



Pilot Studies and Clinical Evaluations

EBT Promotes Resilience in Less than 3 Minutes

According to neuroscientist [Michael Merzenich, PhD](#), the father of neuroplasticity, “If there ever were a solution to a health problem, it will not be chemical. It will be brain training for only resilience can confer lasting benefits.”

As most health problems are caused or exacerbated by stress, [the brain is the central organ](#) of stress and adaptation. Rewiring the circuits that cause [stress overload](#) into circuits that promote stress resilience is a science-based, novel approach to healthcare. This approach was developed in 2007 with the discovery of the EBT 5-Point System of Emotional and Behavioral Regulation and was followed by the proposal of [a new healthcare paradigm](#) of rewiring the stress response based on that premise, which was proposed in 2011 as Emotional Brain Training (EBT).

Interest in neural circuits that activate physiology (chemicals, electricity, organs, and organ systems) has predated EBT. Joseph LeDoux proposed [rethinking the emotional brain](#) based on survival circuits. The NIH [Human Connectome Project](#) aimed at mapping the neural circuits of the [human brain](#) to produce a body of data that will facilitate research into common health problems and disorders. Thomas Insel, MD, director of the National Institutes of Mental Health for 15 years, urged a transition away from psychological conflicts or chemical imbalances to brain disorders or [“faulty circuits.”](#)

At UCSF, researchers focused on the development of a method that was overarching. As all faulty circuits cause stress overload and are “reactive circuits” and all adaptive circuits cause resilience and are “resilient circuits,” circuits can be categorized as reactive or resilient. By using techniques for awareness of circuits and tools to switch from reactive to resilience circuits, physiology, emotions, thoughts, and behaviors can spontaneously and rapidly improve. These tools could be used in self-care, psychotherapy, and medical care, providing more individuals and healthcare professionals to exert more direct immediate control of physical, psychological, and metabolic stress, and ultimately, health and happiness.

The EBT project was formidable in that psychology has focused on symptoms and medicine on problems and, paradoxically, [evolution activates cognitive dissonance](#) in response to a new paradigm, discounting it. The concept that people can switch from focusing on issues, conflicts, and problems to the circuits that activate them will take time. However, the new paradigm lends itself to greater acceptance during the [current mental health crisis](#), as the American Psychological Association described. With [70 percent of Americans](#) in 2020 in moderate-to-severe distress, current constructs and methods are not sufficient. A new paradigm that is focused on the classification of circuits, not disorders, and a set of tools to switch from maladaptive to adaptive circuits is appealing. Over time, this approach could apply positive emotional neuroplasticity to increase adaptive circuits' strength and dominance as a foundation for improved health and well-being.

The most fundamental treatment mechanism in EBT is use-dependent learning, the repeated switching of circuits in daily life with attendant updating. The wires of the stress response are stored in the unconscious memory system, which affords rapid responses not mediated by the conscious memory system, which is offline during episodes of stress overload. These wires change only through experience, and cognitive and behavioral tools do not change them, as they are emotional circuits. Evolutionary biology favors [updating circuits encoded in response to stress](#) only when another stressful experience activates the same level of stress encountered when the circuit was encoded. Traditional methods that focus on calming, relaxing, and quieting the circuit inadvertently block adaptive changes in resilience.

The EBT strategy is to use stress adaptively and therapeutically activate stress to unlock the synaptic connections between neurons of circuits that trigger allostasis, then process negative emotions rapidly to facilitate self-directed positive emotional plasticity. An additional benefit of this approach is the rapid stress reduction. The treatment for daily stress also trains the brain for spontaneous and lasting resilience.

Reliance on psychotherapy for the updating of reactive circuits has been core to mental healthcare. Guidance and co-regulation of the therapist enhance the patient's capacity to focus attention on feelings when the stress circuit is activated and provide a new adaptive experience that rewires the faulty circuit. As the EBT techniques were designed to optimize self-directed updating of these reactive wires, the use of EBT may decrease reliance on psychotherapy. The client may use the techniques with the guidance of a therapist during clinical sessions but also, self-direct the reconsolidation ("erasure") of circuits between sessions.

To decrease excessive reliance on one-on-one therapy, EBT provides the needed resilience experience through the use of the techniques of the resiliency tools. However, core to updating

fear memories and reactive circuits is emotional co-regulation and support. The core of psychotherapy is emotional connectivity. In support of improving the scalability of psychotherapy and promoting self-care, EBT developed a confidential, private portal for peer-to-peer, on-demand use of the tools, and small group remote support. Participants use a mobile app for smartphones to improve accessibility to the tools, private and immediate emotional connection to use the tools with peers, and a myriad of types of e-learning and support.

