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The future of psychology: Approaches to enhance therapeutic outcomes

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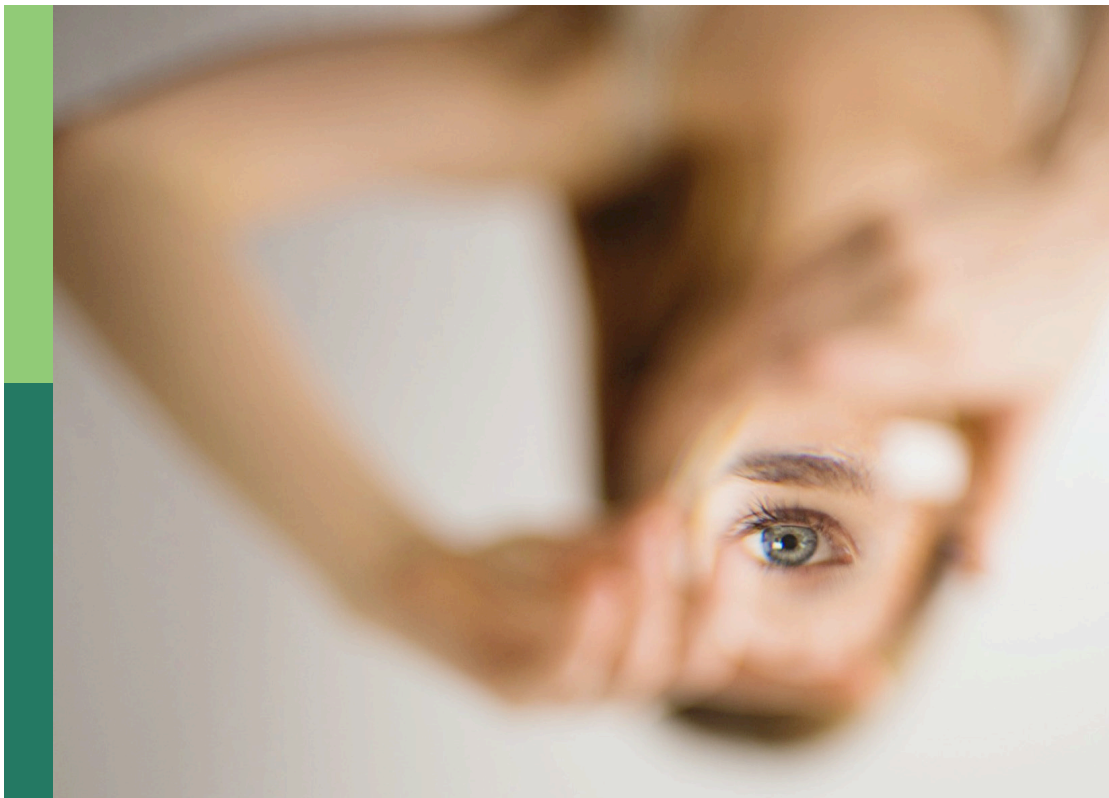

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The future of psychology: Approaches to enhance therapeutic outcomes

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Editorial: The future of psychology: Approaches to enhance therapeutic outcomes

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Editorial on the Research Topic
The future of psychology: Approaches to enhance therapeutic outcomes

A greater acceptance of mind-body approaches in psychology is emerging. Research indicates that supplementing established and evidence-based psychological techniques (e.g., behavioral, exposure and cognitive processing) with physiological or somatic interventions—such as acupressure, meditation, yoga and biofield therapies—enhances therapeutic outcomes.

Characterized as the "fourth wave" of psychology (Gallo, 2009), these therapies view psychological problems as interactions involving energy fields. This is the reason why they are collectively referred to as energy psychology. Energy fields have become essential tools in treatment and diagnosis, with devices such as EEGs, fMRIs, MEGs, PEMS, and TENS machines providing medicine with a new window of understanding into the functioning of brain and body. Among the techniques that produce changes in these energy fields are meditation, the stimulation of acupoints, neurofeedback, eye movements, imagery and intention.

By 2022, more than 400 papers on these therapies had been published in peer-reviewed journals, including meta-analyses, randomized controlled trials, and outcome studies. They demonstrate the efficacy of these approaches for conditions such as anxiety, depression, PTSD, with treatment effects often an order of magnitude greater than conventional therapies. Moreover, therapies in the counseling space focused on the relationships between the mind, body, brain, and behavior are now being recognized as effective treatments by various official bodies, including the US Veterans Administration, the UKs National Institute for Clinical Excellence, and the World Health Organization.

The studies in this Research Topic examine the evidence for the efficacy of interventions supplementing traditional approaches such as talk therapy.

In their Hypothesis and Theory article, Chan et al. propose a temporospatial neuroscientific model of the brain and self, which provides a detailed description of

the temporal structure of transitive psychological processes that take place during psychotherapy and ultimately lead to healing. More specifically, the model provides guidance for when specific psychotherapeutic techniques are optimally employed to elicit neuroplastic changes in the brain, leading to neural activity changes associated with more adaptive, coherent, and energetic thought patterns and behavior.

