

How to Implement Therapeutic Evaluative Conditioning in a Clinical Setting

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Self-injurious behaviors (SIBs), including both suicidal and nonsuicidal self-injury, are major public health problems that have been on the rise in recent decades. There are few effective SIB interventions, and those that are effective cannot reach most people who are in need of help—that is, these interventions are not scalable. To address this need, we recently developed a scalable, app-based treatment called Therapeutic Evaluative Conditioning (TEC) that preliminary studies have shown causes reductions in SIBs (Franklin et al., 2016). Although TEC was developed and evaluated as a standalone, self-administered intervention, it may also be a valuable therapeutic tool within traditional clinical settings. Here we provide a case illustration of a young adult female who presented at an outpatient clinic with a long history of self-injurious behaviors and multiple failed treatment attempts. In discussing this case, we describe how to implement TEC within such a setting and what might be expected as a result. © 2017 Wiley Periodicals, Inc. *J. Clin. Psychol.*: In Session 73:559–569, 2017.

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Self-injurious behaviors (SIBs), including suicidal and nonsuicidal self-injury (NSSI), are major public health problems. Suicide is the 10th leading cause of death in the United States, and the second leading cause of death among adolescents and young adults (Centers for Disease Control and Prevention [CDC], 2015). Moreover, there are approximately 25 nonfatal suicide attempts for every suicide death, producing an estimated one million nonfatal suicide attempts in the United States each year. These behaviors are a particularly big problem for older adolescents and young adults, for whom there are an estimated 100 to 200 nonfatal suicide attempts per suicide death (CDC, 2015). It is estimated that, each year, millions of additional Americans engage in nonsuicidal self-injurious behaviors, such as self-cutting or self-burning (Franklin & Nock, in press). Although these behaviors are nonsuicidal by definition, they negatively affect physical and mental health and are among the strongest risk factors for future suicidal behaviors (Franklin et al., 2017; Ribeiro et al., 2016).

The scope and severity of this problem has prompted tremendous clinical, research, and national policy efforts over the past few decades, but there has been no impact on the national suicide rate. Whereas the rates of homicide and deaths due to motor vehicle accidents have declined sharply over the past 30 years (CDC, 2015), the national suicide rate has not declined. In fact, the suicide rate has increased by nearly 25% since the year 1999 (CDC, 2015). Given the strong associations among suicide, nonfatal suicide attempts, and NSSI (Franklin & Nock, in press), it is likely that these other SIBs have followed a similar trajectory. As described below, there are at least two major reasons for this lack of progress: (a) few scalable treatments and (b) a paucity of effective treatments.

Because millions of people engage in SIBs each year, an intervention that can easily reach millions of people is necessary to produce a sizable reduction in these behaviors. Traditional interventions, which involve a therapist meeting with a single client or a group of clients in

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person, have an inherently limited scale. There are an estimated 700,000 mental health care professionals (broadly defined) in the United States, but an estimated 80,000,000 people in the United States meet criteria for a mental disorder each year (Kazdin & Rabbitt, 2013). As a result, there is roughly one mental healthcare professional for every 115 people in need of mental healthcare. This large imbalance makes it impossible for many people in need to connect with a mental healthcare professional.

For individuals for whom access is possible, other barriers often prevent connection with a mental healthcare professional, including high costs, prohibitive time commitments, and the desire to handle one's own problems, particularly for sensitive issues like SIBs (e.g., Mojtabai et al., 2011). These barriers to scalable intervention help to explain why most individuals who engage in self-injurious thoughts and behaviors do not receive treatment (Bruffaerts et al., 2011). New intervention delivery strategies are needed to overcome these barriers. In particular, strategies to integrate new technologies may have the potential to reach billions of people for little or no cost to the consumer (Rabbitt & Kazdin, 2013).

Progress in large-scale SIB reduction has also been hindered by a lack of effective interventions (Ward-Ciesielski & Linehan, 2014). Although anecdotal accounts and single-group pilot studies have suggested many promising potential treatments, few randomized controlled trials (~75), considered necessary for determining the value of a given treatment above and beyond controls or placebos, have been conducted with SIBs as an outcome (Ward-Ciesielski & Linehan, 2014). Unfortunately, these gold standard trials have produced few significant treatment effects.