The EBT 5-Point System identifies five physiological brain states, with reactive states classified as Brain States 3, 4, and 5, and resilient states classified as Brain States 1 and 2. Switching from a reactive state to a homeostatic state (Brain State 1 or 2) is adaptive. However, optimal physiology only occurs at Brain State 1, and the techniques of the method are designed to promote the attainment, if only briefly, of Brain State 1.

The system integrates 1) a mindful awareness technique that reduces physiological stress, 2) the reappraisal of state based on the five-point system, 3) the application of state-specific emotional processing to rapidly reduce stress, and 4) behavior change. The overall self-regulatory experience covers the full range of physiological brain states. It includes specific sub-skills that address the three causes of stress reactivity: situational stress, circuits of false generalizations, and circuits of false associations.

This inclusive technique integrates the most important and validated aspects of mindfulness and cognitive and behavior therapy with the state-specific emotional processing of EBT. The system includes specific sub-tools for the high-stress state for treating the three neuronal causes of stress overload that are addressed in psychotherapy. It provides continuity of therapy within and between clinical sessions to improve the user's experience and improve the cost-effectiveness of mental health healthcare.

Although the fundamental EBT intervention is the rapid, self-directed switch from a state of stress overload to an optimal physiological state, signified by neural integration and the emotion of joy, the program's effectiveness for preventing and treating health problems is progressive. Not one "switch" of circuits is medically impactful, but the organized, repeated, and advanced switching over time. The EBT program is manualized and is currently in its fourth edition. The EBT program was developed to raise the brain's set point from allostatic to homeostatic and includes a 30-day program for basic training and seven advanced 30-day courses for raising the set point.

The aim of this pilot study was to provide preliminary data on the use of the EBT techniques by answering the questions:

- What is the frequency of achieving self-regulatory success, switching users' circuits from reactive to resilient (Brain State 1 or 2)?
- What is the frequency of optimal self-regulation, switching users' circuits from reactive to optimal resilience (Brain State 1)?
- How long does it take in normal daily life to self-regulate using the EBT techniques?

Methods:

EBT researchers recruited study participants from members of the online EBT Community at all membership levels and offered 30-minute training sessions on how to use the EBT mobile app for rapid resilience and how to participate in this study. Participants were instructed to use the EBT mobile app and the timer on their smartphone.

Evaluation of Self-regulation Using EBT Techniques

Recruited volunteers from the EBT telehealth portal members.

Participants completed a 30-minute training on the EBT tools and study procedures:

- Set timer hourly for five consecutive hours
- Use the Quick and Easy Spiral Up Tool (option to use another tool, as desired)
- Record data (tool used, ending brain state, time lapsed for each of the five observations).

Participants (#): N = 33, 28 female, 5 male

Total observations (#) = 165

Although the process of using the tools can be memorized, there are 20 small steps required for this process of emotional and behavioral self-regulation in EBT. Observations of participants in group and individual EBT clinical sessions supported the need for an external device to enable individuals to perform optimal application of the EBT tools, and the use of the mobile app has become the standard of practice. The external device provides a series of brief phrases or "lead-ins" that the user states, then pauses until words from the emotional brain (unconscious memory system) appear in their mind. Based on clinical observation, the use of

the mobile app has increased the reliability and effectiveness of replicating this resilience process.

The participants were instructed to use the foundational resiliency tool in EBT, the Be Positive Tool for Brain State 4 (definitely stressed) to rapidly release stress, followed by the Take Action Tool to promote adaptive behavior. A daily practice of EBT includes five to 10 uses of this tool per day to prevent or rapidly resolve stress overload. They were instructed to use other tools as needed. For example, if they experienced a triggered response or craving, they could use another tool for Brain State 4, the Stop A Trigger Tool. If they were highly stressed, they would use the Damage Control Tool, the EBT technique for the stress overload of Brain State 5.