Focusing on the psychological consequences of catastrophic events, Feinstein reviews the evidence for the effects of acupressure-based energy psychology techniques, on disorders such as PTSD, anxiety, and depression. Findings across more than 30 countries indicate energy psychology has immediate and long-lasting benefits and has led to the reduction or even complete elimination of disaster-related psycho-symptomatology. Feinstein's review further highlights evidence for the underpinning mechanisms of those treatment effects, with several imaging studies indicating that changes in brain activity accompany cognitive shifts.

The effects of another energy healing technique, Reiki, which involves a therapist placing their hands on or close to a client's body to activate self-healing processes, are evaluated in a systematic review by Zadro and Stapleton. The systematic search yielded 14 high-quality randomized controlled trials. These showed, compared to placebo, Reiki had substantial and significant effects on symptoms of depressed mood, anxiety, stress and burnout, without producing adverse effects.

Church, Stapleton, Gosatti et al. investigated the effects of EcoMeditation—a novel form of mediation that involves a sequence of active physical tasks to reduce mind wandering—on measures of psychological wellbeing as well as the experience of flow and transcendent states. Studies are increasingly measuring not only reductions in dysphoria, but the acquisition of elevated states such as happiness and transcendence. A pre-post comparison found both reductions in adverse psychological conditions and significant increases in flow and peak states. In a second study, Church, Yang et al. identified the beneficial effects of guided meditation on a range of objective markers (EEG, cortisol, and immunoglobin) that correlated with improvements in psychological symptoms related to PTSD, depression and somatic symptoms. They also proposed a new standard for evaluating EEG datasets, the ratio of delta to high frequency beta brain waves.

In a registered clinical trial, Krings et al. investigated a novel treatment approach for depression, combining Behavioral Activation Treatment (BATD) with an Attention Training Technique (ATT). Results showed positive effects on all aspects of depression symptomatology in the short-term (i.e., 2 weeks) but not longer-term (i.e., 3 months). Results further indicated that concurrent delivery of both treatments was more effective than sequential delivery. Booster sessions may potentially prolong the positive treatment effects.

Hauber and Boon provides an interesting contrast by not focusing on the therapeutic method but on how the nature of first-session therapeutic relationship has the potential to enhance psychotherapeutic outcomes. Using a sample of high-risk adolescents, the authors found that therapeutic relationship quality significantly positively affected treatment outcomes. High-quality first-session therapeutic relationships lead to a doubling of treatment effectiveness, while low-quality relationships rarely lead to positive outcomes.

Related to this work, Meier analyzed the causes of ceiling effects (positive-end response clusters) in measures of the therapeutic alliance (i.e., the quality of the relationship between the therapist and their client). The study analyzed self-report response patterns of drug-abuse patients drawn from an archival database. Replicating previous research they found ceiling effects on measures of the therapeutic working alliance. However, the analysis suggests that these effects are due to genuine reflections of commonly positive experiences of the therapist-patient relationship, even though social desirability influences cannot be entirely neglected.

Finally, Church, Stapleton, Vasudevan et al. provide a systematic review of the effects of Emotional Freedom Techniques (EFT), the most widely-used form of energy psychology, on psychological and physiological disorders. This study updates an earlier meta-analysis by Church (2013) and analyses 41 additional randomized controlled trials. Results confirm the earlier investigation and show EFT is efficacious for a range of psychological conditions (e.g., anxiety, depression, phobias, and posttraumatic stress disorder), as well as physiological disorders (e.g., pain, insomnia, and autoimmune conditions). It should be considered a first-line evidence-based primary care treatment.

Taken together, these nine studies provide an indication of the future direction of the field. They show that the newest generation of therapies, and especially energy psychology, are producing outcomes that can make a profound impact on public health. They demonstrate that natural drug-free methods and effective psychotherapy are able to effectively treat a wide range of disorders, often in brief time frames and without the side effects of pharmaceuticals.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Flights and Perchings of the BrainMind: A Temporospatial Approach to Psychotherapy

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This article introduces a process-oriented approach for improving present moment conceptualization in psychotherapy that is in alignment with neuroscience: the *Temporospatial movements of mind (TSMM)* model. We elaborate on seven temporal movements that describe the moment-to-moment morphogenesis of emotional feelings and thoughts from inception to maturity. *Temporal* refers to the passage of time through which feelings and thoughts develop, and electromagnetic activity, that among other responsibilities, bind information across time. Spatial dynamics extend from an undifferentiated to three dimensional experiences of emotional and cognitive processes. Neurophysiologically, *spatial* refers to structures within the brain and their varying interactions with one another. This article culminates in the development of an atheoretical temporospatial grid that may help clinicians conceptualize where patients are in their cognitive and emotional development to further guide technique.

