The "PE Coach" Smartphone Application: An Innovative Approach to Improving Implementation, Fidelity, and Homework Adherence During Prolonged Exposure

Greg M. Reger
National Center for Telehealth and Technology, Joint Base Lewis-McChord, Washington

Julia Hoffman
National Center for PTSD, Palo Alto, California

David Riggs
Center for Deployment Psychology, Bethesda, Maryland

Barbara O. Rothbaum
Emory University School of Medicine

Josef Ruzek
National Center for PTSD, Palo Alto, California

Kevin M. Holloway
National Center for Telehealth and Technology, Joint Base Lewis-McChord, Washington

Eric Kuhn
National Center for PTSD, Palo Alto, California

Prolonged exposure (PE) is an empirically supported treatment that is being disseminated broadly to providers in the Department of Veterans Affairs and Department of Defense. Innovative methods are needed to support the implementation, dissemination, and patient and provider adherence to PE. The PE Coach is a smartphone application (app) designed to mitigate barriers to PE implementation. PE Coach is installed on the patient's phone and includes a range of capabilities for use during the PE session and after each session to support the treatment. Functions include the ability to audio record treatment sessions onto the patient's device, to construct the in vivo hierarchy on the device, to record completed homework exercises, to review homework adherence, and to track symptom severity over time. The app also allows sessions and homework to be scheduled directly in the app, populating the device calendar with patient reminder notifications. In the final session, a visual display of symptom improvement and habituation to items on the in vivo hierarchy is presented. These capabilities may significantly improve convenience, provider implementation and adherence, and patient compliance with treatment. Future research is needed to test whether PE Coach is useful and effective.

Keywords: prolonged exposure, posttraumatic stress disorder, veterans, military, technology

Exposure therapy is one of the most well-researched, evidence-based treatments available for posttraumatic stress disorder (PTSD; Foa, Keane, Friedman, & Cohen, 2009). There is strong research support for its efficacy (Bradley, Greene, Russ, Dutra, & Westen, 2005; Institute of Medicine, 2008), and exposure therapy is a recommended treatment in PTSD clinical practice guidelines (Department of Veterans Affairs & Department of Defense, 2010; American Psychiatric Association, 2004). Prolonged exposure (PE; Foa, Hembree, & Rothbaum, 2007) is a manualized exposure therapy protocol based on emotional processing theory (Foa & Kozak, 1986; Foa, Steketee, & Rothbaum, 1989). PE has strong empirical support (Powers, Halpern, Ferenschak, Gillihan, & Foa, 2010), and is regarded as a first-line treatment for PTSD (International Society for Traumatic Stress Studies, 2009). PE seeks to

---

modify the trauma-survivor's fear structure by intentionally activating aspects of it in order to incorporate new learning. Activation of the fear structure in PE is accomplished through the use of imaginal exposure to the trauma memory and in vivo exposure to avoided situations but objectively safe activities, places, or people. These exposure exercises allow the patient to process the memory and result in a reduction of PTSD symptoms.

Evidence-based treatments, like PE, are urgently needed in the treatment facilities of the Military Health System (MHS) and Department of Veterans Affairs (VA). Depending on samples and methods used, rates of PTSD are approximately 10%–17% for combat-deployed troops and approximately 2%–12% in random samples of all deployed personnel (Sundin, Fear, Iversen, Rona, & Wessely, 2010). Many Veterans also face trauma-related difficulties. A study of veterans of Operation Iraqi and Enduring Freedom found that nearly 22% of Veterans who sought treatment at VA facilities within a 6-year window met criteria for PTSD (Seal et al., 2009).

The first portion of this article reviews some of the barriers to the utilization of evidence-based treatments for PTSD. Specifically, we discuss the challenges to dissemination and implementation of exposure therapy to treat PTSD, implementation challenges for providers, and patient barriers to adherence when participating in PE. The second portion of the article describes an innovative mobile application designed to facilitate implementation and mitigate provider and patient barriers to participating in PE. The article concludes with a discussion of the potential of such applications and future directions for research and clinical practice.

Barriers to Utilization of Evidence-Based Treatments for PTSD

Evidence-based practices have had limited penetration in clinical settings, and many providers rely more on their clinical experience than outcome research (Stewart & Chambless, 2007). This is true of exposure-based PTSD treatments as well as other evidence-based practices. A survey of licensed psychologists' training, comfort, and use of exposure therapy to treat PTSD (Becker, Zayfert, & Anderson, 2004) found that only 31% were trained in imaginal exposure and only 17% had ever used imaginal exposure to treat PTSD. Among psychologists trained to use imaginal exposure, 50% to 88% used it with less than half of their patients with PTSD. The most commonly endorsed factor influencing the providers' use of exposure was limited training. Similar challenges have been historically observed in large medical systems, such as the VA (Rosen et al., 2004), although large-scale roll outs of these treatments is currently underway in the VA (Karlin et al., 2010) and Department of Defense (Copland, Domenici, & Schulz, 2011, November), and thousands of providers have been trained in recent years (Copland et al., 2011, November; Foa, 2012, August). Similar VA dissemination of cognitive–behavioral treatments have demonstrated good outcomes (Karlin et al., 2012).