At present, this literature suggests that antidepressants, antipsychotics, hospitalization (with or without additional intervention protocols), caring letters or phone calls, and most cognitive-behavioral interventions likely do not produce any SIB reductions (Ward-Ciesielski & Linehan, 2014). Even the most promising interventions have produced mixed results. For example, some studies have found that dialectical behavior therapy reduces suicidal behaviors (e.g., Linehan et al., 2006), but others have obtained null findings (e.g., McMain et al., 2009). Contrary to the beliefs of many, randomized controlled trials have not shown that dialectical behavior therapy reduces NSSI (see, e.g., Linehan et al., 2006, p. 763). Moreover, meta-analyses indicate that cognitive-behavioral interventions have, at best, a small effect on suicidal behaviors after publication bias is considered (Tarrier, Taylor, & Gooding, 2008).

Although researchers and clinicians have exerted tremendous effort in developing, implementing, and evaluating potential SIB interventions, most of these therapeutic tools are ineffective at reducing these dangerous behaviors. Taken together, the existing literature indicates that both the format and content of traditional interventions limit their ability to affect SIBs on a national or international scale; a new approach is necessary.

To address this need, we developed a web-based intervention called Therapeutic Evaluative Conditioning (TEC). The web-based format of TEC allows it to overcome many of the barriers described above: it is accessible to any computer, tablet, or phone with an Internet connection; it is available for free via Apple and Android app stores¹; and it is confidential or anonymous. In other words, a large proportion of people around the world can access this intervention immediately, freely, and privately. However, accessibility is only one part of the equation: a successful large-scale intervention also has to be effective at reducing SIBs. One option was to try to adapt traditional interventions into a web-based format, but, as described above, evidence suggests that most of these interventions are not effective. Another option was to build a new treatment from the ground up, using fundamental psychological principles and experimental data about SIBs to build toward a new intervention. Two streams of research informed the treatment targets of our intervention, TEC.

¹A 'native app' version of TEC is available for free for Apple and Android devices. For Apple devices, it can be found on iTunes at: <https://itunes.apple.com/us/app/tec-tec/id1114356340?mt=8>. For Android devices, it can be found on Amazon at: <https://www.amazon.com/Tec-LLC-tec/dp/B01H9C7ISS?ie=UTF8&redirect=true>.

First, TEC aims to change how people feel about self-injury, suicide, and death. Joiner (2005) proposed that, to overcome survival instincts, people who engage in suicidal behaviors must have a reduced fear of death or injury. This fear acts as a major barrier to suicidal behaviors for most people: Even if an individual has a strong desire for suicide, they will not engage in suicidal behaviors unless they are “capable” of side-stepping or overcoming the evolutionarily conserved instinct to avoid pain, injury, and death (Joiner, 2005). In subsequent studies, we found that people with a history of SIBs showed positive emotional reactions to pictures and words related to self-mutilation, suicide, and death (Franklin, Lee, Puzia, & Prinstein, 2014). We later discovered that the more positively someone responded to these pictures and words, the more likely they were to engage in future SIBs (Franklin, Puzia, Lee, & Prinstein, 2014). This latter finding suggested that this fearlessness about SIBs may play a direct role in these behaviors, and that if we could increase fear of SIBs, it might prevent these behaviors. In other words, by conditioning aversion toward injury, death, and suicide, we may be able to establish a major barrier to suicidal behaviors. As described below, we accordingly designed TEC to make people feel aversion toward SIBs.

Second, TEC aims to change how people feel about themselves. Most people possess an extremely positive association with themselves, but others have high levels of self-criticism, self-disgust, self-hatred, and similar constructs. This negative association with oneself is a major reason why some people engage in direct self-injury (i.e., nonsuicidal and suicidal self-injury) instead of indirect self-injury (e.g., substance abuse, risky behaviors; St. Germain & Hooley, 2012). Recent experimental studies show that a negative association with the self leads to beliefs that one deserves pain, punishment, and even death, and that self-administering pain reduces self-criticism (Fox, Toole, Franklin, & Hooley, 2016). Moreover, a brief cognitive intervention aimed at reducing self-criticism reduces the willingness of self-injurers to endure pain (Hooley & St. Germain, 2014). We reasoned that training people to feel more positively about themselves would lower the desire to injure oneself, thereby reducing SIBs.