Keywords: spatiotemporal, psychotherapy, neuroscience, consciousness, interpersonal neurobiology, treatment, brain, mind

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INTRODUCTION

Activity in the brainmind moves through the passage of time and space with varying speed and direction. Phenomenologically, this activity may decelerate as it focuses and accelerate in transition from one experience to the next. In 1890, William James compared the rhythm of a bird's "flights and perchings" (p. 243) to exemplify the transitive and formative aspects of the *stream of consciousness*. An important part of psychotherapy is the formulation of a 'flight path' whereby the therapist can facilitate the maturation of psychological experience. Yet this process of maturation has multiple 'destinations' and may occur on a much smaller time-scale than generic treatment plans can offer. Small inputs may result in large changes within a single session. The type and timing of an intervention may be just as important as their delivery and relevance.

The field of psychotherapy is vast, with several effective theoretical orientations emerging in reaction to one another; similar to the parable of blind men agreeing and disagreeing about their experiences as they examine specific parts of an elephant. Studies suggest that regardless of the approach, psychotherapy may facilitate neuroplasticity impacting brain structure and function

(Cozolino, 2017; Kalsi et al., 2017), and furthermore, the positive outcome of treatment is quite comparable amongst the varying approaches (Cuijpers et al., 2019). The most profound factor facilitating positive change was not identified as any particular theory but rather the quality of the therapeutic relationship. One commonality that all approaches share is the necessity to consider the client's development of feelings and thoughts. Development occurs as a process which can be conceptualized through time and space, or in the terms of James, Flights and Perchings.

In order to address individual differences within the vast spectrum of human experience, clinical practice has opened up to incorporate eclectic paradigms. The integration of various conceptual approaches often results in a particular form of treatment whose fundamental assumptions knit together consonance amongst theories, or a singular conceptual approach that may integrate techniques from other theories. With the abundance of theoretical orientations and techniques, therapists are often inundated with their applications leading to an increased risk of implementing them in the wrong context. One way to decrease this risk is to provide a process-oriented framework that may inform what techniques may be useful in any context.

The purpose of this paper is to build, explicate and refine Chan's (2021) conceptual model that addresses Allan Schore's (2019) suggestion to direct "therapeutic technique toward the elevation of emotions from primitive presymbolic sensorimotor level of experience to mature symbolic representational level, and a creation of self-reflective position that can appraise the significance and meanings of these affects" (p. 280).

INFLUENCES

Chan's framework sought to update Wilfred Bion's grid, in accordance with modern day neuroscience and theories of self, especially from the work of Antonio Damasio, Jaak Panksepp, and Carl G. Jung. Each phase was termed a "movement" to emphasize process as espoused by several influential thinkers, from philosophers such as Heraclitus, Charles Sanders Peirce, and Alfred North Whitehead to Psychologist/Philosophers including William James and John Dewey, to Psychoanalysts Wilfred Bion, and Donald Winicott.

Moment-to-moment transitions allude to the dimension of time. This iteration adds a dimension of Space which develops from the work of James Grotstein (2002), as well as a more formal recognition of emotional evolution, especially from the work of Jaak Panksepp. This conceptualization will be formally known as the *Temporospatial Movements of Mind (TSMM)* model; with the mind being defined as an embodied and relational process that regulates the flow of energy and information (Siegel, 2012). Characterizing human subjective experience and objective processes as being in perpetual relational flux informs us that even the final movement undergoes reconsolidation, returning to the first movement. To improve relatability and application, concrete examples will be provided throughout each section. Finally, a visual representation and an updated "grid" with space on the *X*-axis and time on the *Y*-axis will be provided for therapeutic use.

TEMPOROSPATIAL DYNAMICS IN NEUROSCIENCE

The ideas of time and space are often attributed to the fields of physics and perception. What is less known, is that our brains also operate amongst the background and foreground, anchored in unique signatures of their own inner time and space. There is a temporospatial exchange between the brain and the world. Time and space may be considered the "shared currencies" between objective reality and our subjective experience (Northoff et al., 2020b). The neuroecological and temporospatial model is a paradigm formulated by Northoff (2018) that seeks to understand how our brain-mind's align with the phenomenal world. This is described as "temporo-spatial alignment", which is one of the four key temporo-spatial mechanisms of the brain's neural activity for consciousness (i.e., Temporo-spatial theory of consciousness (TTC), Northoff and Huang, 2017; Northoff and Lamme, 2020).

A key feature of the temporo-spatial approach to brain-mind by Northoff is that the brain's inner time and space exhibit an elaborated structure that is topographical and dynamic (Northoff et al., 2020a). Structural and functional connectivity within and between areas of the brain generate a spatial topography visible by neuroimaging such as magnetic resonance imaging (MRI) and functional magnetic resonance imaging (fMRI), While electromagnetic fields emerging from the brain's dynamic activity form a temporal structure which can be measured through electroencephalograms (EEG), and/or magnetoencephalograms (MEG).

