



Developing an integrated computerized CBT virtual reality platform for treatment of behavioral health conditions

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BACKGROUND

- In 2012, 5% of the population accounted for 50% of total health care spending in the United States¹.
- Many patients face barriers to treatment including income, lack of appropriate staffing, and stigma², which can lead to prolonged suffering, need for institutional care, early mortality rates, and negatively impact caregivers¹.
- Early diagnosis and active management of psychiatric symptoms can help ensure higher quality of life, prevent hospital admissions, and lower overall healthcare costs.
- In line with the AMA's Principles to promote effective Health applications³, we are developing a potential solution to increase access to treatment by integrating novel technology into traditional clinical service delivery models.
- We hope that this will serve as an accessible and convenient medium to engage patients in therapy while reducing stigma associated with traveling to see a mental health therapist in person.

TEAM COLLABORATION

Department of Psychiatry:

- Dr. Michael Hasselberg** is the behavioral health lead of the University of Rochester Health Lab. He was involved in the grant writing, content development, production and software development, and facilitating the CCBT-VR team meetings. The Health Lab consists of individuals from various departments and is a collaborative effort to utilize computing, analytics, and technology to advance medicine.
- Dr. Wendi Cross**, is a clinical psychologist and associate professor in the Department of Psychiatry, in charge of providing content expertise in the utilization of Cognitive Behavioral Therapy techniques to manage symptoms of anxiety.
- Under the guidance of Dr. Wendi Cross, **Robert Henderson** and **Katherine Schmieder**, doctoral interns in the APA Accredited clinical psychology predoctoral internship program, researched pre-existing behavioral health applications and developed the content of the prototype modules for the application.

Department of Computer Science and UR Health Lab:

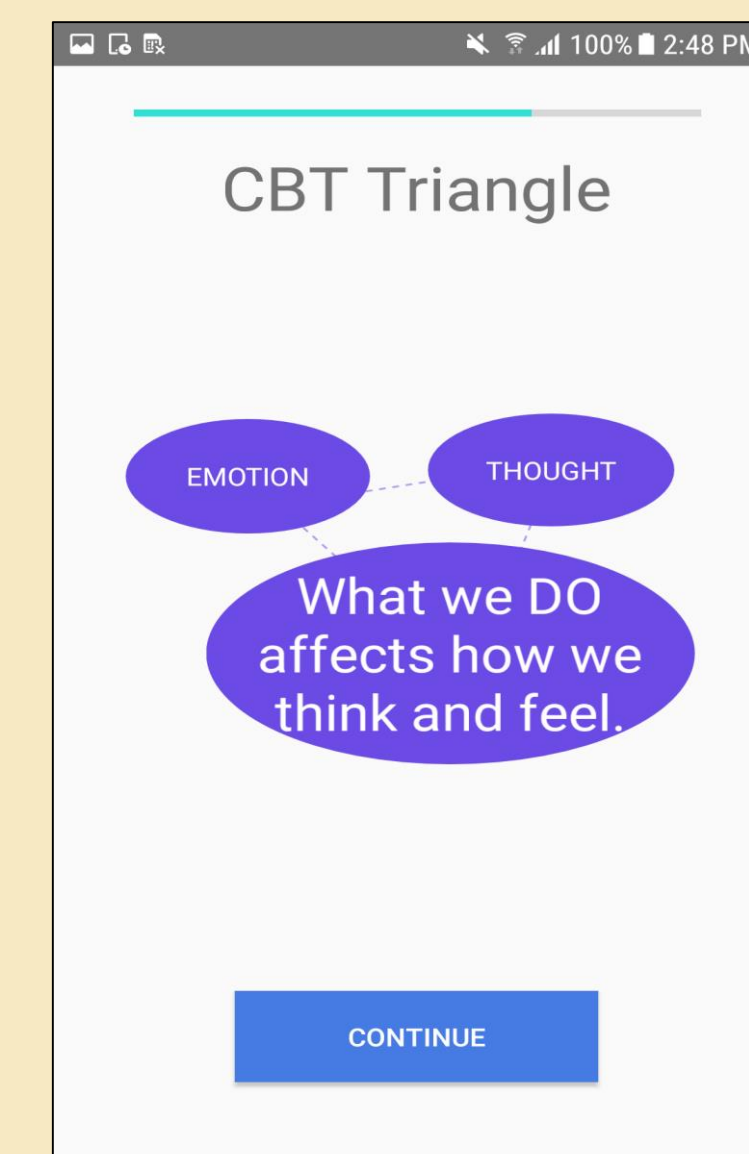
- Dr. Jiebo Luo** professor of computer science in the Hajim School of Engineering and his research lab members developed the immersive virtual worlds of the therapist office as well as the various environments utilized in the immersive relaxation exercise.
- Michael Curtis**, Software Specialist Sr., and **Kaelyn Wendling** in the Health Lab utilized their expertise in Software Development to design and develop the application.