To attack its two treatment targets—fearlessness about SIBs and a negative association with the self—TEC draws on a technique called evaluative conditioning. This technique essentially involves pairing two stimuli to change how people feel about one of the stimuli (see Hoffman et al., 2010). For example, if a picture of a blue circle were repeatedly paired with a picture of a snake, eventually most people would come to dislike the blue circle. This technique is identical to Pavlovian conditioning with the exception that it involves an additional evaluation component (i.e., participants evaluate whether they like/dislike the target stimulus more). Although it has commonly been employed in social psychology research for several decades, evaluative conditioning has only recently been used in clinical psychology, where it has been applied to treat anxiety, substance use, and eating disorders (see Hoffman, 2010). With TEC, we aimed to use these basic conditioning principles to create an effective treatment for SIBs.

In considering how to design TEC, we reasoned that we needed to advance beyond traditional evaluative conditioning techniques, most of which are passive. That is, most of these traditional paradigms instruct a person to watch a screen as different images slowly scroll by or to click a button when they see a certain picture or after a certain time interval. We endeavored to make TEC more engaging. Specifically, we designed TEC as a brief and replayable matching game that becomes progressively more challenging and rewards faster and more correct matches with points.

As shown in Figure 1, at the start of each instance or “game” of TEC, the user is presented with three pairs of stimuli. One of the pairs is designed to increase fear of SIBs by pairing SIB-related stimuli with unpleasant stimuli; another of the pairs is intended to increase a positive association with the self by pairing self-related words with pleasant stimuli; and the final pair involves two neutral stimuli and is included to make the game more challenging by adding an additional match to keep in mind (i.e., it does not have any direct therapeutic purpose). These three types of pairs remain the same across each game, but the specific stimuli within each pairing changes randomly. For example, a noose and a picture of a spider may serve as the “SIBs are bad” pairing for one game, and the word “suicide” and a picture of an infected toenail may serve as the stimuli for this pairing for another game.

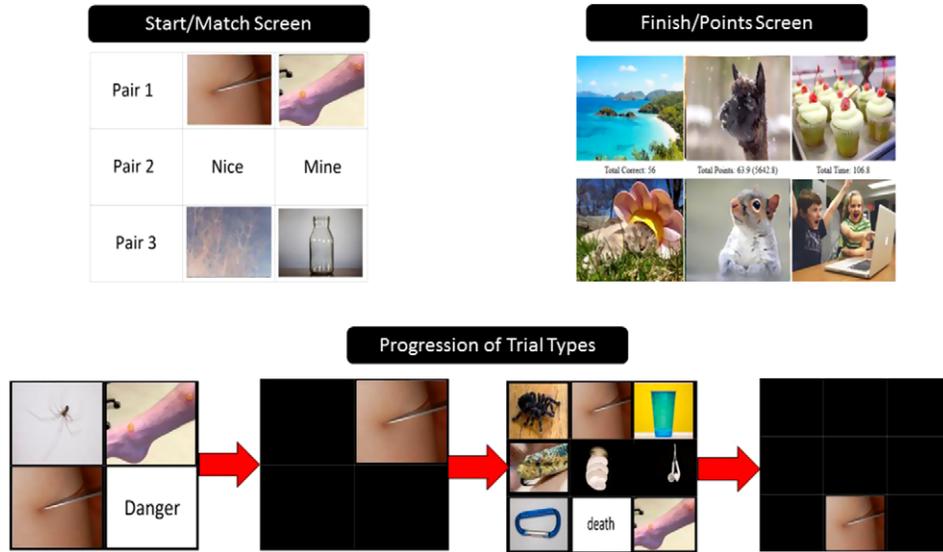


Figure 1. TEC for SIBs screen and trial types.

Note. TEC begins with a screen that displays the three matches/pairs for that particular game. The next 60 trials/screens are the active component of TEC. The first 15 trials are a simple 2 x 2 grid; the second 15 trials mask all other stimuli once the first stimulus is selected; the third 15 trials move to a larger 3 x 3 grid; and the final 15 trials include the masking effect within this larger grid. The game finishes with a screen that shows pleasant pictures as a positive mood induction and shows the score for that game and total points across all games played.

