

WHY DO TEENAGERS START SMOKING (AND HOW DO WE GET THEM TO STOP?)

Cigarette smoking, along with obesity, is the most significant health problem in the United States. After decades of advocacy it is declining here, as it is in most developed countries. However, smoking is increasing in developing nations. In China, nearly 70 percent of men smoke, accounting for one-third of the world's cigarette consumption. Smoking is escalating among women and children previously protected from the practice by cultural norms. It's not surprising then that Chinese public health officials are working with School of Community and Global Health (SCGH) Dean Andy Johnson, Professor Jennifer Unger, and Associate Professor Paula Palmer on smoking prevention programs.

The partnership began 10 years ago, when Johnson got a request from Chinese public health officials at the Wuhan Centers for Disease Control and Prevention. It made sense that the Chinese would reach out to Johnson, as he had over 25 years of experience in the development of evidence-based smoking prevention programs. Along with Unger and Palmer, he has investigated psychosocial, neurocognitive, environmental, and genetic factors across diverse cultural groups that might contribute to smoking. Chinese health officials hoped the intervention techniques the group had developed would be applicable in their own country. Johnson was happy to help, but modifications had to be made.

"We did some pilot work in China with middle-school students and found we were more successful at preventing male smokers from escalating to higher levels of smoking than at preventing never-smokers from experimenting with cigarettes," said Palmer. "We learned that Chinese youth started smoking at a later age, so we needed to intervene in high school. But this wasn't just about age; it was also about culture and genetics. Basically, we wanted to disentangle the effects of genes and environment to understand the causes of smoking."

This challenge led to a transdisciplinary approach. Unger, a behavioral scientist, began studying gene-environment interactions to understand why some people smoke and others don't. Johnson, a social psychologist, returned to his neurocognitive science roots. Over the last decade this transdisciplinary template has spawned over a dozen research projects conducted by the school's Transdisciplinary Tobacco and Alcohol Use Research Center (TTAURC), which Johnson directs.

Johnson's and Palmer's latest project investigates cognitive processes and neural mechanisms that may increase smoking risk among youth. Findings indicate that limited capacity to make optimal decision under emotional arousal (hot decisions) predicts rapid progression to poorly regulated tobacco and alcohol consumption, while decision-making capacity under non-arousal (cold) conditions does not. In Chengdu, China, the TTAURC team used magnetic resonance imaging to assess activity in regions of the pre-frontal cortex, midbrain, and related regions thought to underlie hot and cold decisions during hot and cold decision-making activity. "What we discovered," explains Palmer "was that adolescents who showed impairments in the ability to make good economic decisions on

the Iowa Gambling task were far more likely to be regular smokers and binge drinkers, and were more likely to progress rapidly in problem drinking behavior. The imaging confirmed the role of suspected brain regions in emotional decision capacity."

"We could have never gotten there without the neurocognitive measures," said Unger. "Knowing where this unhealthy behavior emanates from helps us in our goal: to help people to make better decisions, healthier choices. Maybe through transdisciplinary science we can learn more about ways to delay gratification leading to better choices and improved health outcomes."

The applied aspect of the research is especially important to Palmer. She and the TTAURC team are dedicated to the development of intervention methods driven by their science. In Chengdu, she and Johnson are carrying out an intervention that has high school students creating anti-smoking media campaigns. Each student receives a specially programmed cell phone to take photos, shoot videos,

and text message classmates with creative ideas. The purpose of these activities is to help youth, especially those with decision-making impairments, be more mindful of their health goals, especially in high risk situations. The Chengdu CDC has big plans for the dissemination of the student projects, including securing TV time for the project.

"Why are we doing this? It's a social marketing approach. Kids get involved and relate more to the information they're collecting and using. Kids don't always listen to adults. We tell them not to smoke, and that just makes them more curious about smoking," Unger explained.

Of course, all this requires the work of more than just the faculty. Palmer credits her students with making the scope of her work possible: "I have amazing students. They're a part of the research team. They often travel the world with me and learn from their field work. I'm thrilled that when they graduate they have these experiences and publications, and they're able to hit the ground running in their careers."

Paula Palmer has used computer card games to assess an individual's propensity to smoke and binge drink.