Brown (2021) estimates that we have 100 mind/brain states within 10 s, each which overlaps and builds upon one another, similar to waves combining to form a wavefront. Damage to an area of the brain, such as the left hemisphere, may not destroy a particular function, but rather disrupt the process of the function. An aphasic subject who mistakes a table for another furniture piece, experiences the disruption of brainmind processes that serve to narrow down a category into a specific item. Put simply, it is not the destruction of a 1–1 correspondence, there is no specific brain area for "table," but the process that enables this identification. This demonstrates how a process-oriented framework provides an interpretation more aligned with the empirically validated understanding of the brainmind.

From the spatial perspective, there have been a surplus of studies identifying robust changes in the structure and function of the brain in victims of posttraumatic stress disorder (PTSD) (see Chan, 2016 for extensive review). The neural networks' overall dysfunctions can be characterized as such: default mode network activity (e.g., correlates to introspection) is interrupted by the salience network and central executive network activity (e.g., correlates to goal directed activity) exhibits intrusions from the default network. This is in line with several studies identifying hyperactive amygdala activation during resting state which contributes to hyperarousal as well as decrements in

specific cognitive functions when an individual is focused on goal-directed activity (Chan, 2016).

The group around Northoff (Duncan et al., 2015) provided three levels of analysis that supports the idea that the brain's temporospatial structure is highly defined by early experiences. At the first level, they concluded that there are higher levels of complexity (i.e., entropy) in signals across time and space in individuals who suffered from early childhood trauma. One notable area related to self-processes is the perigenual anterior cingulate cortex (PACC), which exhibited inconsistent signaling that continued into adulthood. There was a significant correlation between childhood trauma and levels of entropy. In this way the brain's intrinsic activity implicitly encoded temporospatial features, generating "temporospatial memory" (Northoff, 2016, p. 229) expressing the impact of traumatic interpersonal experiences. An abundance of research on the influence of attachment on adult relationships may also be supportive of this framework (Siegel, 2019). Areas such as the orbital medial prefrontal cortex, and its connections to the limbic system have been identified as core regions for attachment based responses (Schore, 2019).

Mucci's model of interpersonal trauma (Mucci, 2018; Mucci and Scalabrini, 2021) suggests that early relational trauma (ERT) that occurs as a consequence of poor attunement between the mother and child can lead to psychopathology that renders the mother unable to provide the care required for the child's optimal development. Lack of attunement may lead to affect dysregulation which can leave the child vulnerable to drug and alcohol abuse, eating disorders, interpersonal difficulties, and impulsivity. ERT has been found to be associated with decreased functional connectivity within the DMN in the resting state, suggesting an unstable and insecure sense of self. Furthermore, children who suffer severe abuse may develop a vulnerability toward developing disorganized attachment. In tandem, dissociative symptoms may lead to conflictual internal experiences, such as simultaneous identification with the victim and perpetrator. Experiences of victimization include: low self-esteem, blame, shame, and guilt, while an internal persecutor (unconsciously) experiences violence, hate, and aggressiveness (often toward one's own body). An identification with the aggressor is thought to reflect a dissociative defense mechanism which allows the individual to avoid experiencing the overwhelming affects associated with the trauma (Mucci, 2018). This victim/persecutor dissociation may be reflected in severe personality disorders, such as borderline personality disorder or narcissistic personality disorder.

Mucci also refers to "massive trauma", caused by massive calamities such as genocides and war. Individuals subjected to these massive traumatic events may suffer psychopathological effects on a personal level and inadvertently contribute to the first and second level of traumatization in their offspring by not being able to provide the attunement and attachment necessary for their offspring's optimal development. Massive trauma may lead to an intergenerational transmission of trauma whose effects percolate down to the second and third generations of trauma survivors. The transmission of such interpersonal trauma finds expression in alterations of the neuroecological layer characterized by changes in the brain's spatiotemporal structure and features.

On the second level, Duncan et al. (2015) encountered alterations in glutamate, a neurotransmitter playing a central role in neurodevelopment, more specifically lower levels in the PACC. Thirdly, they found that when anticipating an aversive stimulus there was lower activity in the right anterior insula and motor cortex in individuals who suffered from early childhood trauma. This anticipatory response correlated significantly with degree of entropy and glutamate as well. Another study conducted by Nakao et al. (2013) also identified alterations in infra-slow frequency fluctuations (IFF) in neural activity (0.01–0.1 Hz) in the medial prefrontal cortex, another area highly correlated to self-processes. In particular, they found that higher levels of childhood trauma correlated to lower power in IFF in the aforementioned region. Northoff (2016) concludes "the balance between the environmental life events" "external disturbing power" and the brain's "internal modifying power" may determine the degree to which "life events as perceived" deviate from the "life events as real" and consequently the degree to which life events are encoded and subsequently perceived as more less traumatic" (P. 236).