On each subsequent trial or “screen,” one (and only one) of these matches will appear within a grid of other stimuli. The goal of TEC is to locate and select the correct pair on each screen as quickly as possible. The faster this selection is made, the more points that are given. Once a selection is made, whether correct or incorrect, the game instantly moves to the next screen. This continues for 60 screens of TEC. As illustrated in Figure 1, the first 15 screens are a simple 2x2 grid; the second 15 screens are more challenging because all other stimuli are masked once the first stimulus is selected; the third 15 screens are even more challenging because they move to a 3x3 grid; and the final 15 screens are most challenging of all because the masking effects occur within the 3x3 grid. At the end of the game, a screen appears that displays pleasant pictures as a positive mood induction, points and other information about that game, and a button that allows the user to immediately begin another game with new pairs.

We believed that this more engaging design would have two main benefits over typical evaluative conditioning paradigms. First, because it necessitates memorizing specific stimulus pairings and repeatedly locating those pairings in increasingly difficult circumstances under time pressure, it requires greater attention and promotes stronger therapeutic associations. As a result, associations between concepts like “me” and “good” and “suicide” and “scary” may quickly become ingrained and automatic. Second, because it is brief (typically taking only 1–2 minutes to play a game), game-like, and mobile, it motivates frequent and continued use. This further strengthens the therapeutic associations.

After developing a web app version of TEC (i.e., a version accessible to any device with an Internet connection), we conducted a randomized controlled trial to investigate whether it had any effect on SIBs (Franklin et al., 2016). Because TEC is intended primarily for use outside of the clinic or hospital, we wanted to test it in a way that was consistent with this intention. To accomplish this, we recruited 114 people from around the world with a recent history of SIBs from online forums that focused on topics related to suicide and self-injury. Participants were told that they would be paid to play a matching game online, and that the game would include words and images that may be unpleasant, including images related to

self-injury. They were then randomly assigned to receive either TEC or a control intervention that was the same as TEC but included only neutral pairings. Of note, participants were not told that this game was designed as a potential treatment for SIBs because we did not yet know the efficacy of TEC and did not want to induce the placebo effect. Throughout the month-long treatment portion of the study, participants were allowed to access TEC as often as they desired.

We hoped that this initial study would provide a small treatment effect that we could explore and build upon; surprisingly, the results exceeded these expectations. Compared to the control group, the TEC group showed large reductions in nonsuicidal self-cutting (35%), suicide plans (33%), and suicidal behaviors (47%). These findings held after controlling for prior month SIBs, emotion dysregulation, depressive symptoms, psychiatric treatment history, desire to stop SIBs, and self-prediction of future SIBs. These findings represented some of the first-ever significant reductions in NSSI and suicide plans in a randomized controlled trial and some of the largest-ever reductions in suicidal behaviors. Although encouraging, we were cautious about these results because most scientific findings that exceed expectations cannot be replicated.

To examine the replicability of these findings, we conducted a second randomized controlled trial with nearly identical methods and a slightly larger sample of 131 people with a recent SIB history (Franklin et al., 2016). In contrast to the first version of this study, in this second version our consent form informed participants that “some participants will be assigned randomly (by chance, like flipping a coin) to a group that includes a treatment that we hope will help people with behaviors that are hard to control. We are trying to see if it works.” Results were weaker for all outcomes, although reductions in nonsuicidal self-cutting (40%) and suicidal behaviors (33%) were still significant. These findings suggested that TEC still held promise as a potentially effective intervention for SIBs, but the magnitude and consistency of effects were now less clear.

To investigate whether the results of Study 1 were overly optimistic or the results of Study 2 were overly pessimistic, we conducted a third randomized controlled trial with an even larger sample of 163 participants (Franklin et al., 2016). Differing slightly from the first two studies, this study included a version of TEC more directly focused on suicidal behaviors and all participants were selected on the basis of a history of recent suicidal behaviors. Results revealed a robust treatment effect, with significant reductions in nonsuicidal self-cutting (32%), suicide plans (59%), and suicidal behaviors (77%).

