetite for nicotine, Caggiula said. Psychologically, nicotine joins other such addictive drugs as heroin and cocaine-and even basic needs like food and water-in the category of primary reinforcers. These reinforcers drive people to engage in and repeat behaviors that result in achieving the desired substance.

Without discounting nicotine as a powerful primary reinforcer, Donny said, the Pitt research proposes that nicotine also amplifies the satisfaction smokers get from their environment, from the smell of cigarette smoke to drinking in a favorite bar. This second action of

nicotine is known as a reinforcement enhancing effect. Smokers associate the heightened enjoyment with cigarettes and continue smoking to recapture that sensation.

Nicotine's pleasure-intensifying properties help explain why smoking remains among the hardest habits to overcome despite the well-publicized perils of cigarettes and ample cessation therapies that administer nicotine, Caggiula said.

“If people were just after nicotine,” Caggiula asked, “why don't they get addicted to it in other ways such as drinking it or shooting it into their arm? But people don't do those things-they smoke cigarettes. There has to be something else at work here other than just an easy way to get nicotine. We're not saying that focusing on the physical addiction to nicotine is worthless, but it's incomplete.”

Caggiula, Donny, Sved, and other researchers debuted their current ideas on nicotine addiction in the journal “Psychopharmacology” in 2003. The article stemmed from an experiment wherein rats with constant exposure to nicotine repeatedly pressed a bar that caused a set of lights to blink. The amount of nicotine the rats received did not rely on how often they pressed the bar, yet their interest in pressing the bar and seeing the subsequent lights remained high after ingesting nicotine. Conversely, Sved added, the rats showed only a fleeting interest in the lights when they did not have nicotine in their systems. The researchers concluded that nicotine increased the rats' interest in the lights.

Based on those results, Donny tested the basic conclusion of nicotine as a reinforcement enhancer in clinical trials on people. He gave 30 adult smokers cigarettes with nearly all the nicotine removed. The study's participants smoked the cigarettes for a week or more before their interest in the cigarettes subsided, he said. Considering the absence of nicotine, Donny concluded that the smokers in the study derived

pleasure from the act of smoking itself. The results were published in the February edition of the journal “Addiction.” Similar research is under way.

Source: University of Pittsburgh

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