Particular components of a manualized treatment can function as a barrier to provider implementation. For example, in PE providers must audio record sessions to support their patients' homework. Further complicating this effort, clinicians must record the imaginal exposure portion of the session separately from the rest of the session. Cassette recorders are increasingly rare, and digital audio recording often requires software installation that

may not be approved on the computer networks of some large medical systems. The time and inconvenience of transferring digital audio files to the patient by, for example, burning CDs can also create logistical challenges. Some organizations are hesitant to dedicate more than 60 min for any patient encounter, and time-consuming data recording and file transfer may be a barrier to implementation.

Effective treatments for PTSD typically involve a session frequency of once or twice a week (Foa et al., 2007). Obviously, the most basic aspect of patient adherence is attendance of treatment sessions. However, the avoidance symptoms of PTSD can result in patients missing trauma-focused psychotherapy sessions. It is expected that patients participating in PE will wrestle with a desire to avoid treatment (Foa et al., 2007), and up to 30% of patients drop out of exposure therapy (Hembree et al., 2003). The rates may be slightly higher for veterans and active duty personnel (Schnurr et al., 2007). Accordingly, providers treating trauma survivors face the risk of inefficient use of clinic time secondary to patients' no-shows. Some providers take the time to make reminder calls to increase the likelihood of session attendance. Additional tools for mitigating avoidance of PE sessions would be helpful.

Most psychologists assign homework and view it as important to the successful treatment of anxiety disorders (Kazantzis & Deane, 1999). Homework supports improvement in therapy, and homework compliance is a significant predictor of outcome (Kazantzis, Deane, & Ronan, 2000; Mausbach, Moore, Roesch, Cardenas, & Patterson, 2010). Studies have found better treatment outcomes for therapies with homework than those without homework (Kazantzis, Whittington, & Dattilio, 2010) and most cognitive–behavioral therapies include homework to leverage time between sessions and apply skills in everyday settings. Following this approach, patients participating in PE have significant daily homework assignments that can require up to 2 hr a day. Given the logistical challenges of incorporating this homework into one's day, and the emotional challenges of confronting distressing aspects of the fear structure, inconveniences can provide "invitations" for activating patient avoidance. For example, some patients' access to equipment for completing imaginal exposure homework may be a CD player in their vehicle, which would not facilitate focused imaginal exposure and could risk increasing anxiety while driving. Others may use computers at home to listen to the recordings but are concerned with the risk of leaving the recording where children or spouses may find it. Regarding in vivo exposure homework, adherence requires carrying these paper logs (Rothbaum, Foa, & Hembree, 2007) into real-world settings to document exposure exercises and subjective units of discomfort (SUDs). The cumbersome and overt nature of the recording forms can lead some patients to postpone recording the information necessary to allow the therapist to monitor homework compliance and progress. Providers sometimes find patients documenting their in vivo homework in the waiting room of the clinic immediately prior to the start of the next PE session. It is not always clear whether the SUDs being recorded are simply of questionable validity or whether the patient was not compliant with the homework and is seeking to please their therapist. Finally, paper forms and session recordings are often misplaced or lost.

Behavioral health providers have used a range of technologies in an attempt to improve clinical services or to address problems or barriers to treatment. Examples include in home-messaging for

patients with substance use disorders (Santa Ana, Stallings, Rounsaville, & Martino, 2011), virtual environments to activate fear structures during exposure therapy (Reger et al., 2011; Rothbaum et al., 2006), video teleconferencing to support engagement in evidence-based treatments (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011), digital cameras to document progress during treatment (Eonta et al., 2011), and telehealth-based cognitive assessment (Schopp, Johnstone, & Merrell, 2000). Smartphones also provide a new and rapidly expanding innovation with a number of capabilities that are increasingly being used to support psychological health (Luxton, McCann, Bush, Mishkind, & Reger, 2011). Mobile phone apps have been used to support substance abuse assessment (Bernhardt et al., 2009), mood management interventions for individual with persistent mental illness (Depp et al., 2010), and skills training to support evidence-based treatments (Rizvi, Dimeff, Skutch, Carroll, & Linehan, 2011).

PE Coach: A Mobile Application to Support Implementation and Adherence

PE Coach is a mobile application (app) that was designed to be installed on a patient's Android or Apple smartphone or mobile device, and it is meant to be used during each PE session with their therapist and between sessions to support the patients' homework. These types of mobile devices are increasingly in the possession of active duty personnel and Veterans. A recent study reported that 65% of soldiers who had not been deployed and more than half of previously deployed soldiers reported ownership of a personal smartphone (Bush, Fullerton, Crumpton, Metzger-Abamukong, & Fantelli, 2012). PE Coach was publically announced on July 31, 2012, and the app has been installed more than 5,000 times at the time of writing (October, 2012). The content and capabilities of PE Coach proceed sequentially in accordance with the PE treatment protocol to provide only the functionality that is required at each particular PE session. App tools relevant to the content covered in Session 1 appear on the first session screen, and tools relevant to the content covered in Session 2 are not available until the Session 2 screen, and so on. In this manner, the app serves as a coach by providing the relevant tools at the appropriate point in the treatment protocol (see Table 1). Although not a replacement for formal training, the sequential presentation of content may help support trained providers' need for ongoing support even after training (e.g., Rosen et al., 2004). The following section outlines the key capabilities of PE Coach.