Eastman School of Music:

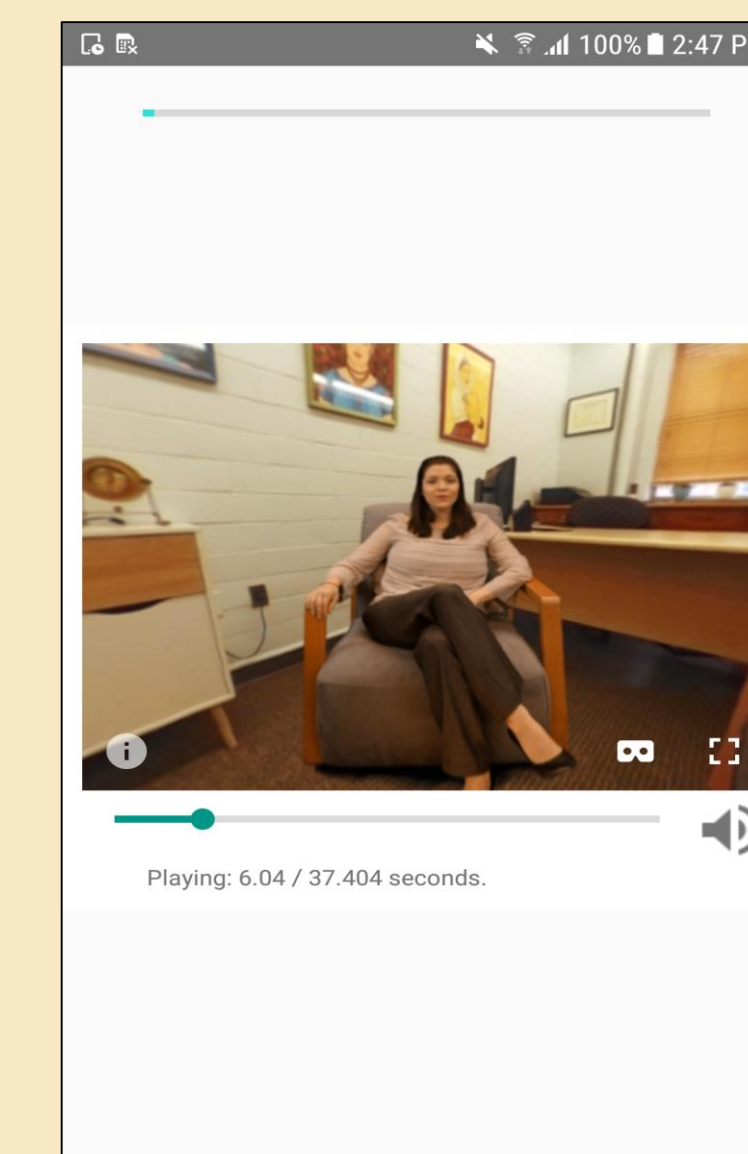
- Dr. Matthew Brown**, professor of music theory and **Dr. Christopher Winders** were directly involved in providing expertise around the overlay of visual and audio content of the modules. Additionally, they produced the original music and relaxation sounds utilized in the Relaxation exercises included on the application.