Taken together, these three randomized controlled trials support the possibility that TEC is an effective treatment for SIBs. We emphasize, however, that many further studies are needed to provide additional evaluations of TEC and many improvements are needed to make the effects of TEC more powerful and durable. For example, results indicated that most TEC effects did not extend beyond the treatment month, suggesting that TEC must be used regularly in order to confer benefits. Additionally, most participants only accessed TEC for about ten minutes per week; ideally, the design of TEC would motivate more frequent use. As noted earlier, results held even after accounting for participants’ desire to stop (or continue) engaging in SIBs. This is consistent with the possibility that approaches like TEC (i.e., approaches that include a game-like format that can be accessed at any time) may not require as much motivation for treatment as traditional approaches. Nevertheless, TEC would clearly benefit from several improvements that may motivate much greater use.

We are currently conducting studies on advanced versions of TEC that tailor stimuli and treatment targets to each person, additional gamification elements to motivate more frequent TEC use, and a virtual reality version of TEC to condition more powerful associations. In the meantime, the initial version of TEC is available to clinicians and the public for free via multiple app stores (see Footnote 1). Although, thus far, TEC has been tested as a standalone scalable intervention, it may also be valuable as an addition to interventions for disorders that often co-occur with SIBs (e.g., mood and anxiety disorders, borderline personality disorder). Below, we provide a case illustration of how TEC might be integrated into a traditional therapeutic approach.

Case Illustration

Presenting Problem and Client Description

Samantha (a pseudonym) was a 27-year-old White homosexual female. She presented at an outpatient clinic in December 2015. This was Samantha's third time at the clinic. The first was in May 2013 for two therapy sessions. She returned in July 2015, attending 10 outpatient therapy sessions. Her most recent return was prompted by a discharge from an intensive outpatient program. After receiving services for one month, staff at the program informed Samantha that the services they could provide were not sufficient to meet her needs, given the severity of her psychopathology and self-injurious behaviors; as such, she was asked to pursue treatment elsewhere.

Samantha was born in a small suburb of a major Midwestern city. She excelled athletically and academically, graduating with honors at a prestigious Midwestern university with bachelor's degree. She subsequently moved to Florida. At the time she was seeking services, Samantha was single, unemployed, and residing alone while receiving psychiatric disability. She reported generally positive social interactions, though limited in scope.

Mood symptoms were prominent for Samantha. She reported these first emerged at the age of 16, following the divorce of her parents. She described periods of depression that lasted roughly 3 months on average. Typically, these episodes were characterized by anhedonia, insomnia, loss of appetite, feelings of worthlessness, inappropriate guilt, concentration difficulties, and suicidal thoughts and behaviors. At the time of her intake session, she reported that she had more episodes than she could count. When Samantha's symptoms of depression would become severe, auditory hallucinations were common. Most often, she would hear voices encouraging her to kill herself, telling her that she was evil, and/or instructing her not to trust other people.

At the age of 19, Samantha experienced her first manic episode. This episode included diminished sleep (between 0 and 3 hours, per her report), inflated self-esteem, agitation, increased talkativeness, distractibility, and increased engagement in risky behaviors (namely, overspending, substance abuse, and reckless driving). To date, she has suffered from two additional manic episodes. She was hospitalized twice due to the severity of her manic symptoms, which lasted between 5 and 14 days.

Samantha had an extensive history of suicidal behavior. She reported 12 prior suicide attempts, ranging in method and severity. Her first suicide attempt was at the age of 18. Her most severe attempt occurred one year ago and involved a near-lethal overdose. She described a well-detailed, high-lethality suicide plan and, at the time of intake, acknowledged access to means. She noted constant suicidal thoughts but fluctuating suicidal intent.

She also engaged in NSSI, most commonly self-cutting. She reported that these behaviors began at age 16. Medical attention was required more times than she could recall, and she had extensive scarring on her extremities. She reported experiencing sudden mood changes that would last a few hours, which often preceded her NSSI. She also reported that NSSI was helpful in alleviating symptoms of dissociation.

Treatment history was also extensive. Samantha reported approximately 15 inpatient hospitalizations. Along with intensive outpatient treatment in 2015, she had received extensive outpatient services since the age of 18. She had been prescribed a range of psychotropic medication and had received a full course of bilateral electroconvulsive therapy. At the time she presented for intake at the clinic, she reported full medication compliance, but denied any noticeable effects. She felt that no treatment had yet provided any significant or lasting relief from her symptoms.