Audio Recording and Imaginal Exposure Homework

All PE sessions can be recorded directly onto the device using PE Coach (see Figure 1). Once audio recording starts, the other functionalities of the app can continue to be used. Beginning in the third session screen, audio recording functionality is modified. Recording is initiated at the start of every session, and at the point at which imaginal exposure begins, the user toggles a button to begin recording the imaginal exposure portion of the session. This creates a new audio track that simplifies the task of listening to the imaginal exposure exercise as homework between sessions. At the end of imaginal exposure, the user toggles off the imaginal exposure recording, and audio recording of the full session continues. At the end of the session, the user stops the recording. The imaginal and full session recordings are automatically saved and made available on the corresponding session's homework screen. When patients chooses to complete their homework, they can select whether to listen to the full-session recording or the imaginal exposure recording. When imaginal exposure is selected, they are prompted to provide pre-SUDs and post- and peak SUDs when appropriate.

Ongoing Assessment of Treatment Outcome

Ongoing assessment of symptoms is usually used during PE in order to monitor progress in treatment, inform problem solving of challenges, and facilitate feedback to the patient (Foa et al., 2007). Assessment typically involves the use of self-report measures, such as the PTSD Checklist (PCL; Weathers, Huska, & Keane, 1991). PE Coach currently enables PCL administration on the device every odd-numbered session. Once the final item is completed, the total score and individual item responses are displayed. Results of each PCL are saved and are available later to support assessment of progress in treatment. At the final session, there is the capability to display all dates and total PCL scores taken during treatment. Review and discussion of symptom improvement on the PCL can be incorporated into discussions of the patient's efforts and improvement.

Table 1
PE Coach Mitigation of Barriers to Optimized Treatment

Potential barrier to treatment	PE Coach capability
Avoidance of PE sessions/no-shows	App scheduling of next PE session on patient's device calendar with alarm reminders
Provider access to audio recording devices or audio recording software	App audio recording capability directly onto the patient's device
Patient access to private audio playback environments or devices	Mobile audio playback capability on the patient's device.
Accurate provider knowledge of completed in vivo homework in order to assist patient in problem-solving barriers	Itemization of date, time, and SUDs for each completed in vivo exercise
Accurate provider knowledge of completed imaginal exposure homework in order to support problem solving	Itemization of date, time, and SUDs for each completed imaginal exposure exercise
Patient recall of, and access to, assigned in vivo hierarchy, assigned in vivo homework items	Hip pocket access to in vivo hierarchy and assigned in vivo homework in a manner that is unlikely to be misplaced or lost (i.e., on the patient's mobile device)

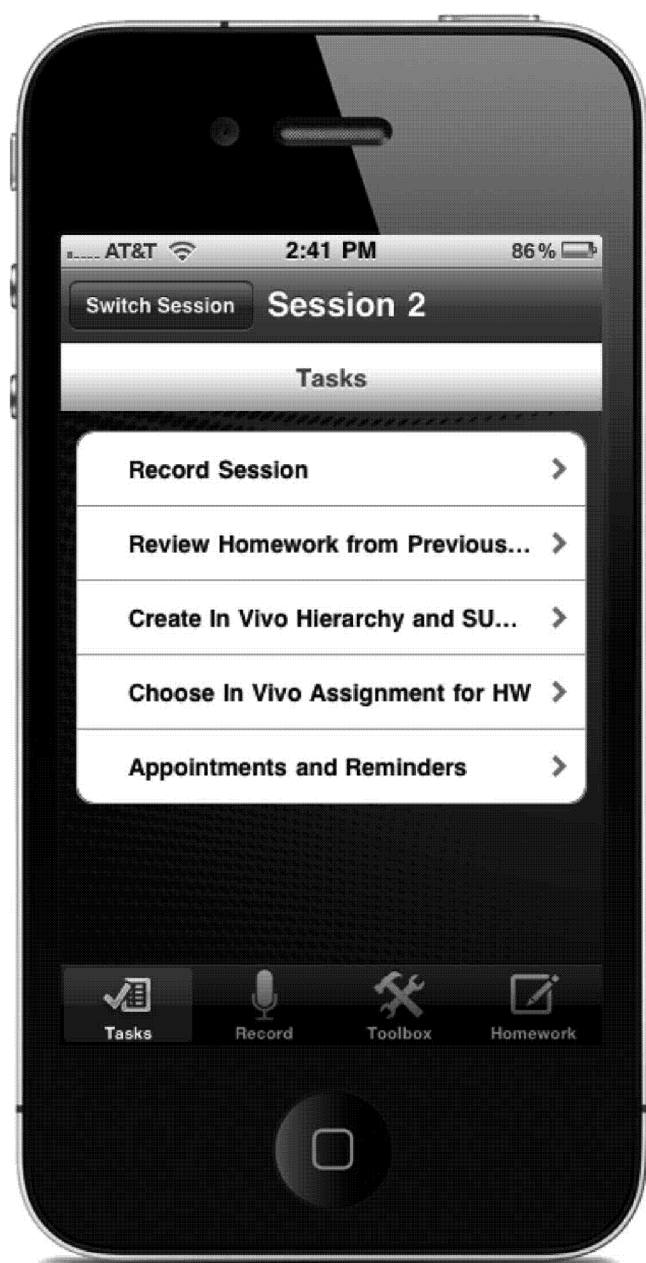*Note.* PE = prolonged exposure; SUDs = subjective units of discomfort.

Figure 1. Screen shot of PE coach, Session 2 menu for Apple (iOS devices).

Scheduling Next PE Session

As noted above, PTSD avoidance symptoms can negatively affect attendance of PE sessions. To support recall of scheduled treatment sessions, PE Coach includes a scheduling tool for the next session appointment. The time and date of this session populates the calendar on the device, and calendar reminders can be set to help the patient remember and attend the scheduled PE session. This scheduling tool can also support scheduling of homework activities, if desired.

