Memory-updating intervention enhances smoking cessation

By Dr. Will Boggs

A brief memory-updating intervention reduces craving and cigarette use in smokers trying to quit, according to a randomized clinical trial.

Smokers trying to quit often report that cue-elicited craving plays a key role in smoking relapses, and recent neuroscience research on memory reconsolidation suggests that memories involved in craving are amenable to behavioral or pharmacological alteration. Retrieval-extinction (R-E) training is one of these behavioral approaches to memory modulation.

Dr. Michael E. Saladin from the Medical University of South Carolina in Charleston and colleagues evaluated the effects of R-E training on smoking behavior in a trial of 88 treatment-seeking cigarette smokers.

Craving decreased across training sessions in both the R-E and non-R-E groups, but by one month, craving was attenuated to a significantly greater extent in the R-E group, the team reports in JAMA Psychiatry, online February 1.

Negative affect also decreased across test sessions, but with no significant difference between the groups.

Following the two training sessions, participants in the R-E group reported smoking 2.4 fewer cigarettes per day, a significant effect.

A greater percentage of participants in the R-E group (51.5%) than in the non-R-E group (25.6%) achieved a 60% reduction in smoking, but this difference fell short of statistical significance, and the groups did not differ in the percentages that achieved 50% and 75% reductions.

Expired CO levels at one month were significantly lower in the R-E group than in the non-R-E group, but differences in urine cotinine levels, total number of days abstinent, and smoking lapse failed to reach significance between the groups.

“These findings are consistent with the reconsolidation hypothesis, which would assert that a very brief (5-minute) smoking cue video, followed shortly after by massed extinction, would result in the updating of the cue-drug contingency in memory and produce the observed behavioral outcomes,” the researchers conclude. “In summary, to our knowledge, this study is the first investigation to evaluate the effects of a brief R-E training procedure on clinically relevant smoking behavior, with craving and smoking reductions either emerging or maintained at 1-month follow-up, respectively.”

Dr. Amy Catherine Janes from McLean Hospital and Harvard Medical School in Belmont, Massachusetts, who studies addiction, told Reuters Health by email, “While the R-E training worked as predicted, it is somewhat surprising, as the study participants continued to smoke after the training sessions. Since the study participants continued to smoke, they
had about one month to re-learn the link between smoking cues and reward, yet prior R-E training still reduced cue-induced craving and cigarette smoking.”

“Reducing cue-induced craving may be necessary to prevent relapse, but it is not sufficient to achieve abstinence, as R-E treated smokers were still regularly smoking at the follow-up visits,” said Dr. Janes, who was not involved in the study. “If R-E training was provided at the beginning of a quit attempt with more traditional therapies, such as nicotine replacement therapy, this strategy might help prevent relapse.”

Dr. Stephen J. Wilson, an addiction researcher at The Pennsylvania State University in University Park, said, “To me, it was particularly interesting that there was a delay until the retrieval-extinction intervention had detectable effects on self-reported craving to smoke (i.e., a reduction relative to the nonsmoking-related retrieval-extinction control condition). The authors suggest that this delay may relate to the durability of the effects produced by the intervention compared to those produced by the control condition, which is an intriguing idea that warrants further study.”

“Assuming the retrieval-extinction intervention proves effective in additional research,” Dr. Wilson told Reuters Health by email, “it may be most effective when used alongside other behavioral and pharmacological treatments as part of a multicomponent smoking cessation strategy, as suggested by the authors of the study.”

In a companion paper, Dr. Lin Lu from Peking University in Beijing, China, and colleagues investigated the effect of selective inhibition of reactivated nicotine-associated memories with propranolol on nicotine craving in a study of rats and humans.

Dr. Lu told Reuters Health by email, “We found that propranolol administration in combination with brief smoking (unconditioned stimulus, UCS)-triggered reactivation of smoking-related memories decreased smokers’ liking for multiple nicotine-associated conditioned stimuli (CS) and reduced their urges to smoke triggered by various smoking-related cues. Thus, it may be a simple and promising method for preventing nicotine craving and, potentially, relapse to nicotine addiction.”

“However,” he said, “the study was done within a laboratory setting, so it will be interesting to test whether the UCS-induced memory retrieval-reconsolidation interference procedure will decrease craving and relapse in the smokers’ home environments.”

Dr. Sunjeev K. Kamboj from University College London in the U.K., who coauthored an editorial accompanying the reports, told Reuters Health by email, “The key thing to note is that smoking-related memories are strongly encoded and resistant to being ‘erased.’ So I think that in the future these procedures are likely to form part of integrated smoking cessation packages that might include drugs that enable memories to be weakened, as well as memory-weakening psychological treatments and nicotine replacement therapies that help with withdrawal reactions.”

He suggests waiting “for the evidence to gather. These new techniques are exquisitely sensitive to minor procedural variations which could render them ineffective, or potentially even harmful. It’s a common refrain, but I think we need more research to understand the conditions under which these kinds of treatments are optimally effective.”

Dr. Saladin did not respond to a request for comments.