Case Formulation

At the time she presented at the clinic, Samantha met criteria for bipolar I disorder, severe with psychotic features and borderline personality disorder, when assessed using the Structured Clinical Interview for DSM-5. At the time of intake, her bipolar symptoms were responding well to medication. Samantha reported that her self-cutting and suicidal thoughts and behaviors were her most distressing and impairing symptoms. Because these symptoms were also the

most prominent and potentially life threatening, they were identified as the initial treatment targets.

One critical factor that facilitated Samantha's SIBs was her fearlessness about self-injury, death, and suicide. She reported no fear of self-inflicted pain or injury and only a mild fear of death. This claim was supported by her performance on the SIB version of a sequential priming test called the Affect Misattribution Procedure (see Franklin et al., 2016). This test measures implicit affect (i.e., unconscious feelings) toward objects and concepts. Samantha's test indicated that she possessed positive unconscious feelings toward self-injury, suicide, and death, echoing her self-reports. She noted that she was initially fearful of SIBs and often needed hours to work up the courage to engage in these behaviors. After a few months, however, she felt little fear or hesitation about engaging in SIBs and actually began to enjoy the behaviors and things related to the behaviors (e.g., blood, knives, scars). Although she acknowledged having fear of pain and injury from self-cutting when she first started engaging in the behaviors, she noted that is no longer the case.

This pattern is consistent with evidence that fearlessness about SIBs is behaviorally conditioned rather than natural or biological. Recent research indicates that self-injury (specifically, the removal of a painful stimulus during self-injury) simultaneously reduces negative feelings and increases positive feelings (Franklin et al., 2013). This intense state of relief then becomes paired with self-cutting and things associated with self-cutting. Self-cutting becomes reinforced because it begins to predict relief, and related stimuli (e.g., blood) become reinforced because they are present at the same time as relief.

Samantha additionally endorsed the faulty thoughts that suicide would be an easy alternative to problem solving difficult situations. These thoughts provided her with a sense of relief, which served to negatively reinforce suicidal thinking. Other faulty assumptions about SIBs (e.g., "cutting is the only thing that will help," "suicide would be easier than living") further interfered with change by preventing the use of healthier coping strategies. When she did engage in more effective behaviors (e.g., direct problem solving), outcomes were often either not positively reinforcing (i.e., neutral or negative) or positive reinforcement was delayed.

In addition to Samantha's fearlessness about SIBs, she had highly perfectionistic standards, trouble with setting graduated goals, and difficulties managing her behavior with strategies other than self-punishment. These behavioral patterns perpetuated severe self-criticism, which further facilitated SIBs. Regardless of circumstance, Samantha would readily blame herself when she was unable to meet her high and, at times, unrealistic expectations, often pointing to these "failures" as evidence of her flaws. When she perceived failure, Samantha regularly expressed self-hatred and self-disgust. Her performance on the self-criticism version of the Affect Misattribution Procedure (see Franklin et al., 2016) was consistent with these reports, indicating strong negative unconscious feelings toward herself. In sum, not only did Samantha believe she deserved pain and punishment because of her perceived failures, she also feared that she would continue to fall short unless she punished herself.

Because TEC for SIBs targets both of these major risk factors (i.e., fearlessness about SIBs; negative feelings toward herself), it was selected as a treatment tool for Samantha. Given her reports that she typically spends up to 8 hours per day using her smartphone, it was further reasoned that TEC may fit well with Samantha's lifestyle, allowing her to access treatment in the context of her normal daily phone use.

Course of Treatment and Assessment of Progress

Treatment comprised eight sessions of individual therapy and 2 months of TEC. Target outcomes (i.e., suicidal and self-injurious behaviors) were assessed weekly in session. Hypothesized maintaining factors (i.e., fearlessness about SIBs; negative feelings toward the self) were also assessed regularly using implicit behavioral measures (i.e., SIB and self-criticism versions of the Affect Misattribution Procedure) and questionnaires (i.e., self-ratings scale for self-criticism; acquired capability for suicide/self-injury scale).