Psychoeducation

Homework assignments during PE include those that reinforce the psychoeducation topics covered by the therapist in session. Specifically, the patient is traditionally assigned reading material from the PE workbook (Rothbaum et al., 2007) on (1) the rationale for PE therapy and (2) common reactions that people have to traumatic events. PE Coach includes this content on the corresponding session homework screens and offers it in two formats, as a video presentation and text. The videos incorporate audiovisual presentation of the psychoeducational material. However,

content is also available as text to accommodate those who may want to review the homework without audio or video.

Breathing-Retraining Tool

Patients are taught breathing retraining during the first session of PE and asked to practice this technique three times a day for 10 min at a time throughout the course of treatment (Foa et al., 2007). Although the authors' experience is that many PE providers do not emphasize compliance with this aspect of PE, some patients find it helpful, and it remains a part of the homework assigned at each session (Rothbaum et al., 2007). PE Coach incorporates a *learn*, *watch*, and *practice* breathing-retraining tool. In the learn section, there is audiovisual or text presentation of the PE psychoeducation on breathing retraining. The watch section provides audiovisual or text presentation of instructions on how to conduct the breathing-retraining exercise. Practice displays an audio-visual "coach" to guide the patient through the breathing-retraining exercise. The visual coach includes a ball that inflates, deflates, and becomes static during the inhale, exhale, and hold portions of the breathing exercise, respectively. The app also allows customization of the speed or pace of the breathing animation.

In Vivo Hierarchy

In Session 2, the patient and provider work together to create an in vivo hierarchy. Using PE Coach, this can be done directly on the smartphone (see Figure 2). Doing so allows the patient to have hip-pocket access to the hierarchy, and the patient can add previously unidentified items to the list, on-the-go. Currently, the app does not allow data transfer. Clinicians may want to retain a paper copy of the in vivo hierarchy for their records.

Each session, providers and patients select specific items from the app's in vivo hierarchy list to be completed as homework assignments. Doing so automatically populates the corresponding session's homework screen with the selected items. From that homework screen, the patient can identify the in vivo homework item that they are going to complete, and the app will prompt them to report pre- and post-SUDs and peak SUDs as they are needed.

Review Completed Homework

Each session screen of the app provides information about homework adherence since the last session, based on app usage (see Figure 3). This information may be shared with the provider to enhance compliance. For example, PE Coach displays the amount of time the patient used the app to complete psychoeducation homework related to the rationale for exposure, common reactions to trauma, or breathing retraining. If the psychoeducational content was not accessed, the provider can assess the patient's understanding of the content and revisit key points in session, as necessary.

Similar capabilities support in vivo and imaginal exposure homework review. When a patient selects an item with which they are conducting in vivo exposure, the app automatically logs the date and time, and the patient is prompted for the preexposure SUDS. During review of the in vivo homework in session, PE Coach presents an itemized list of exposure homework exercises completed with the corresponding SUDS. Similarly, the review of
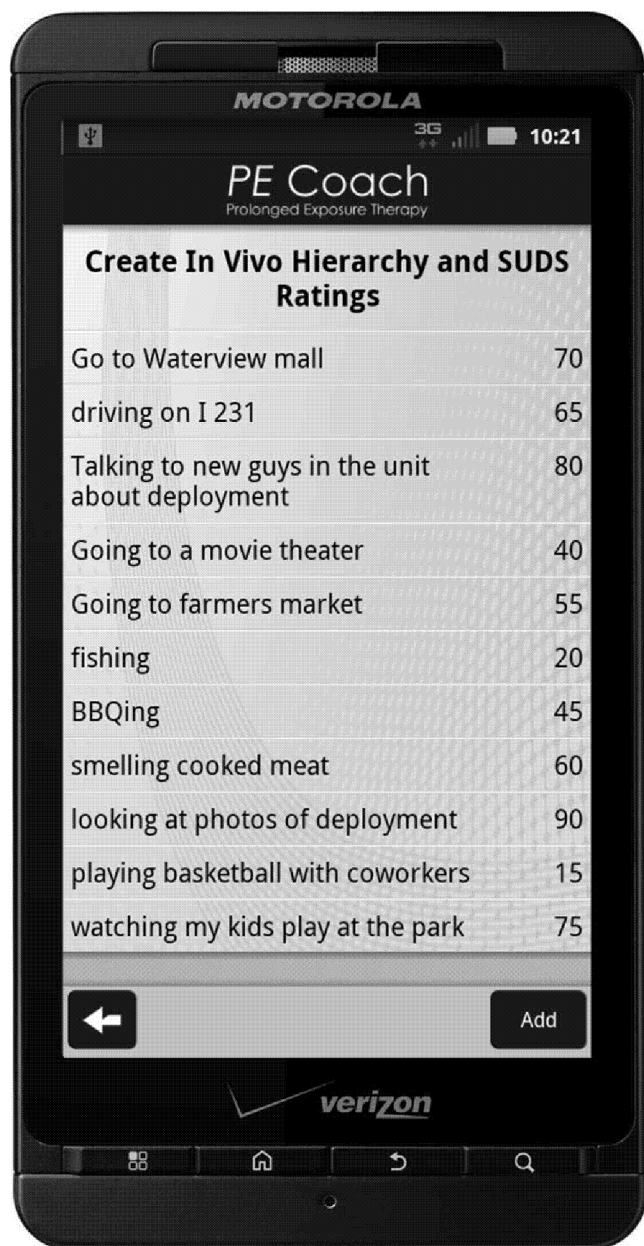
Figure 2. PE Coach screen shot of in vivo hierarchy on Android devices.

homework screens display the total amount of time spent listening to the audio recordings of the total session and imaginal exposure. The provider and patient can use the app to see the individual dates, times, and pre- and post-SUDs and peak SUDs for each instance of completed imaginal exposure homework.

