Identifying Which Smartphone App Features Aid Smoking Cessation

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Cigarette smoking kills six million people worldwide each year, but is an addictive behavior that can be difficult to stop. No wonder, then, that there are over 400 smartphone apps available to help people quit smoking. Despite their ubiquity, little research has evaluated whether these apps are successfully aiding smoking cessation, or what features of the app are the most useful. To explore this issue, Drs. Jaimee Heffner and Jonathan Bricker, along with colleagues in the Public Health Sciences Division, sought to evaluate the features of their recently piloted SmartQuit app. As reported in *The American Journal of Drug and Alcohol Abuse*, the authors found that only two of the most commonly used features were prospectively associated with quitting in the pilot group.

Smartphone apps for smoking cessation are certainly in demand, with an average of 780,000 downloads per month. Whether these apps successfully help people quit smoking, however, is still under investigation. In order to help guide future development in the most productive way, the authors developed and evaluated their own smoking cessation app, called SmartQuit (see figure). "By studying how users engage with specific app features and whether use of these features predicts successful smoking cessation," said lead author Dr. Heffner, "we are identifying the basic building blocks needed to create effective interventions on the smartphone app platform, which reaches millions of smokers each year and has the potential to transform treatment delivery."

First, "we developed the first smartphone app for smoking cessation based on Acceptance and Commitment Therapy (ACT)," said Dr. Heffner. This type of therapy focuses on increasing the user's willingness to accept the physical, mental, and emotional challenges of quitting, while also encouraging commitment to engage in values-based behavior change. The app uses these principles through features that help enhance the user's motivation to quit, provide the skills needed to accept the urge to smoke without acting on it, and aid coping skills for when smoking slips occur. These principles are accompanied by other features based on elements of cognitive behavioral therapy (CBT), which helps develop skills for avoiding or controlling smoking triggers. These CBT features help the user to set goals, track their smoking, view progress, and get positive reinforcement and social support.

The authors evaluated the effectiveness of these techniques by tracking usage of 41 different app features, and then comparing this use against whether users successfully quit smoking. Surprisingly, only 2 of the top 10 most-used features were prospectively associated with 30 days abstinence at the 60 day follow-up: viewing the quit plan and tracking the practice of letting urges pass. One less-used feature, tracking ACT skill practice, was also associated with cessation. In describing these findings, Dr. Heffner recalls a quote attributed to Einstein: "What is popular is not always right."

Continued Dr. Heffner, "we think that the message contained in that quote is critically important not just for this particular app, but for the broader field of smartphone apps for smoking cessation, where there has been greater emphasis on designing apps that are appealing to users rather than on developing apps grounded in behavioral theory and with demonstrated effectiveness as a cessation aid. Appeal and effectiveness are both important and, as we demonstrated in this study, they don't necessarily go hand-in-hand." The findings from this study are thus extremely valuable for ensuring that future iterations of health intervention apps are useful.

To that end, the authors are now focused on updating the app and continuing to evaluate its performance. "These results have informed the revision of our SmartQuit app (now available publicly)," said senior author Dr. Bricker, "and we will be testing the revised app starting January 15th with employees of several companies through a Life Sciences Discovery Grant." Additional future work will also allow the authors to experiment for causal relationships between feature usage and smoking cessation. Said Dr. Heffner, "this would provide the most accurate and rigorous test of the each feature's contribution to successful quitting." If successful, these apps could certainly generate a large public health impact.

Other PHS researchers contributing to this project were Dr. Roger Vilardaga and Ms. Laina Mercer.