TEMPOROSPATIAL NEUROSCIENCE OF BRAIN AND SELF

Temporospatial dynamics may be the common intrinsic feature which connects brain and psyche. Instead of characterizing the brain and self by specific functions of single regions/networks, temporospatial neuroscience explores the spatial topography and temporal dynamics of neural activity and subjective mental contents. Spontaneous activity is topographically identified within interacting networks like default-mode, salience, and central executive network and is temporally characterized by the balance between infraslow, slow, and fast frequencies (Northoff and Scalabrini, 2021).

Specifically, longer and more powerful slower frequencies nest the faster frequencies which allow for correlation of varying timescales to provide temporal stability (i.e., long range temporal correlation). A kind of temporal or dynamic memory forms in which past neural patterns influence future dynamics outside of our conscious awareness. Abnormal temporal integration of stimuli may contribute to phenomenological experience of discontinuous sense of self observed in disorders like schizophrenia (Northoff et al., 2020b).

The neural correlates of the self can be conceptualized under a spatially nested hierarchy in which brain regions (i.e., bilateral insula), of lower layers (e.g., interoceptive processing), are recruited again and complement additional regions within higher layers of the cognitive self (Qin et al., 2020; Northoff and Scalabrini, 2021). Conducting a large-scale meta-analysis, Qin et al. (2020) observed three levels of self. The interoceptive self is the most basic layer and recruits interoceptive regions like the insula and thalamus; these regions are also recruited by the exteroceptive–proprioceptive self which also involves the bilateral temporo-parietal junction, the premotor cortex and the

medial frontal cortex. Finally, these regions are also recruited during the mental or cognitive self plus the typical midline regions of the default-mode network. Together, this amounts to a three-layer nested hierarchical structure of the intero-exteroceptive and mental self.

Findings suggest the insula in particular is highly involved in self processing and is at the center of interoceptive processing, which could be foundationally relevant for higher-order self-processing (Qin et al., 2020). Different subdivisions of the insula were found to be particularly relevant in different functioning in the mediation of interoceptive signals. From the posterior to anterior perspective, the insula presents sensory signals ranging from objective to subjective levels of processing. In this progression, subjective feeling states are conveyed by the anterior insula which may represent a neural core explaining an individual's awareness of bodily self. The insula's activation in all three levels of self-processing proposes that it is still necessary for integration between external environmental signals with recognition of self.

The insula may also play a key role in narcissistic personality disorder, in which individuals tend to lack empathy in response in social relationships and environments. Although direct neural underpinnings of this are yet to be clear, there is evidence that core regions of the brain associated include the anterior insula, as well as the left inferior frontal cortex, premotor cortex, and the dorsolateral prefrontal cortex. The anterior insula is considered more related due to its relation to one's focus on the self as mentioned above. Neuronally, studies show that individuals with high narcissistic traits psychologically produce increased scores of alexithymia, general psychopathology, and depression (Fan et al., 2010).

Research from Scalabrini et al. (2021) implicates the right insula as having more topographic and dynamic features when compared to the left. The right exhibits a higher degree of integration with other regions from an interoceptive and exteroceptive perspective and notably with the recognition to the three layers of self-processing. The right insula proves to be an ideal node for the layers of the confirmation of self-integration at a higher order state for temporal continuity.

The right insula's high degree of functionality guarantees interoceptive, exteroceptive, proprioceptive, and cognitive or mental-self integration. SCDF hypothesize that key functioning of the right insula involves spatial nestedness on a neuronal level which also precipitates psychologically. This may constitute a shared feature between neuronal and mental understandings of the self and self-processing.

These three layers of self are extremely important for psychotherapy (Northoff and Scalabrini, 2021). Different mental health changes may correlate with different balances or imbalances between the three layers of self. For instance, social anxiety disorder reflects decreased midline DMN activity and thus an unstable mental self, which manifests as anxiety. That, in turn, renders the lower intero- and exteroceptive layers in these subjects as relatively stronger. This relative imbalance manifests as an increase in interoceptive awareness of the body. In this context, psychotherapeutic efforts need to address these imbalances between the three layers of self and reset them by re-establishing their hierarchical nestedness (i.e., the relative balances among each other). **Figure 1** (below) is an artistic rendering of the temporospatial model, which may be of assistance in its conceptualization.

SPATIAL DYNAMICS IN PSYCHOLOGY

How do we characterize space and time in the mind and in such a way that it is beneficial for therapeutic use? Psychological theories have often used the metaphor of space in language. For example: object relations theory conceptualizes the mind as housing representations of people and their relationships, and self-psychology speaks about psychological structures that require rehabilitation. Addressing these questions leads us back to the brain's spontaneous activity.