MODULES

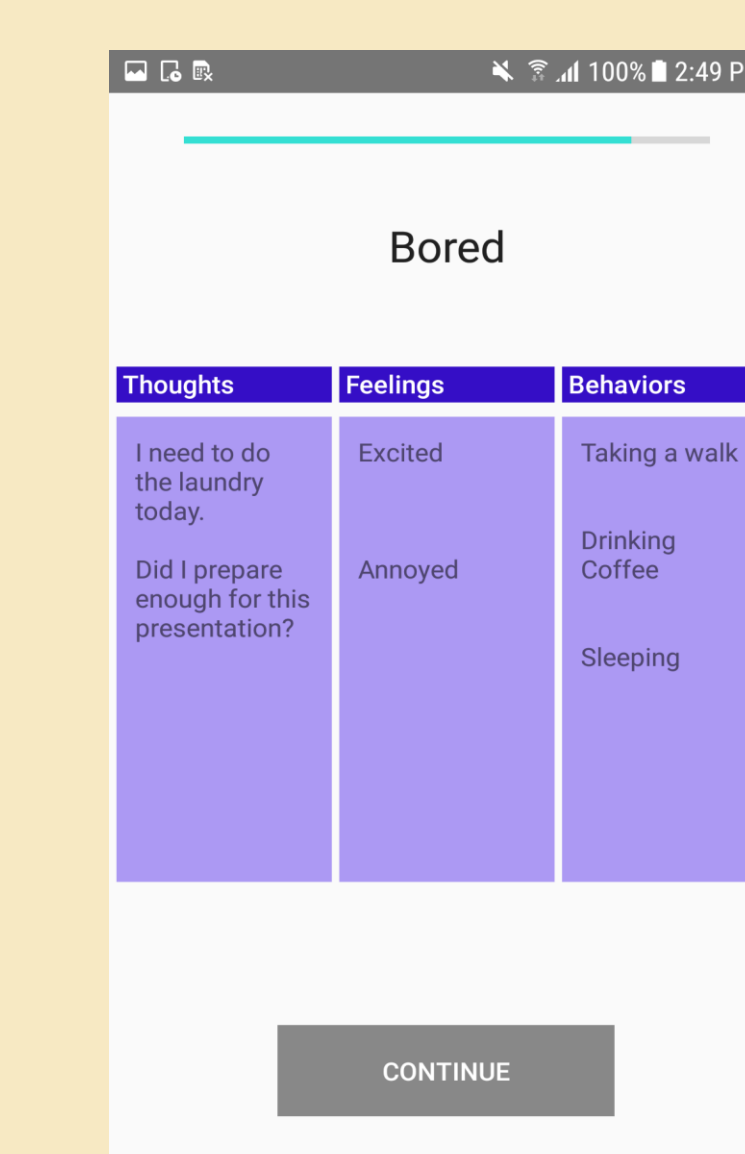