Rerate and Compare in Vivo Hierarchy SUDs

When the final PE session screen of the app is activated, patients and their providers have the ability to review the full in vivo hierarchy, and the patient may rerate each item with their current SUDs as is suggested in the PE manual. Users can then compare the Session 2 SUDs and the final session SUDS for each item. This digital display can be used to support the final PE session discussion of progress made in treatment, as well as to identify work that remains to be done.

Additional Features

Providers may want to access content from the app that is associated with previously completed sessions. For example, when avoidance becomes problematic, providers may revisit the rationale for treatment by PE and ask their patients to again review this psychoeducational portion of PE Coach. To facilitate this kind of

out-of-sequence access to key materials, every screen includes a "tools" link that provides instant access to all PE psychoeducational materials, the breathing-retraining tool, and a Clinician's Guide for using the app. In addition, PCLs can be administered at any time by accessing the tools section of the app.

An additional feature available at the tools link is the option to insert the therapist's contact information into PE Coach. This contact information can be viewed only in the app and is not listed in the device's general contact list. This capability enables convenient, readily available clinician contact information in a manner the patient is unlikely to lose.

Data Security

Using technology tools in trauma treatment raises concerns around issues of data security, and these issues deserve careful attention. In general, the Health Insurance Portability and Accountabity Act (HIPAA) does not apply to patients use of personal technologies to store data on a mobile device. If a patient transmits or shares protected health information with a provider, that provider must adhere with the requirements of HIPAA. Currently, PE Coach does not facilitate electronic transmission of any data. Nonetheless, patients' smartphones contain a range of personal
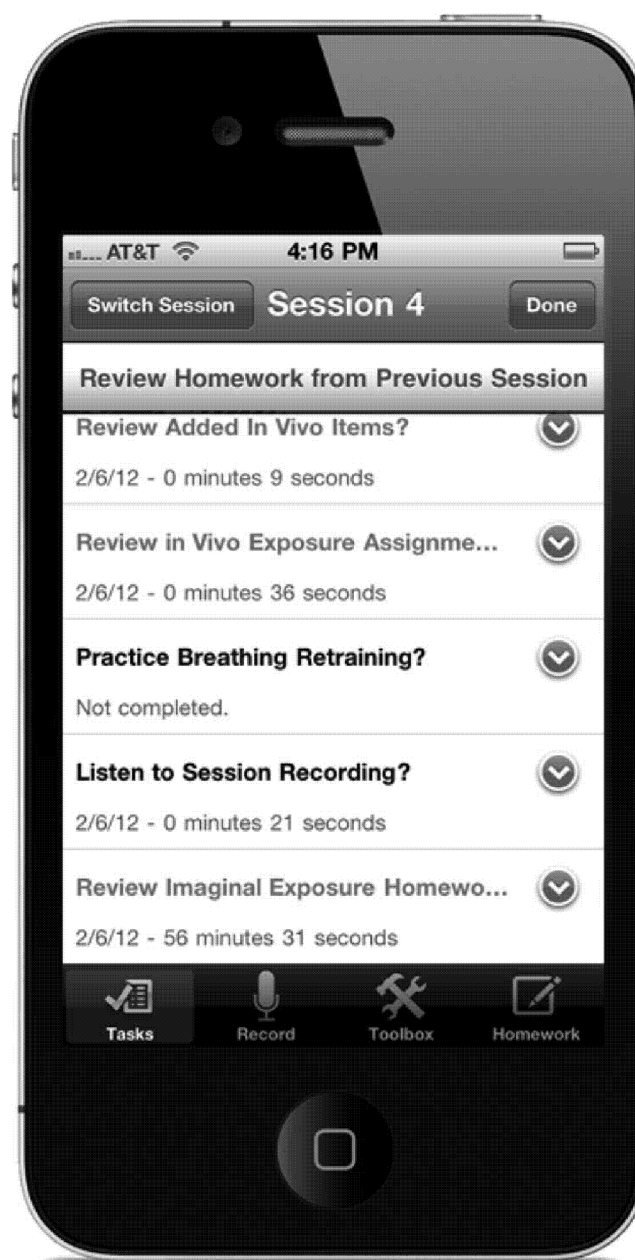

Figure 3. Review homework screen on Apple (iOS devices).

information including information that likely identifies the owner of the device. The data generated and stored on that device during use of PE Coach is sensitive and includes audio recordings of psychotherapy sessions, multiple self-reports of PTSD symptoms, therapist contact information, and information about in vivo exercises completed. The app is on the patient's phone, and the data belong to the patient. However, discussing the security of information created and stored on the patient's phone while using PE Coach is important. The ethical practice of psychology requires providers to take reasonable precautions to protect confidential information obtained through or stored in any medium (American Psychological Association, 2010). Patients should be reminded that the information in PE Coach is only as secure as their phone. In the same manner that patients can erroneously leave unsecured PE session recordings on CDs or paper worksheets with identifying information, unsecured information on their phone presents a vulnerability. PE Coach is available on Android or Apple (iOS) devices, which can be pattern locked or password protected. PE Coach can also be password protected, enabling an additional layer of protection. When the app is uninstalled, all data created through the use of PE Coach is deleted.