The brain's spontaneous activity continuously attempts to synchronize with its external environment, corresponding to how someone relates to the world. Its inner time and space can modify how information from the external world is encoded and this occurs through what Northoff (2016) calls "active modification by amplification or attenuation" (p. 233) This demonstrates continual reciprocity between brain and environment. The world and our brains are not static but in continual dialog with one another, better characterized as dynamic, continuous and

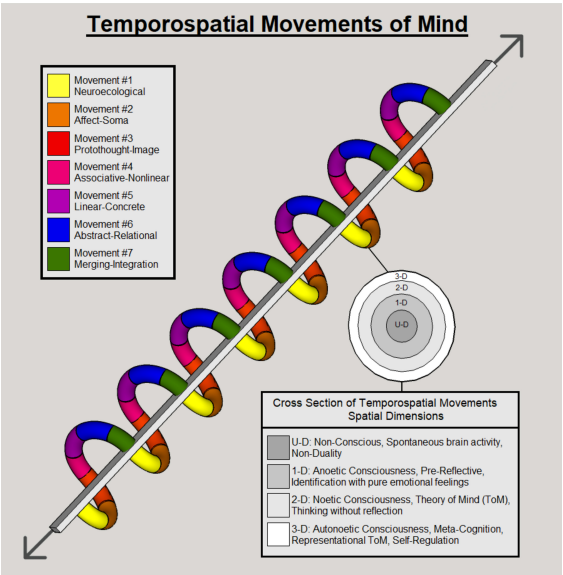

FIGURE 1 | This is a visual representation of the temporospatial model to refer throughout the paper. It is followed by sections describing each spatial dimension and temporal movement in depth. For further clarification, each ring composes a full temporospatial cycle. The end (Merger-Integration) is reconsolidated into the beginning (Neuroecological), as the beginning builds upon the end (where green and yellow meet). They are iterative in nature, and can move in either direction (i.e., regression, progression). Temporal cycles are coded to corresponding colors, a cross section of which reveals their volumetric composition as spatial dimensions. Spatial dimensions are illustrated as rings to a tree trunk, colored in light gray. Note that spatial volume and temporal movements form a single stream, and each phase within respective cycles are nested within one another. Artwork by Daniel Icaza.

process-oriented. This is expressed in the key relevance of temporo-spatial alignment of the brain's spontaneous activity to its external environment (Northoff and Huang, 2017; Northoff, 2018). Such temporo-spatial alignment operates, as in its words, through time and space shared by the brain and environment – how does the temporal dynamic of, for instance music, match with the temporal dynamic of the brain's ongoing spontaneous activity?

The logician, mathematician and philosopher Peirce et al. (1892/1992) thought space and time are continuous and that mental events are no exception. In his own words, feelings are subject to "inhesion," (p. 324) and if "space is continuous, it follows that there must be an immediate community of feeling between parts of mind infinitesimally near together" (P. 325). Moreover, the language humans typically use in everyday experience is defined by space, for example: whenever there is tension or an argument amongst individuals, a common reply may be "I need some space." This may literally mean needing some physical distance but more often than not it implies psychological space in order to process issues.

When we consider dreams, one must wonder where do these dreams occur? When we engage in imagination, although images are not perceived they are experienced within the stream of consciousness. Where is that happening precisely? Meares (1984) considers it "virtual space," as "inner vision cannot be located in a material way" (P. 163). He further argues that there is a constriction of space in states of anxiety and for those who suffer from narcissistic personality disorder. Anxiety is often characterized by a "limbic hijack" when emotions overpower frontal functioning and there becomes less space for one to respond within, one may become reactive as opposed to responsive.

In narcissism, one is restricted toward a "'selfish center,' and the world of material objects" (P. 166). In psychotherapeutic practice, Meares (1984) asserts that every time an association is formed and a new narrative constructed, there is an expansion of psychological space. There is now more room for one to think about other things. Notably, he concludes that the nature of psychological space is highly interpersonal and related to increasing levels of empathy. This parallels neuroecological findings described above, with increasing levels of entropy in trauma victims and their associated symptoms.

In our particular view, we use space as conceptualized in physics as an analogy. In particular, physics considers that we exist in a multidimensional universe. There is an undifferentiated dimension, characterized by implicit experience and anoetic consciousness followed by three dimensions that allow for increased complexity metaphorically characterized as length, width and height. In this conceptualization we consider four dimensions of space. Grotstein (2002) introduced the conceptualization of dimensions related to psychic space, however he includes a "null dimension," to signify "infinite space and timelessness" (p. 85). In this model, label this the U-dimension representing an undifferentiated state between the internal and external world.

The spatial component of the TSMM operates from the framework proposed by Vandekerckhove and Panksepp (2009), which explicates anoetic, noetic and autonoetic phases of consciousness. The following (**Table 1**) is a brief summary of what these levels entail.

With this in mind, the therapist ideally helps facilitate higher levels of incorporation from preceding dimensions into proceeding ones. These developmental shifts in psychological territory mimic the neurodevelopment of humans from infancy to adulthood and rest on a spectrum. Moreover, overlapping regions may enable a transitory shift from one dimension to a novel array of psychological experience, and there will always exist the potential for regressive movement back to earlier phases. A general term expressing the enlargement of conscious experience, which includes higher levels of dimensional thought, will be termed *spatial dilation*. Another term of interest is that of *resistance*, which may range depending on the spatial dimension achieved. We introduce three degrees of resistance which will be explicated throughout. Finally, each one of the spatial dimensions may be characterized by the degree to which an individual's conscious self is actively or passively involved in their behavioral expressions due to unconscious processes and actively involved in self-regulation. While certain interventions or approaches will be mentioned in transitive portions, it is important to note that these are by no means exhaustive, and only an attempt to illustrate examples.