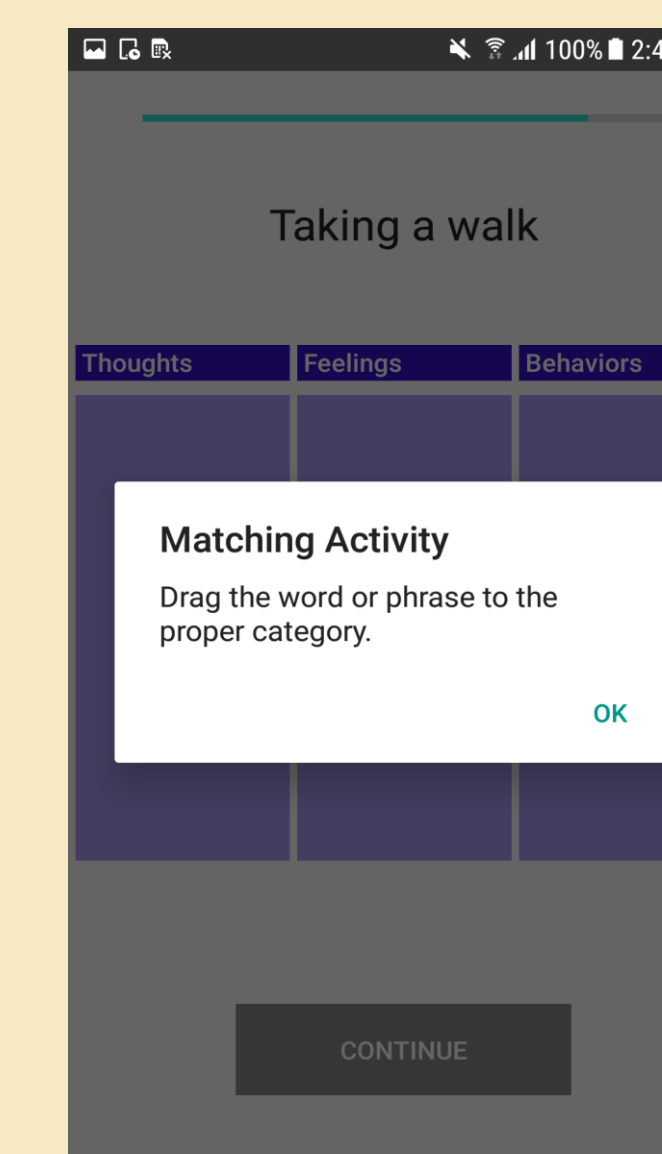
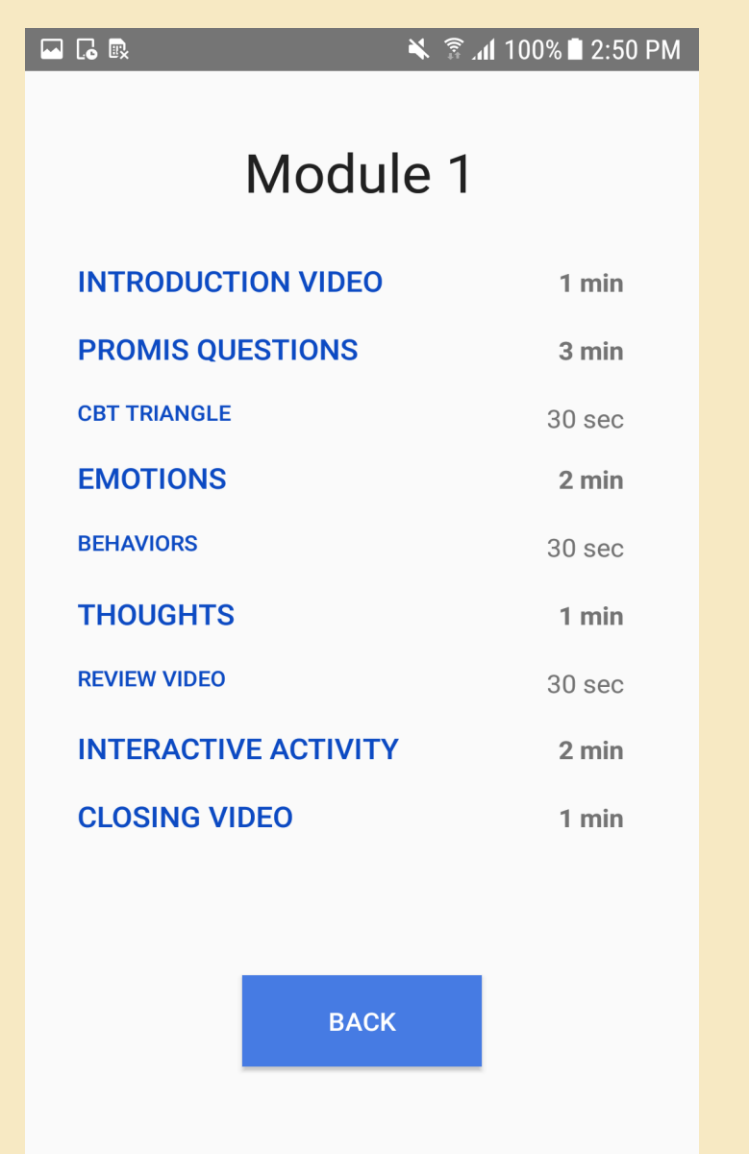


