**Lit: A Mobile Game Intervention for Nicotine Smokers**

*Nisha Alex1, Azadeh Jamalil2, Pazit Levitan3, Rosanna Lopez4, Jessica Mezei5*

Teachers College, Columbia University

The mobile game Lit is an intervention for smoking behavior based on self-administered behavioral coping strategies and breath therapy research. Lit uses breath control as its central game mechanism and serves as an emotional and physiological self-regulation tool to help smokers reduce their smoking habits. We are proposing an experimental study that will inform the design, development and evaluation of Lit as an intervention for reducing smoking habits.

**Theoretical Framework**

Although tobacco use may have decreased, it is still the leading cause of death in the United States (Robert Wood Johnson Foundation, 2009). Among adult smokers, 70% report that they want to quit completely, and more than 40% try to quit each year (World Health Organization, 2008). However, studies show that regardless of many available interventions, several smokers still struggle with quitting or reducing their smoking habits (Lancaster, Stead, Silagy & Sowden, 2000); thus, the necessity of new approaches to this problem is evident.

The proposed presentation takes as its foundation that mobile games may be especially well suited to address the maintenance of non-smoking behaviors and thus can be placed in the “health-related games” domain. In a separate submission for a poster presentation, design elements for such games are discussed. Here, we propose to present a mobile game. Lit, as an intervention for smoking reduction and discuss why a mobile platform is especially suited for health-related outcomes in this area. Lit is designed to mimic the emotional and physiological effects of smoking by using the innovative game element of breath control alongside color and sound—a unique design innovation for mobile game platforms, where breath controls is not found as an input mechanism.

Biofeedback mechanisms on mobile platforms pose special challenges, but can result in the necessary “just in time” interventions that can address craving as they occur. Such use would be impossible with non-mobile platforms, as cravings can occur anywhere, anytime. The challenge, therefore, is to provide a means to intervene with a game/intervention whenever it occurs, and in ways that make a behaviorally important difference.

In a study accompanying the game’s implementation, using biofeedback measurements such as electroencephalography (EEG) techniques, physiological responses to different game events will be measured. These responses will be mapped into the circumplex model of affect (Russell, 1980), which represents emotions with two dimensions of arousal and valence.

The study will be completed by the conference date; the design of the game is completed at present. While we do not address design elements in this proposal, choosing instead to focus on the mobile platform itself as important to our behavior intervention and outcomes, members of the audience will leave the session with a better understanding of why certain outcomes, and input mechanisms, appear on a continuum that must be considered when making decisions about the type of platform (e.g., mobile or fixed, multiplayer or single user, and so on) should be chosen in conjunction with health-related and/or behavioral outcomes.

Within the mobile platform, we will discuss the possibility of utilizing breath control as a game element to provide players with an effective coping strategy that allows them to reduce smoking behavior. Breath therapy has been proven to be an effective intervention for reducing smoking (O’Connell, Hossein, Shwartz & Leibowitz, 2007). Deep inhalation during smoking promotes relaxation. Breath therapy interventions for

---

1 Contact email: nma2120@columbia.edu
2 Contact email: aj2334@columbia.edu
3 Contact email: pl2239@columbia.edu
4 Contact email: rl2442@columbia.edu
5 Contact email: jmm2221@columbia.edu
smoking cessation focus on guiding smokers in regulating their breath mechanism in a way that slows down the pace of their whole body and therefore promotes general relaxation (American Lung Association, 2009). The breath interface allows greater scope for biofeedback effects and has been shown to be an effective intervention for smokers in other contexts since it mimics the physical behavior of smoking (O’Connell et al., 2007).

Lit is being developed and will be distributed for a smart-phone environment. Mobile platforms allow players easy, everyday access to the harm-reduction intervention.

Moreover, the mobile nature of the platform lets the game occur in the context where players would ordinarily smoke—outside and/or during brief breaks in their daily schedule. By delivering the intervention in the same place as the behavior that players want to change, we expect increased effectiveness from the game (Godden & Baddeley, 1975).

Research Questions and Hypotheses
The research questions that will be addressed in this study are as follows:

Q1: Is using biofeedback measurements a helpful design technique for developing mobile games for self-regulated health interventions? Specifically, is this technique useful for developing a game for smoking reduction?

Q2: Is breath control a useful game element in games for health interventions? Specifically, does breath control as a game element provide players with an effective coping strategy that allows them to reduce smoking behavior?

The hypotheses are:

H1: Lit’s Rush mode will evoke physiological reactions in the player comparable to nicotine’s stimulant effect.

H2: Lit’s Relax mode will evoke physiological reactions in the player comparable to nicotine’s sedative effect.

H3: Lit will reduce smoking more than breath therapy alone among smokers who are trying to quit.

H4: Smokers who use Lit with the breath control interface will reduce their smoking more than those who use a version without breath control.

Measurements
To validate these hypotheses, biofeedback of smoking and of specific game-play events will be measured and compared. The mean physiological value during game-play with and without the breathing component will also be measured. To assess whether Lit is effective at reducing smoking, a randomized controlled experiment with one control group and two experimental groups will be conducted. A pool of 120 subjects in their 20s and 30s who wish to reduce their smoking habits will be divided into 3 groups of 40 subjects each.

The control group will use breath therapy as an intervention to reduce smoking. Subjects in the first and second experimental groups will play Lit with and without the breathing component respectively. The experimental groups will be provided with iPod touch devices with the appropriate version of Lit. Subjects’ level of smoking activity will be tracked using a saliva-based Cotinine test (Jannone and O’Connell 2007). Subjects will also use a self-report survey application installed on their iPod touch to report their smoking activity and game use.

Implications
We believe that Lit will promote the use of underutilized game mechanism of breath control, which could open a new set of opportunities for game designers in designing games in the future, contributing to health issues, research and education. These and other aspects of mobile platforms as a delivery system for on demand health-related games form the core of the proposed presentation.

References