UNDIFFERENTIATED DIMENSION (U-DIMENSION)

This dimension is characterized by interactions between undifferentiated psychosocial experiences from early life and genetic imperatives; an operation comparable to how humans were prior to having an explicit sense of self, around the

TABLE 1 | Three phases of consciousness.

Anoetic consciousness	Involves "implicit procedural, sensory and affective memory and on the conceptualization and empirical foundation of raw affective consciousness of Panksepp, and primal perceptual consciousness. . ." (Vandekerckhove and Panksepp, 2009, p. 1018). It is defined by its unreflective nature. Individuals may experience the "body and world with sensory perceptual immediacy and affective intensity" (P. 1021).
Noetic consciousness	Beginning around age 2, infants develop a sense of self which is determined through the mirror experiment. In this moment, the child is now aware and "at a *knowing* level that the recognized image is of him or herself, with a sense of self belongingness. . ." (p. 1024). Associated with this level of consciousness is the emergence of the semantic memory system. The semantic system is atemporal and aspatial, organizing factual knowledge about the world in the 'present.' Factual knowledge allows one to operate and function in the world but still lacks a dynamic personal relationship with the world.
Autonoetic consciousness	Involves explicit memory systems and episodic (i.e., autobiographical memory). They are now capable of mental time travel into the future to simulate potential events and into the past to retrieve memories that are personally significant. This is where the notion of recursion begins. Narratives are formed and humans are capable of reflecting and learning from their experiences and experiences of others.

age of 2 (Rochat, 2003). It corresponds to implicit systems, neuroanatomically correlated to right hemispheric lateralized structures and unconscious within the autonomic nervous system and body (Schore, 2019). Moreover this is in congruence with the work of Panksepp and Biven (2012), who would refer to unconscious secondary emotions to the upper limbic system.

One example would include individuals who suffer from schizophrenia. Such individuals may experience disruptions in neural synchrony with the environment, resulting in misperceptions in causal relationships (Northoff, 2016). They may also experience positive hallucinations and/or delusions, a major correlate of which is an overactive dopamine system in the mesolimbic pathway and more recently, the dorsal striatum in the basal ganglia (McCutcheon et al., 2019). Here we have a classic example of internal stimuli manifesting in the external world. Individuals with delusions may have a firm belief about others which are anchored in a false conviction. They may become aware of hallucinations and delusions in higher levels of the temporospatial movement. This dimension may be compared to Kernberg's most severely disorganized level of personality organization, the psychotic level (Lenzenweger et al., 2001). Such patients exhibit impaired reality testing in which they are unable to differentiate self from others and intrapsychic stimuli from the external environment.

Attachment based trauma has also been associated with loss of coherence in spontaneous brain activity (Nakao et al., 2013). It is well known in psychodynamic work that early childhood trauma, especially from primary caregivers, may result in dysfunctional patterns of relating. These patterns are largely unconscious, and come as no surprise, given that 65% of the brain volume develops after birth, with a large proportion of the adult brain being met by 6–7 years of age (Gilmore et al., 2018). As fundamental relational circuits are established in implicit systems, so are they re-enacted throughout the individual's adult life. Thus, in this dimension there is no resistance to affect, and they are simply expressed as implicit operations. The individual is completely passive and unaware of psychological challenges, and maladaptive behavioral expressions. Behaviorally, we find phenomena such as repetition compulsion, projections, projective identification, transference, and acting out.

TRANSITIVE UD-1D

This transition comprises the groundwork of all psychotherapy. The establishment of a trusting relationship sets the conditions necessary for healing to occur. Alongside this process is the conversion of feelings into language. Rogerian paraphrasing may assist with the client's feelings of being understood, and help with the organization and clarity of challenges. As trust is established, and affective laden mental contents enter from non-conscious processes into consciousness with higher levels of organization, there is a natural dilation of inner space. The clinician clarifies and confronts defenses, drawing awareness to their existence. For severe conditions, medications, TMS, ECT may all be necessary for the stabilization of neurochemical imbalances and electromagnetic coherence.

First Dimension

One-dimensional thinking and emotional experience are by and large anoetic or preconscious, which has been associated with the orbitofrontal-limbic network (Schore, 2019). This implies decisions based on pure feeling and entails a higher potential for contents to rise into consciousness. There is a subtle distinction between subject and object, thus lacking in differentiation. The client is capable of pre-reflective thinking. We might assign *length* as its descriptor. The client vacillates between unconscious processes and awareness of their psychological existence. For example, individuals who suffer from borderline personality disorder often experience the extremes of love or hate, good or bad, with no shades of gray. They can move in the direction of love and immerse the clinician with flattery or enter the session with hate, berating the clinician. One might consider this the paranoid-schizoid position in a Kleinian approach. The individual's thoughts are still fused or identified with primary emotional processes and non-conscious secondary emotional processing.