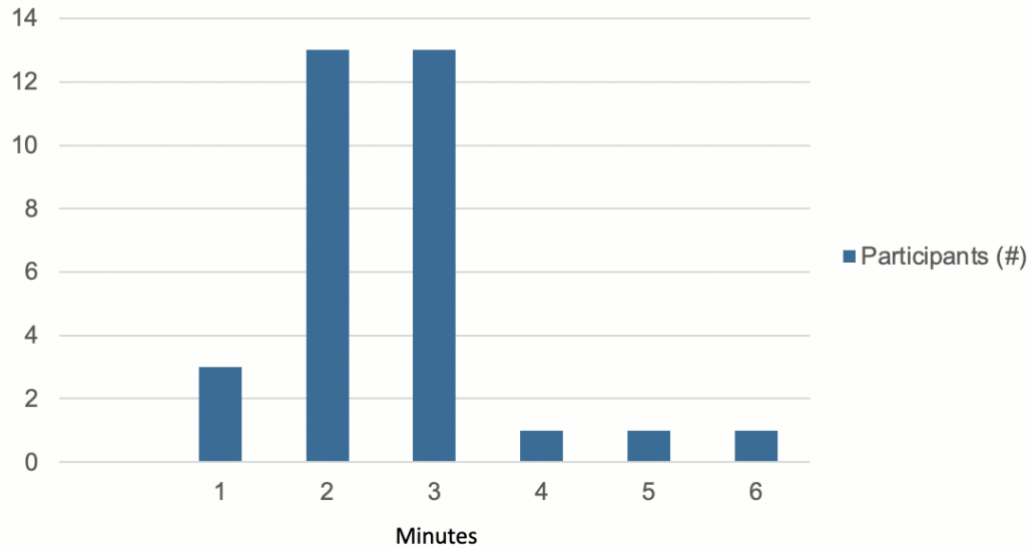
Based on the training of program participants in EBT groups and coaching services, we observed that the use of the Quick and Easy Spiral Up process took about 60 to 90 seconds with practice. However, we predicted that the application of EBT would take longer in normal daily life, as daily activations may be more extreme, or participants may prefer to use the 4 Tool in a longer form or the 5 Tool.

The lead-ins for the technique are the same as the other uses of the tool for Brain State 4, except:

- 1) the tool is used quickly, without pausing after stating the lead-ins to feel one's feelings
- 2) the tool relies heavily on the use of six to nine "I feel angry" statements to release stress rapidly, rather than awareness of feelings
- 3) after expressing negative emotions, the tool applies the use of positive emotions rather than updating unreasonable expectations to alleviate stress
- 4) the tool delivers a "tingle" sensation associated with stress relief, which can be produced more rapidly than the emotion of joy, as delivered by other tools of the method.

Data were collected from 33 participants – 5 males and 28 females – and were de-identified, then analyzed. Frequencies of meantime for five observations per participant and meantime of all observations were calculated. Based on the ending brain state, the observations were categorized as self-regulatory success (attaining Brain State 1 or 2) and optimal self-regulation (attaining Brain State 1).

Frequencies of Time to Self-regulate Using EBT Techniques



Results:

The frequencies of meantime per participant for the use of the EBT techniques was 13 for both two and three minutes. Three participants recorded a mean of one minute and one each required four, five, and six minutes. The mean time for the aggregated observations was two minutes and 46 seconds. Brain State 1 or 2 (“self-regulatory success”) was achieved for 86 percent of observations and Brain State 1 (“optimal self-regulation”) for 66 percent of observations.

Self-regulation Using EBT Techniques

N = 33 Observations = 165

Mean Time: 2 minutes 46 seconds

Self-regulatory success (Brain State 1 or 2): 86%

Optimal self-regulation (Brain State 1): 66%

Discussion:

This preliminary study accomplished its aim of providing initial data on the time required for self-regulation and the frequency of self-regulation success and optimal self-regulation. Self-regulatory success and optimal self-regulation were accomplished rapidly in most participants. This supports our subjective clinical experience of rapid and consistent self-regulation accomplished by the EBT Five-Point System of Emotional and Behavioral Regulation using the EBT mobile app.

Our preliminary observation was that the structured use of the self-regulatory process takes about 60 to 90 seconds to produce the physiological signs of homeostasis. However, the use of the method in real life was not known. As participants were given the option to use other tools or use the self-regulation tools more slowly, the data showed that the average time was doubled when used in a naturalistic setting, to slightly less than three minutes.

Since the inception of the method in 2007 and our [initial proposal of rewiring the stress response](#) as a new paradigm in healthcare, our research has focused on: 1) decreasing time required for self-regulatory success, 2) improving accessibility of the process through a mobile app, and 3) establishing self-regulatory techniques within the mobile app that also support long-term improvements in neural circuitry and set point by using established patterns associated with the [reconsolidation of fear memories](#). By retaining this “brain state reconsolidation pattern,” EBT can be used adjunctively or as a sole method for neuroscience-based psychotherapy.

This preliminary study provided evidence that supported the success of the first two goals of EBT, which are to make the process quick in normal daily life and easy by using a mobile app. This is an initial report of the immediate utility of EBT for self-regulation.

Conclusions:

This study supported clinical observations that the EBT techniques can produce rapid, reliable, and effective self-regulation in two to three minutes using the EBT mobile app. Additional research is needed, including studies with larger sample sizes and in more diverse populations and the addition of objective physiological and psychological measures.

