
Mobile Device Application of Cognitive Behavioral Therapy Techniques

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Abstract

This paper explores the design and implementation of an anxiety management application for transmission on mobile devices. The application employs cognitive behavioral therapy (CBT) methodology and is designed for the 16 to 25 year old demographic. Normally used in face to face therapeutic interactions, the use of a mobile application is unique in that it supplies the patient with just in time access to the therapeutic techniques necessary to manage their condition. We plan to evaluate the efficacy of the application in real world deployment to a statistically significant user population.

Keywords

Personal health informatics, mobile technology, mental health, persuasive design, gamification, serious games.

ACM Classification Keywords

H5.m. Information interfaces and presentation:
Miscellaneous. J.3. Life and Medical Sciences: Health.

General Terms

Anxiety in this context refers to a range of stress, worry and anxious feelings. To be classified as a clinical disorder however, anxiety must last for at least six

months. Mobile device refers to the iPhone, iPad, iPod Touch or any handheld device that allows for interaction and remote connectivity.

Introduction

At some point everyone has felt the racing heart, sweaty palms or nausea of anxiety. For some people their anxiety gains momentum, worsening over a period of months or years. When stress or worry heightens to the level of an anxiety disorder, therapeutic intervention is usually recommended. About half of Americans will meet the criteria of an anxiety disorder sometime in their lifetime, with the first onset usually in childhood or adolescence [2]. Nearly three-quarters of those with an anxiety disorder have their first episode by age 22 [6]. Anxiety is experienced by children and adolescents at a similar rate to adults, and the burden of illness is just as far reaching. When anxiety is persistent, this population is at risk for depression, substance abuse and suicide [5].

Access to Care

Implemented by therapists and psychiatrists worldwide, cognitive behavioral therapy is a widely recognized technique used to manage anxiety. Its interventions are aimed at influencing mood, emotional reaction and behavioral patterns through the focused practice of new ways of thinking and acting. Though proven effective with adults, children and adolescents alike, the therapy is often inaccessible to the people who need it due to cost, distance or the availability of a qualified therapist [4].

Mobile technology has become an integral part of daily life for much of the millennial generation [7]. The use of mobile device technology for mental health education

and skill practice is uncommon, but perfectly suited to the needs, desires and knowledge of the application's target demographic. This population is at home with technology, games and applications. Seventy-three percent of teens and ninety-three percent of adults ages 18-29 own cell phones [3]. Fourteen percent of all mobile subscribers report having downloaded an application in the last 30 days [3]. Of the teens with Internet access on their devices, thirty-one percent report getting health, dieting or physical fitness information online [3].

Proposed Application Components

In addition to providing information about anxiety recognition and management, the mobile application guides the user through activities designed for use during times of heightened anxiety.

Components of the proposed application include:

- Information about anxiety and coping behaviors
- Heart rate monitor
- Music-based activity to slow the user's heart rate when anxious
- Games designed to reinforce positive behaviors
- Journal for the user to track their mood and contributing environmental and internal factors
- Ability to photograph situational triggers for use within the application
- Tracking function for users to evaluate their performance in each of the described activities over time
- Notifications that the user can set to self-regulate their interactions with the application

- Functionality for users to email their log to themselves or a support person (e.g. a therapist) directly from the application

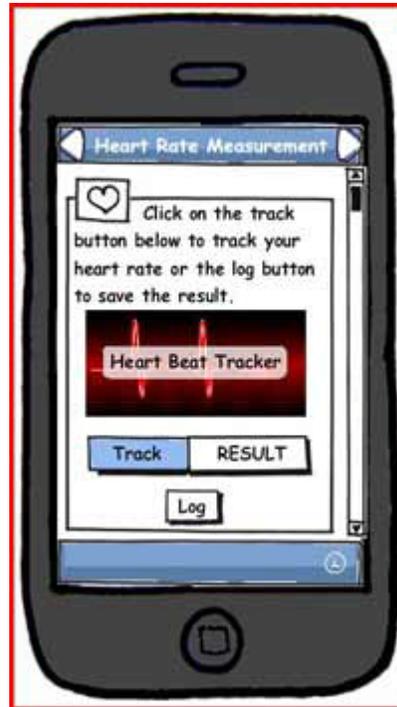


figure 1. Screen shot of activity to lower heart rate.

The application takes advantage of the multisensory environment of mobile devices with heart and breath monitors designed to give the user feedback on their physical reactions to anxiety. A source of intrinsic motivation, the application includes games that provide the user artificial environments for problem solving and immediate feedback to positively reinforce those skills.

The ability to track their information supports the users' self-awareness of their condition. With the ability to post results to Facebook or Twitter, the journal and tracking functions leverage the support offered by social media outlets [1]. The presentation of the data will promote self-awareness and persuade the user to modify their thoughts and behaviors in a positive way. Together the activities present a holistic approach to increase the patients' self-efficacy in the management of their anxiety.

Evaluation Methods

Longitudinal data will be collected to determine when and how the application is used among two focus groups - those using it as their sole anxiety cessation tool and those using it as part of a supervised therapy plan. The user's interaction patterns with the application including the duration of time spent in each activity, frequency of use and length of time in the application overall, will be noted. In an effort to determine the platform-specific benefits of mobile health applications, data will be collected on the user's information retention, feelings of empowerment and engagement levels in each activity over time.

Implications

The social implications of this application are numerous. In addition to the improvement of quality of life for millions of people suffering from anxiety, the application might be an economical tool for communities unable to provide consistent, quality access to mental health care to their constituents. While this study/demo utilizes one mobile device, the design has the potential to be used on other smart phones or tablet PCs.

Citations

- [1] Anderson, I., Maitland, J., Sherwood, S., Barkhuus, Chalmers, M., Hall, M., Brown, B. and Muller, H. Shakra: Tracking and Sharing Daily Activity Levels with Unaugmented Mobile Phones. *Mobile Networks and Applications*, 12 (2). 185-199.
- [2] Arch gen psychiatry -- Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication, June 2005, Kessler et al. 62 (6): 593 Retrieved 2/1/2011, from <http://archpsyc.ama-assn.org/cgi/content/full/62/6/593>
- [3] "Carlson Marketing Research Shows Segmenting Mobile Users Leads to Better Understanding and Greater Marketing Success." The Free Library 09 June 2010. Retrieved 1/4/2011, from [http://www.thefreelibrary.com/Carlson Marketing Research Shows Segmenting Mobile Users Leads to...-a0228452540](http://www.thefreelibrary.com/Carlson+Marketing+Research+Shows+Segmenting+Mobile+Users+Leads+to...-a0228452540)>.
- [4] Dugas, M. J., Brillon, P., Savard, P., Turcotte, J., Gaudet, A., Ladouceur, R., et al. (2010). A Randomized Clinical Trial of Cognitive-Behavioral Therapy and Applied Relaxation for Adults with Generalized Anxiety Disorder. *Behavior Therapy*, 41(1), 46-58.
- [5] James, A., Soler, A., & Weatherall, R. (2005). Cognitive Behavioural Therapy for Anxiety Disorders in Children and Adolescents. *Cochrane Database of Systematic Reviews (Online)*, (4), CD004690.
- [6] Kessler RC, Berglund PA, Demler O, Jin R, Walters EE. Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*. 2005 Jun; 62(6):593-602.
- [7] Overview | Pew Internet & American Life Project Retrieved 12/11/2010, from <http://pewinternet.org/Reports/2010/Social-Media-and-Young-Adults/Summary-of-Findings.aspx>