Pretreatment for TEC consisted of one session that focused on rationale and obtaining a commitment to treatment. In this session, Samantha was provided with information about TEC,

including the theory underlying TEC and the empirical evidence supporting its effectiveness. As part of this discussion, evaluative conditioning principles were explained. Samantha was also fully informed about the graphic and disturbing nature of some of the images included in TEC and the rationale supporting the inclusion of these images. Samantha acknowledged understanding the rationale for the intervention and remained interested in trying TEC. The remainder of the session focused on learning how to play TEC and setting goals for the following session. To ensure Samantha understood how to play TEC, she was asked to try playing the game in session. Samantha denied any difficulties in playing the game. Although she acknowledged some disgust toward the non-SIB-related unpleasant images, particularly the images of infections, she noted that these images “weren’t that bad” and was willing to try TEC at home.

In collaboration with Samantha, an initial goal of obtaining 500 points per week was established. This would equate to roughly seven games of TEC between sessions. A simple reward system was also discussed with Samantha, to increase play. In collaboration with Samantha, a list of positive reinforcers was created. Although she had some difficulty generating options, she identified several potential options that she felt would be easily doable and positively reinforcing (e.g., purchasing her favorite treat at a local coffee house). She was encouraged to reward herself with one of these options for every 1,000 points she earned.

Individual therapy sessions were scheduled once a week following the initial pretreatment session. Suicide risk was regularly assessed in session to monitor for risk of imminent suicidal behavior. After completing assessments of treatment targets and maintaining factors, the focus of each session was twofold: first, to discuss any barriers to TEC and, second, to establish goals for TEC (i.e., number of points to target) over the following week. Samantha appeared genuinely open to the individual therapy sessions, as evidenced by her high-level of attendance across treatment as well as her consistent engagement and positive demeanor during sessions.

Outcome and Prognosis

Samantha responded very well to TEC, with considerable reductions in the frequency of self-cutting and suicide plans, and reported no suicidal behaviors (see Figure 2). Reductions were steep across the first few weeks of treatment and continued to decline slowly thereafter. Samantha’s explicit and implicit levels of self-criticism and fearlessness about SIBs also decreased over the course of treatment (see Figure 2).

At the final session, Samantha reported a generally positive experience with TEC. She noted that she found TEC to be engaging and fun, though she became a little less interested in playing toward the end of treatment. During the first few weeks of treatment, she earned 5,000–10,000 points per week and gradually declined to 500–1,000 points per week. Samantha indicated that the novelty of the game wore off over time, and she felt like she did not need to use the app as much in later weeks because her self-cutting and suicide plans had stopped. She noted that this was these past few weeks were the longest she had gone without engaging in SIBs in several years, and that she felt no urge to engage in the behaviors for the first time since her teenage years. Samantha reported that the app-based treatment’s privacy, mobility, and ease of play were particularly appealing to her. Samantha acknowledged some benefit from in-person therapy sessions, noting that she had a good relationship with her therapist and that individual therapy sessions kept her accountable for completing her therapy homework. Despite these benefits, she expressed finding little utility in the meetings for reducing her mood symptoms.

Clinical Practices and Summary

Samantha’s treatment response was similar to that observed in studies on TEC (Franklin et al., 2016). Specifically, her SIBs declined swiftly, but so too did her use of TEC. Little is known about how TEC treatment effects might endure after TEC cessation. Existing studies have suggested that TEC benefits may decline, but this is not because people in the TEC groups began engaging in SIBs once treatment stopped; rather, it is because people in the control groups began to slowly improve across the course of the study (see Franklin et al., 2016). It is accordingly likely that Samantha will continue to engage in few SIBs, but her SIB abstinence would be more likely if