Heffner JL, Vilardaga R, Mercer LD, Kientz JA, Bricker JB. 2015. Feature-level analysis of a novel smartphone application for smoking cessation. *Am J Drug Alcohol Abuse*. 41(1):68-73. doi: 10.3109/00952990.2014.977486

See also:
Bricker JB, Mull KE, Vilardaga R, Kientz JA, Mercer LD, Akioka K, Heffner JL. 2014. Randomized, controlled pilot trial of a smartphone app for smoking cessation using acceptance and commitment therapy. *Drug and Alcohol Dependence*, 143, 87-94
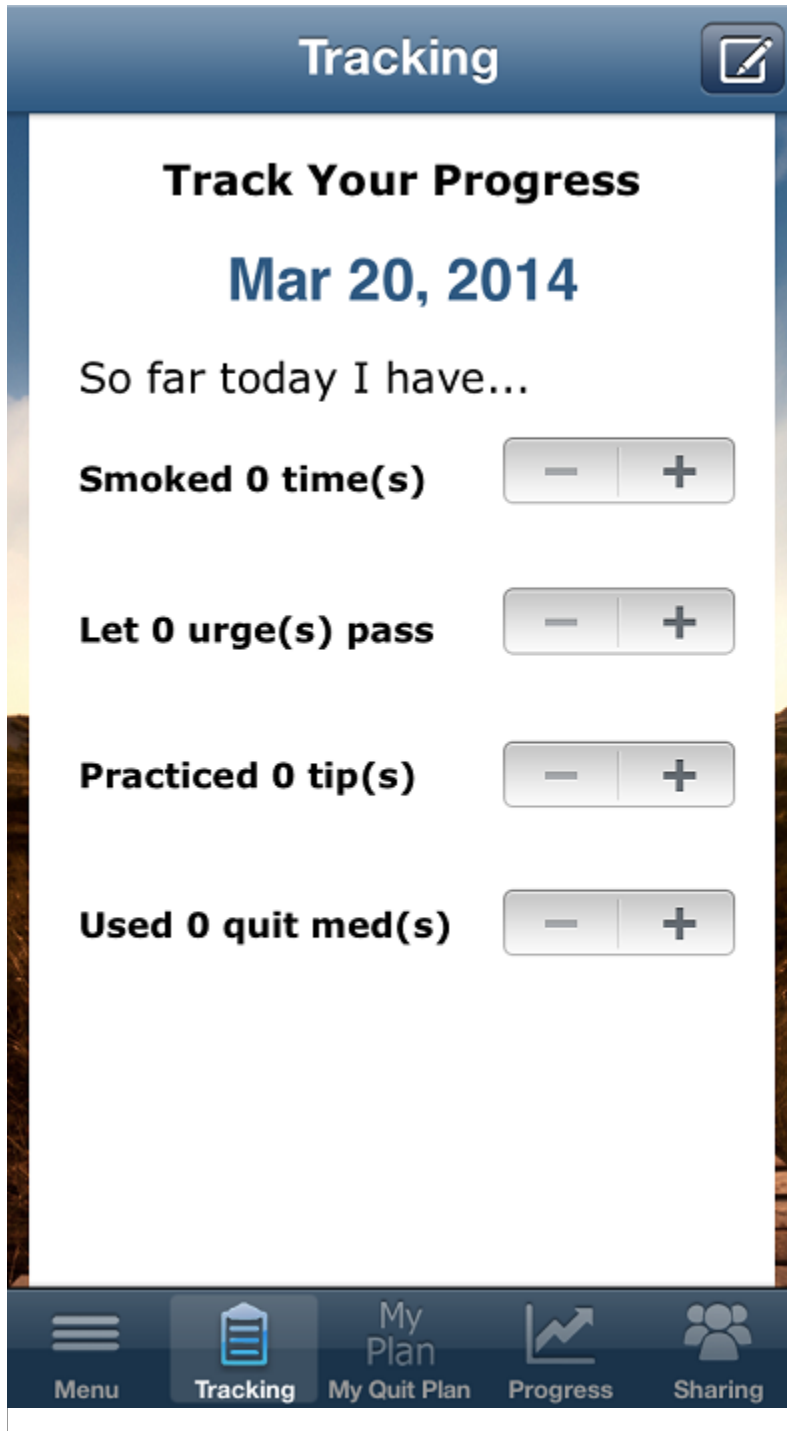
Image provided by Dr. Jaimee Heffner

Example screen of the SmartQuit app, which helps users track their progress towards their smoking cessation goals.