Discussion and Future Directions

PE Coach is one of the first smartphone apps designed to support the work of the patient and provider during an evidence-based cognitive–behavioral therapy. In the context of PE, this app may increase the convenience of patient and provider participation in PE. PE Coach may provide a better experience during treatment by enabling easy patient access to treatment-related information, education, and tools, as well as the capability to unobtrusively record homework-related data on a mobile device in real-world contexts. Providers may appreciate time-saving capabilities to audio recording directly onto the patient's device and the objective data about the homework adherence of their patients. Taken together, it is possible that these capabilities will improve patient adherence to the treatment and support provider implementation and fidelity to the treatment manual.

A particularly interesting feature of PE Coach is the information it provides on patient homework adherence. Given the theoretical rationale for exposure therapy (Foa & Kozak, 1986), repeated therapeutic exposure to the memory and avoided situations, places, and circumstances is necessary to incorporate corrective information into the fear structure. Time between treatment sessions is required to support these tasks, and typically, the only feedback providers received on the extent to which this homework is completed is patient self-report. PE Coach's logging of when and for how long imaginal exposure homework was conducted provides a level of feedback fidelity previously unavailable. In addition, this data capture provides a unique form of accountability for patient homework completion. It clearly would not be productive to surprise patients with evidence that they did not do their homework. Trauma patients are already prone to perceptions of incompetence, and inappropriate use of this feature of the app would not be helpful. However, informing a patient up front that the app will provide information about what homework was or was not completed can help support identification of barriers to full, successful participation in an effective treatment.

PE Coach opens up new, important questions that require future research. It is not known, for example, whether the use of PE Coach would facilitate increased rates of homework compliance, improved engagement in treatment, decreased dropout rates, improved provider implementation following training, improved fidelity to the treatment protocol, or improved clinical outcomes. Interesting questions arise about the impact of patient and provider collaboration around a mobile device in session. Do such interactions facilitate rapport or interfere with the clinical process? For whom is PE Coach a useful tool and why?

Similarly, PE Coach also enables a new method for research. The capabilities of PE Coach and mobile computing platforms, in general, enable a new, objective source of information about patient's use of time between sessions. Although previous research on the use of homework in CBT includes both correlational studies and experimental research (Kazantzis, et al., 2010), little research exists that provides the kind of detailed, objective information available through the data collected in the course of using of a mobile app. These capabilities could also be used in dismantling studies to better understand the impact of various components of the treatment protocol. One could also consider the use of PE Coach to test training models aimed at improving therapist adherence.

There are many ways the current capabilities of PE Coach could be expanded in helpful and innovative ways. For example, it would be useful to providers if some of the data created in the course of using PE Coach could be electronically transferred to clinical records. This would allow providers to retain and reference a copy of the in vivo hierarchy and to track the course of habituation over time. If these data could be transferred with appropriate encryption to a secure web-portal accessible by clinicians, PE Coach would likely be viewed as more valuable by providers. Within the context of large medical systems like the VA and the MHS, the ability to transfer data directly to the electronic medical record could help inform systems of the progress of patients in treatment for better resource tracking or refinement of services. There may also be innovative opportunities to leverage additional device capabilities to support patient motivation and celebrate successes.

There may be broader implications for an app of this kind as well. Prolonged exposure is just one evidence-based psychotherapy to treat anxiety disorders. Protocols have been published for the management and treatment of social anxiety (Hope, Heimberg, & Turk, 2010), panic (Craske & Barlow, 2007), and depression (Gilson, Freeman, Yates, & Freeman, 2009) to name just a few. PE Coach may serve as an initial example and model for other effective protocols that would also lend themselves to patient and provider companion apps.

Limitations of this app include the requirement for patient access to a mobile device. This requirement could make the app difficult to access for some Veterans and trauma survivors with limited financial resources. However, many young adult patient populations may well have these devices on hand (Bush et al., 2012), and the growth of the mobile market is likely to continue (Gartner, 2010). Furthermore, some large medical systems may be willing to provide assistive devices to patients. Another limitation is the requirement for network connectivity for some features of the app. The psychoeducational videos are accessed through a network connection and where this connectivity is poor, these features will not work. However, text presentations of these ma-

terials are always available. PE Coach does not directly address a major barrier to the implementation of evidence-based treatments, namely limited training. However, the structured presentation of key session content may provide support to previously trained providers. Finally, it is a limitation that there is currently no data on the impact of the app on patient or provider convenience, treatment adherence, or treatment fidelity.

PE Coach is available for free and can be downloaded and installed from Google Play and Apple App store. Now that the PE Coach is designed and available, research is needed to evaluate its usefulness and effectiveness. We speculate that it will be embraced by many clinicians and patients alike. The current generation of service members and young veterans tend to be a technologically savvy group, and the rapid growth of the mobile device market suggests that these mobile computing platforms are likely to persist as readily available tools that can be thoughtfully applied in clinical practice. Researchers are likely to discover increasingly innovative ways to leverage these devices and tools, even as their capabilities continue to expand.

References

American Psychiatric Association. (2004). *Practice guideline for the treatment of patients with acute stress disorder and posttraumatic stress disorder*. Washington, DC: American Psychiatric Association.