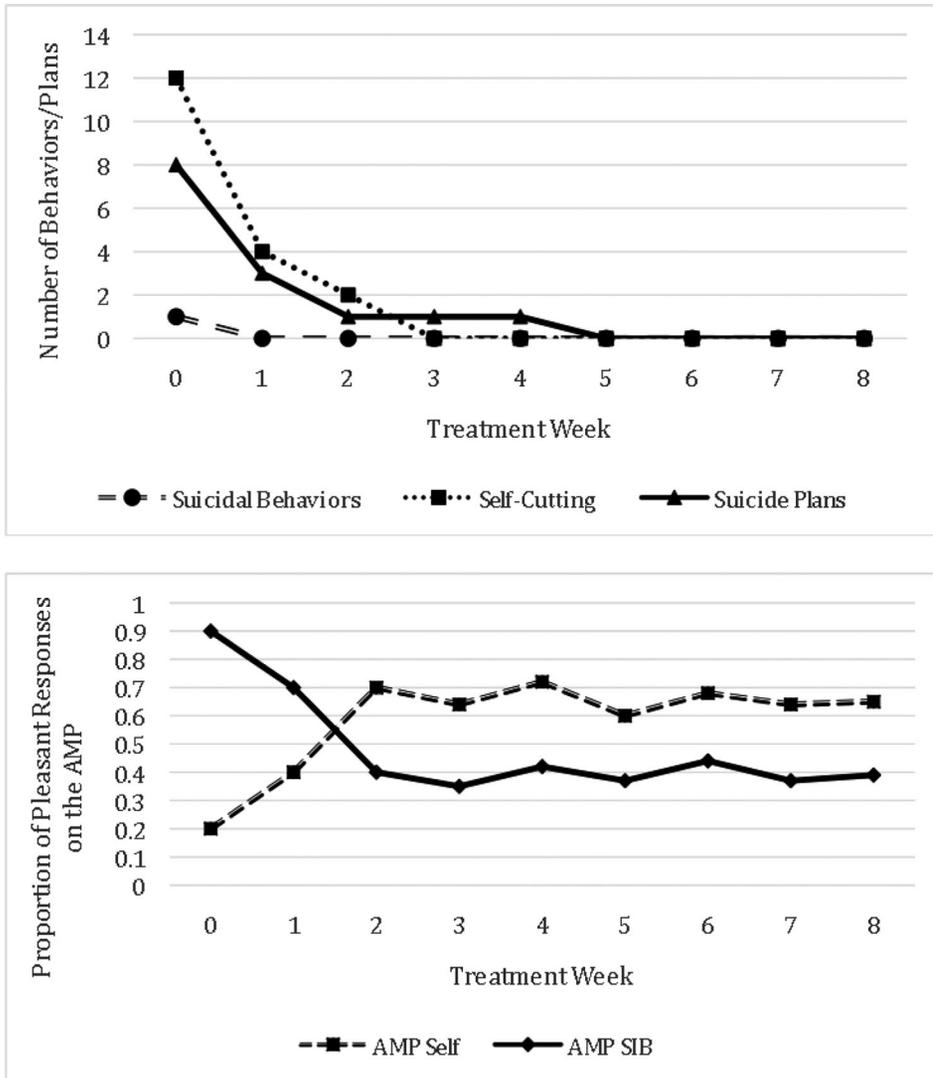


Figure 2. TEC treatment effects.

Note. The top panel shows the course of self-cutting, suicide plans, and suicidal behaviors (i.e., interrupted, aborted, and actual attempts) across the week before treatment (Week 0) through the end of treatment (Week 8). The bottom panel shows the same course of the two primary treatment target measures.

AMP = Affect Misattribution Procedure (self-criticism and SIB versions); higher scores on the AMP indicate more positive feelings toward that category. This graph depicts a decrease in negative feelings toward the self and an increase in negative feelings toward SIBs.

she continued to play TEC. Unfortunately, as noted above, the replay value of TEC may not extend beyond a few hundred games. Although this replay value is sufficient for a short-term therapy, it is insufficient for a longer term preventative tool. To improve on this weakness, our team is currently evaluating advanced versions of TEC to determine whether these new additions make TEC's effects more powerful and enduring. If these changes are shown to be helpful, the TEC apps for Samantha and thousands of other users will automatically (and freely) update to include these advances.

In summary, there are few effective or scalable interventions for SIBs. The current version of TEC represents a step forward, but there is still a long way to go. Although it was designed to be

able to be used as a private, standalone, self-administered intervention, TEC may also serve as a valuable tool to address SIBs in the context of a more traditional therapeutic approach. TEC's game-like design and app-based format make it ideal for use as therapeutic homework between sessions, and its points-based system allows both therapist and client to set specific goals for use. We aim to improve TEC in the near future but hope that the current version will assist clinicians in reducing these dangerous and deadly behaviors.

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