INTRODUCTION
The first module consists of an introduction to the application, completion of PROMIS scale assessments to obtain a baseline of patient symptoms, and a brief introduction to Cognitive Behavior Therapy.



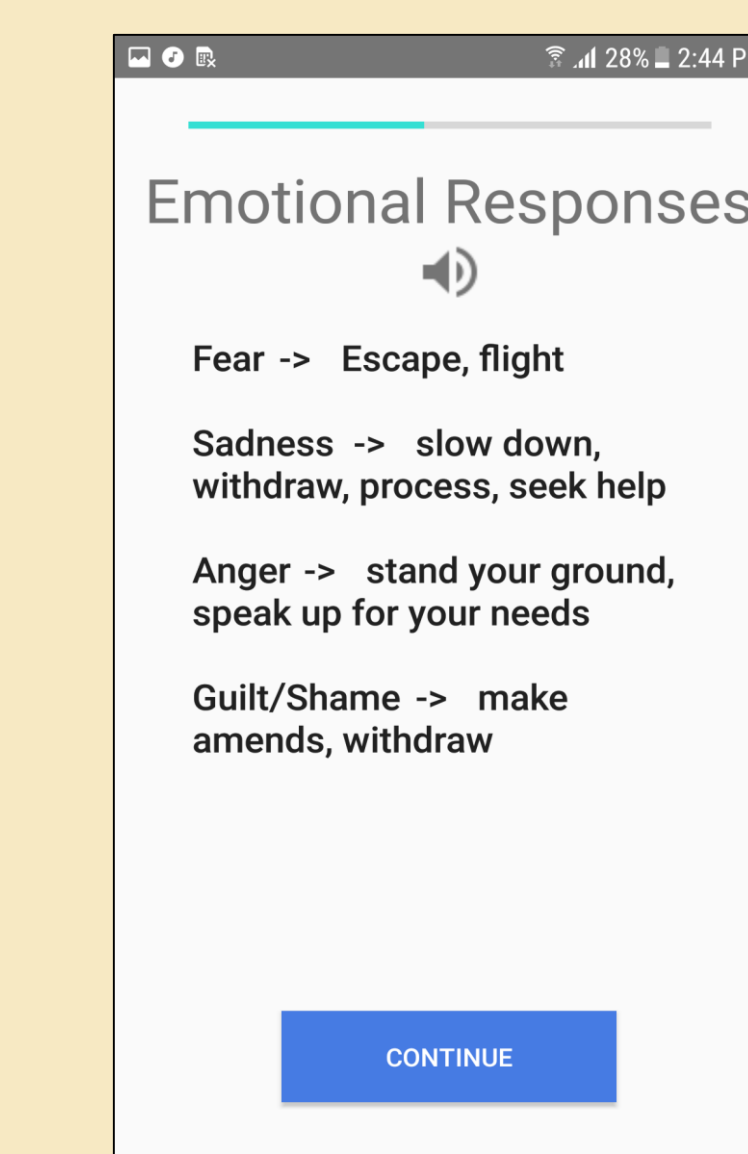
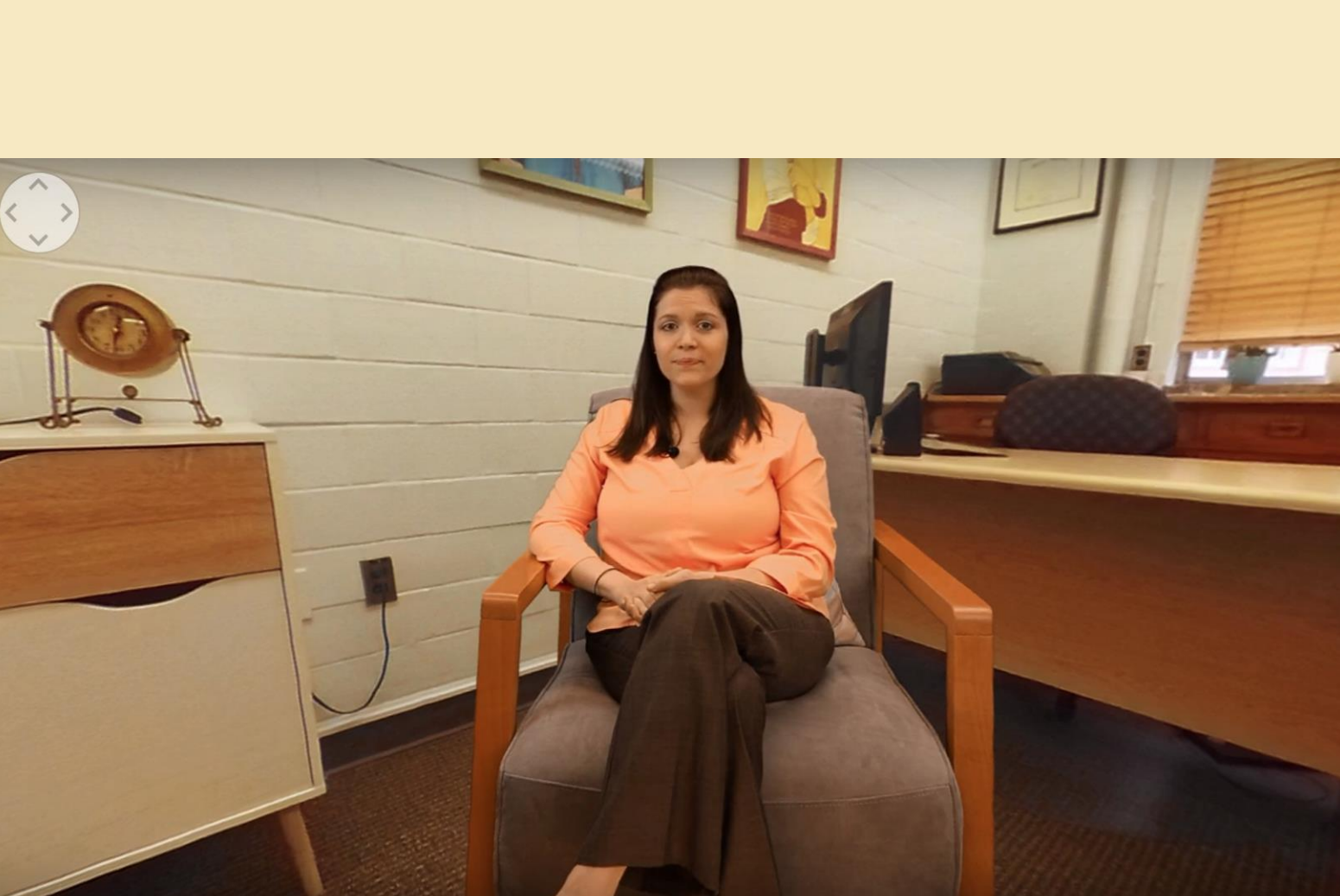
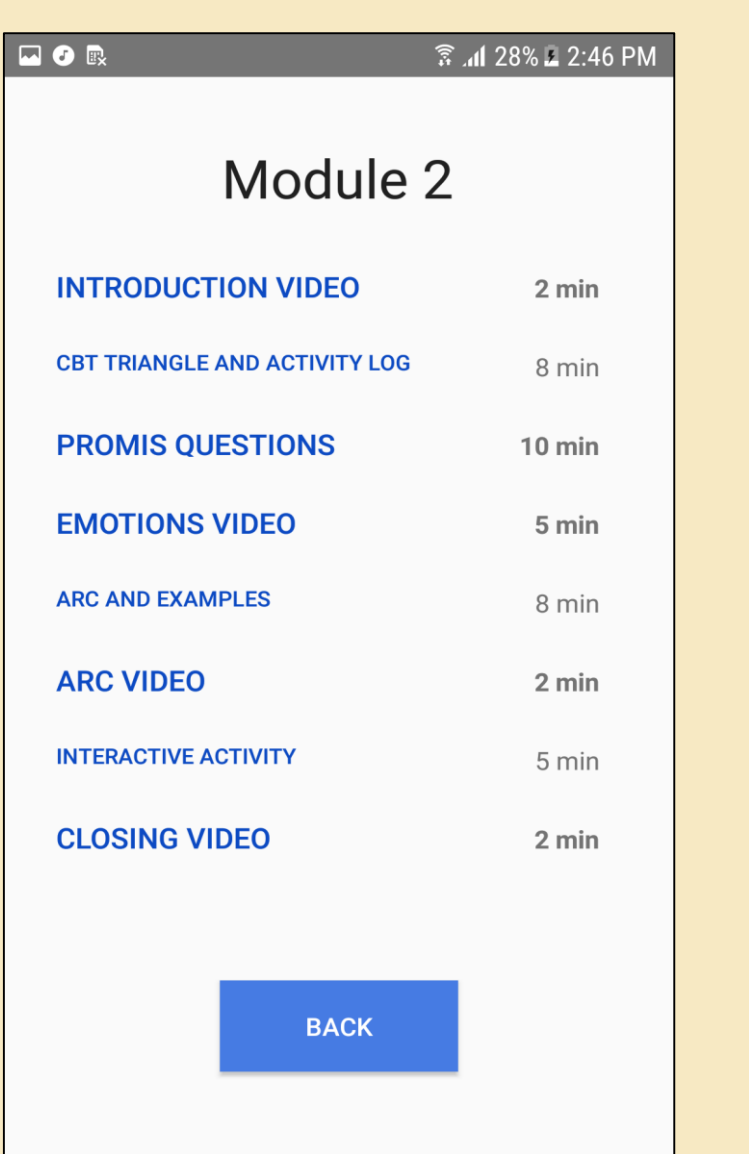
MODULE 1