American Psychological Association. (2010). *Ethical principles of psychologists and code of conduct including 2010 amendments*. Retrieved from http://www.apa.org/ethics

Becker, C. B., Zayfert, C., & Anderson, E. (2004). A survey of psychologists' attitudes towards and utilization of exposure therapy for PTSD. *Behaviour Research and Therapy, 42,* 277–292. doi:10.1016/S0005-7967(03)00138-4

Bernhardt, J. M., Usdan, S., Mays, D., Martin, R., Cremeens, J., & Arriola, K. (2009). Alcohol assessment among college students using wireless mobile technology. *Journal of Studies on Alcohol and Drugs, 70,* 771–775.

Bradley, R., Greene, J., Russ, E., Dutra, L., & Westen, D. (2005). A multidimensional meta-analysis of psychotherapy for PTSD. *The American Journal of Psychiatry, 162,* 214–227. doi:10.1176/appi.ajp.162.2.214

Bush, N., Fullerton, N., Crumpton, R., Metzger-Abamukong, M., & Fantelli, E. (2012). Soldiers' personal technologies on deployment and at home. *Telemedicine and e-Health, 18,* 253–263.

Copland, L., Domenici, P., & Schulz, P. (2011, November). *Dissemination of evidence-based psychotherapies: Cognitive processing therapy and prolonged exposure therapy*. Paper session presented at the 27th Annual Meeting of the International Society for Traumatic Stress Studies, Baltimore, MD.

Craske, M. G., & Barlow, D. H. (2007). *Mastery of your anxiety and panic*. New York, NY: Oxford University Press.

Department of Veterans Affairs & Department of Defense. (2010). *VA/DOD Practical Guidelines for Management of Post-Traumatic Stress*. Retrieved from http://www.healthquality.va.gov/PTSD-FULL-2010c.pdf

Depp, C. A., Mausbach, B., Granholm, E., Cardenas, V., Ben-Zeev, D., Patterson, T. L., & Jeste, D. V. (2010). Mobile interventions for severe mental illness: Design and preliminary data from three approaches. *Journal of Nervous and Mental Disease, 198,* 715–721. doi:10.1097/NMD.0b013e3181f49ea3

Eonta, A. M., Christon, L. M., Hourigan, S. E., Ravindran, N., Vrana, S. R., & Southam-Gerow, M. A. Using everyday technology to enhance evidence-based treatments. *Professional Psychology: Research and Practice, 42,* 513–520. doi:10.1037/a0025825

Foa, E. B. (2012, August). Disseminating of prolonged exposure within the United States and abroad. In A. M. Zeiss (Ed.), *Dissemination of effective treatments—Lessons learned from efforts with Veterans and the community*. Symposium conducted at the Annual Convention of the American Psychological Association, Orlando, FL.

Foa, E. B., Hembree, E. A., & Rothbaum, B. O. (2007). *Prolonged exposure therapy for PTSD: Emotional processing of traumatic experiences: Therapist guide*. New York, NY: Oxford University Press.

Foa, E. B., Keane, T. M., Friedman, M. J., & Cohen, J. A. (Eds.). (2009). *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies*. New York, NY: Guilford Press.

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99,* 20–35. doi:10.1037/0033-2909.99.1.20

Foa, E. B., Steketee, G., & Rothbaum, B. O. (1989). Behavioral/cognitive conceptualizations of post-traumatic stress disorder. *Behavior Therapy, 20,* 155–176. doi:10.1016/S0005-7894(89)80067-X

Gartner. (2010). *Gartner Highlights Key Predictions for IT Organizations and Users in 2010 and Beyond*. Retrieved from http://www.gartner.com/newsroom/id/1278413

Gilson, M., Freeman, A., Yates, M. J., & Freeman, S. M. (2009). *Overcoming depression: A cognitive therapy approach*. New York, NY: Oxford University Press.

Gros, D. F., Yoder, M., Tuerk, P. W., Lozano, B. E., & Acierno, R. (2011). Exposure therapy for PTSD delivered to veterans via telehealth: Predictors of treatment completion and outcome and comparison to treatment delivered in person. *Behavior Therapy, 42,* 276–283. doi:10.1016/j.beth.2010.07.005

Hembree, E. A., Foa, E. B., Dorfan, N. M., Street, G. P., Kowalski, J., & Tu, X. (2003). Do patients drop out prematurely from exposure therapy for PTSD? *Journal of Traumatic Stress, 16,* 555–562. doi:10.1023/B:JOTS.0000004078.93012.7d

Hope, D. A., Heimberg, R. G., & Turk, C. L. (2010). *Managing social anxiety: A cognitive-behavioral therapy approach* (2nd ed.). New York, NY: Oxford University Press.

Institute of Medicine. (2008). *Treatment of posttraumatic stress disorder: An assessment of the evidence*. Washington, DC: National Academies Press.

International Society for Traumatic Stress Studies. (2009). Cognitive-behavioral therapy for adults. In E. B. Foa, T. M. Keane, M. J. Friedman, & J. A. Cohen (Eds.), *Effective treatments for PTSD,* (2nd ed., pp. 549–558). New York, NY: Guilford Press.

Karlin, B. E., Brown, G. K., Trockel, M., Cunning, D., Zeiss, A. M., & Taylor, C. B. (2012). National dissemination of cognitive behavioral therapy for depression in the department of veterans affairs health care system and patient-level outcomes. *Journal of Consulting and Clinical Psychology, 80,* 707–718. doi:10.1037/a0029328

Karlin, B. E., Ruzek, J. I., Chard, K. M., Eftekhari, A., Monson, C. M., Hembree, E. A., . . . Foa, E. B. (2012). Dissemination of evidence based psychological treatments for posttraumatic stress disorder in the Veterans Health Administration. *Journal of Traumatic Stress, 23,* 663–673. doi:10.1002/jts.20588

Kazantzis, N., & Deane, F. P. (1999). Psychologists' use of homework assignments in clinical practice. *Professional Psychology: Research and Practice, 30,* 581–585. doi:10.1037/0735-7028.30.6.581

Kazantzis, N., Deane, F. P., & Ronan, K. R. (2000). Homework assignments in cognitive and behavioral therapy: A meta-analysis. *Clinical Psychology: Science and Practice, 7,* 189–202. doi:10.1093/clipsy.7.2.189

Kazantzis, N., Whittington, C., & Dattilio, F. (2010). Meta-analysis of homework effects in cognitive and behavioral therapy: A replication and extension. *Clinical Psychology: Science and Practice, 17,* 144–156. doi:10.1111/j.1468-2850.2010.01204.x

Luxton, D. D., McCann, R. A., Bush, N. E., Mishkind, M. C., & Reger, G. M. (2011). mHealth for mental health: Integrating smartphone technology in behavioral healthcare. *Professional Psychology: Research and Practice, 42,* 505–512. doi:10.1037/a0024485

Mausbach, B. T., Moore, R., Roesch, S., Cardenas, V., & Patterson, T. L. (2010). The relationship between homework compliance and therapy outcomes: An updated meta-analysis. *Cognitive Therapy and Research, 34,* 429–438. doi:10.1007/s10608-010-9297-z

Powers, M. B., Halpern, J. M., Ferenschak, M. P., Gillihan, S. J., & Foa, E. B. (2010). A meta-analytic review of prolonged exposure for posttraumatic stress disorder. *Clinical Psychology Review, 30,* 635–641. doi:10.1016/j.cpr.2010.04.007

Reger, G. M., Holloway, K. M., Candy, C., Rothbaum, B. O., Difede, J., Rizzo, A. A., & Gahm, G. A. (2011). Effectiveness of virtual reality exposure therapy for active duty soldiers in a military mental health clinic. *Journal of Traumatic Stress, 24,* 93–96. doi:10.1002/jts.20574

Rizvi, S. L., Dimeff, L. A., Skutch, J., Carroll, D., & Linehan, M. M. (2011). A Pilot Study of the DBT coach: An interactive mobile phone application for individuals with borderline personality disorder and substance use disorder. *Behavior Therapy, 42,* 589–600. doi:10.1016/j.beth.2011.01.003

Rosen, C. S., Chow, H. C., Finney, J. F., Greenbaum, M. A., Moos, R. H., Sheikh, J. I., & Yesavage, J. A. (2004). VA practice patterns and practice guidelines for treating posttraumatic stress disorder. *Journal of Traumatic Stress, 17,* 213–222. doi:10.1023/B:JOTS.0000029264.23878.53

Rothbaum, B. O., Anderson, P., Zimand, E., Hodges, L., Lang, D., & Wilson, J. (2006). Virtual reality exposure therapy and standard (in vivo) exposure therapy in the treatment of fear of flying. *Behavior Therapy, 37,* 80–90. doi:10.1016/j.beth.2005.04.004

Rothbaum, B. O., Foa, E. B., & Hembree, E. A. (2007). *Reclaiming your life from a traumatic experience: Workbook.* New York, NY: Oxford University Press.

Santa Ana, E. J., Stallings, D. L., Rounsaville, B. J., & Martino, S. (2011). Development of an in-home telehealth program for outpatient veterans with substance use disorders. *Psychological Services.* Advance online publication. doi:10.1037/a0026511

Schnurr, P. P., Friedman, M. J., Engel, C. C., Foa, E. B., Shea, M. T., Chow, B. K., . . . Bernarday, N. (2007). Cognitive behavioral therapy for posttraumatic stress disorder in women: A randomized controlled trial. *Journal of the American Medical Association, 297,* 820–830. doi:10.1001/jama.297.8.820

Schopp, L., Johnstone, B., & Merrell, D. (2000). Telehealth and neuropsychological assessment: New opportunities for psychologists. *Professional Psychology: Research and Practice, 31,* 179–183. doi:10.1037/0735-7028.31.2.179

Seal, K. H., Metzler, T. J., Gima, K. S., Bertenthal, D., Maguen, S., & Marmar, C. R. (2009). Trends and risk factors for mental health diagnoses among Iraq and Afghanistan veterans using Department of Veterans Affairs health care, 2002–2008. *American Journal of Public Health, 99,* 1651–1658. doi:10.2105/AJPH.2008.150284

Stewart, R. E., & Chambless, D. L. (2007). Does psychotherapy research inform treatment decisions in private practice? *Journal of Clinical Psychology, 63,* 267–281. doi:10.1002/jclp.20347

Sundin, J., Fear, N. T., Iversen, A., Rona, R. J., & Wessely, S. (2010). PTSD after deployment to Iraq: Conflicting rates, conflicting claims. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 40,* 367–382.

Weathers, F. W., Huska, J., & Keane, T. M. (1991). *The PTSD Checklist Military Version (PCL-M).* Boston, MA: National Center for PTSD.

E-Mail Notification of Your Latest Issue Online!

Would you like to know when the next issue of your favorite APA journal will be available online? This service is now available to you. Sign up at http://notify.apa.org/ and you will be notified by e-mail when issues of interest to you become available!