This module expands upon the CBT Triangle. The overarching goal of this module is to help the participant learn how to differentiate between thoughts, emotions, and behaviors. The module ends with an interactive exercise to reinforce information.



MODULE 2

The main purpose of module 2 is to expand upon the user's knowledge of emotions by providing psychoeducation on the three components of emotional experience, which include antecedent events, emotional responding (physical sensations, behavioral responses, and thoughts), and consequences.



IMMERSIVE EXPERIENCES

Users may choose a guided imagery or a mindfulness immersive experience. Each experience incorporates soothing music and natural scenes (e.g., beach, meadow). Users can interact with the experience using their smartphones. The immersive experience module is available at any time and users can repeat the activities as many times as desired.

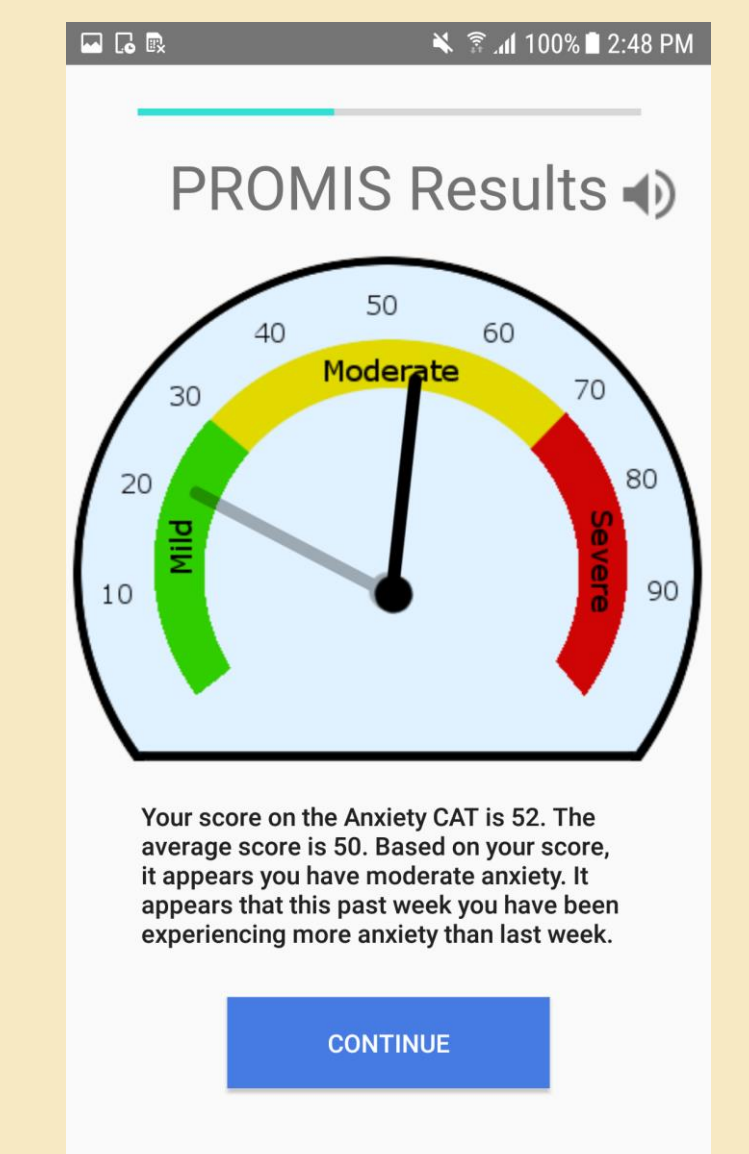
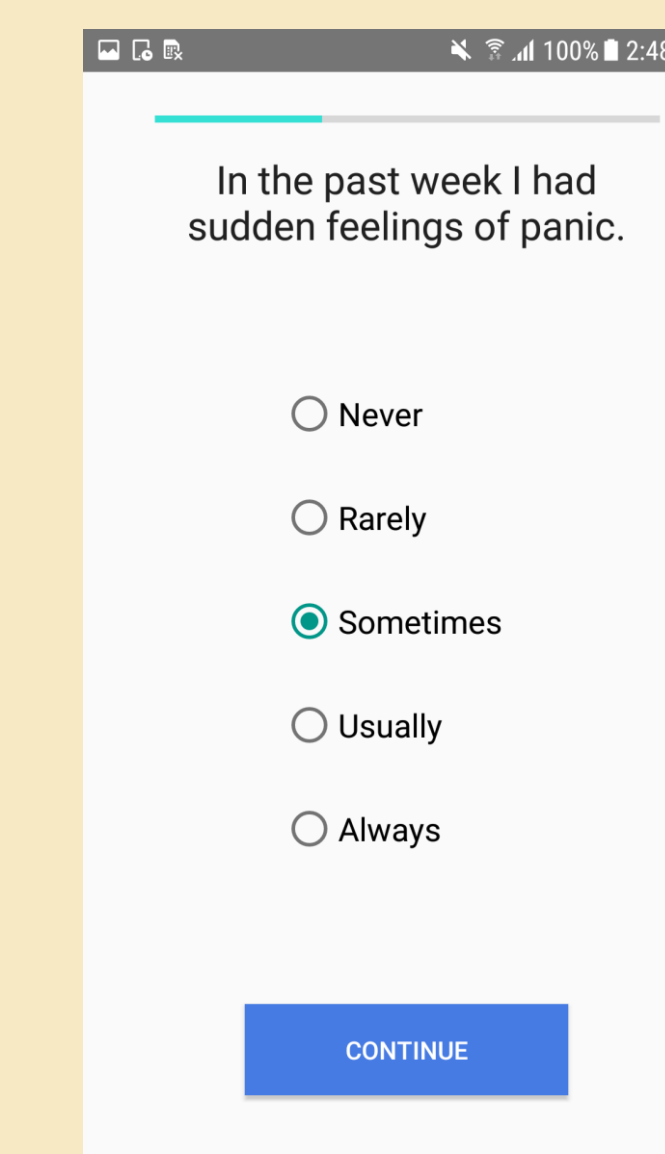
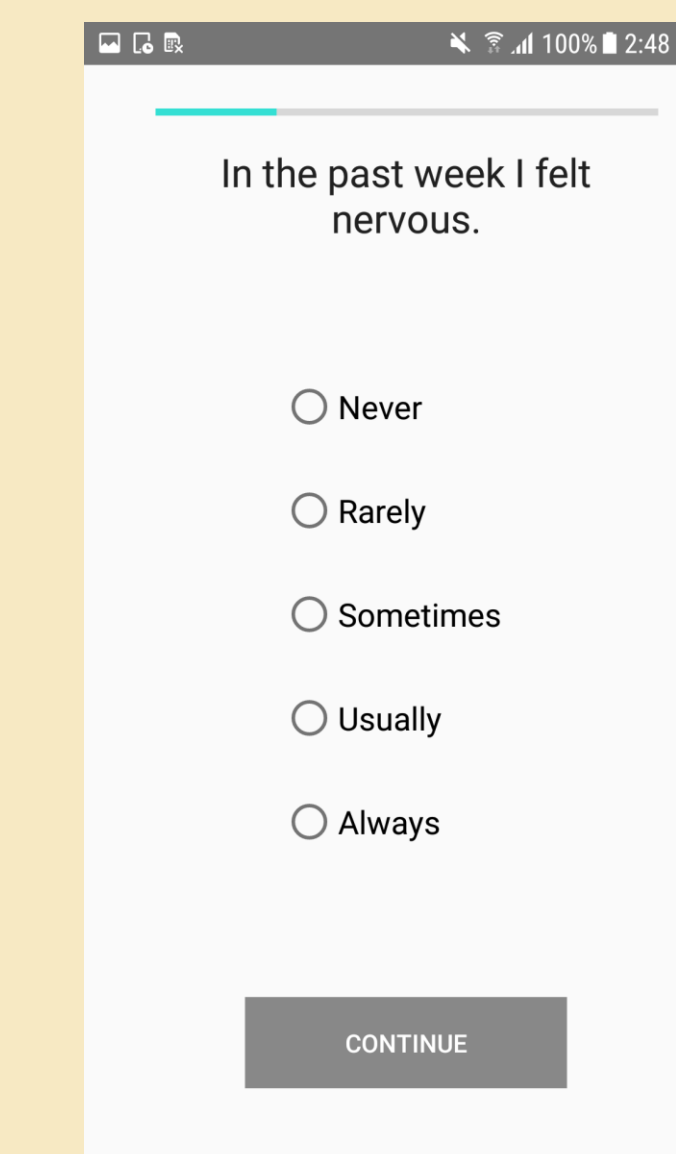


PROMIS Measures

Users complete self-report measures from the Patient-Reported Outcomes Measurement Information System (PROMIS⁴).

Administered in computerized adaptive test format.

Users complete 5 measures prior to starting the first module: Anxiety, Depression, Somatic Arousal, Perceived Stress, General Self-Efficacy, and complete the Anxiety module prior to starting each module.



Users receive tailored feedback about their responses on these measures from the 'virtual therapist' and see their scores displayed relative to the general population.

FUTURE DIRECTIONS

Continue development of remaining modules for a total of 10 for the full program.

Establish compatibility with the electronic medical record, enabling providers to monitor patient's progress throughout treatment, and to contact the patient with options for additional interventions if necessary.

Pilot usability within various medical offices for patients with clinically-significant anxiety symptoms.

Evaluate suitability for use in treatment of other psychiatric conditions, such as mood disorders, and in individuals with comorbid medical and psychiatric disorders.

Evaluate response to treatment for individuals completing treatment using the cCBT-VR application compared to individuals receiving treatment as usual, computer-assisted CBT, and wait-list control groups.

ACKNOWLEDGEMENTS

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