It is in the first dimension we find the inception of awareness in relation to defense mechanisms. To be more specific, when one identifies with a particular emotion and is unable to think through it, these emotions are externalized, often onto another person. In this scenario, the therapist is meant to help the patient first become aware of these externalizations and help them represent the content in such a way that they can take ownership and responsibility. For example: if we consider an individual who suffered from sexual or physical abuse by a parent, they may transfer similar thoughts and feelings to a same-sex authority figure, such as the clinician. These inner events may be operating implicitly, likely characterized by entropic spontaneous activity in the brain. Feelings of distrust and anger may emerge and be directed at the clinician without further thought. An individual's thoughts and decisions are thus recruited to fulfill demands made by primary emotional processes (Panksepp, 1998; see Table 3). Thus, resistance of the first degree signifies a low threshold, yet there is a gradual reduction of emotional strength, and regulation as they are labeled (Lieberman et al., 2007), organized into an increasingly coherent narrative and made aware. The individual is passive-active, meaning psychological experiences and behavioral expressions are still being recruited by primary emotional systems, though secondarily active, with increasing awareness.

TRANSITIVE 1D-2D

With increased awareness of unconscious processes, and greater insight into their psychological disposition and behaviors, there is a greater capacity for self-representation and social cognition. Successfully facilitating the incorporation of another individual's perspective (such as in mentalizing) potentially reduces the strength of affective valence and results in spatial dilation. Other approaches such as dialectical behavioral therapy may also be of assistance as emotion regulation and distress tolerance are enhanced.

Second Dimension

Two-dimensional thinking and emotional experience afford movement in two directions, length and width. There is clearer differentiation between themselves (length) and others (*width*). The added component of others enables self-representation (Uddin et al., 2005). This corresponds to a noetic dimension, whereby there is a knowing of habitual patterns, but not yet the capacity to subvert their influence. There is an awareness of primary process emotions in action but a lack of awareness of secondary process emotions. There may be a theory of mind but not yet representational theory of mind (Saxe, 2006). For example, in the clinical context, a borderline patient gains the capacity to consider that another person may have another perspective, but this perspective is incapable of being represented resulting in biased responses. Similarly, clients under Otto Kernberg's borderline personality organization may have intact reality testing but still engage in immature defense mechanisms owing to a fragmented sense of self (Kernberg, 1968). Resistance is of the second degree, or moderate, in this dimension, as the client is able to tolerate the psychological existence of maladaptive paradigms, but still unable to incorporate insight into their behaviors. In light of this challenge, the individual is considered active-passive, signifying that awareness has increased to the extent that the individual is actively working through maladaptive psychological representations, though still experiences relapses with incongruent behaviors. Neurologically, this may be seen as a failure of the orbitofrontal cortex to effectively inhibit an internal behavioral response, and the necessity to continue developing descending inhibitory fibers (Rudebeck and Rich, 2018).

TRANSITIVE 2D-3D

Spatial dilation expands as transferential dynamics are successfully interpreted, wider perspectives achieved, and the empathic relationship internalized. Other approaches that might be of assistance may be the use of socratic questioning (CBT) to cover "blind spots," awareness of triggers alongside behavioral plans to assist with consolidating beneficial habits (CBT), increased non-verbal awareness (Gestalt), and self-soothing through mindfulness-based practices.

Third Dimension

To operate from three-dimensional thinking and emotional experience, we include length, width and *height,* which represents metacognition and autonoetic consciousness (i.e., consciousness enabling mental time travel). An individual becomes conscious of conflicting motives and emotions and they can work on the ground of ambivalence. One might compare this to the depressive position in Kleinian approaches, or the achievement of object constancy in object relations, accepting that the people may have both positive and negative qualities. This form of thinking may facilitate a process of healing. Such an achievement allows one to function free of the impact dealt to them from their negative experiences, as they can represent them in an alternate interpretive framework, or increase their capacity to bear associated feelings. This achievement is observed in the healthiest level of Kernberg's personality organization, the neurotic client, as their consistent sense of self and others allows for accurate perception of the world and subsequent adaptive solutions (Kernberg, 1968). An individual recovering from an early traumatic relationship may become aware that their current relationships have been repeating themes, and this awareness allows them to navigate future relationships free of rigidity. They are given a third dimension of awareness that enables them to make a decision every time a similar potential experience arises. In this lower end, there may be times when they vacillate between this third and second dimension, as they relapse back into patterns and are unable to sustain the third dimensional experience.

In its upper end, one may tolerate ambivalence and justify the accompanying affect by living in accordance with their ideals. As time passes, these decisions become second nature and accompanying negative affect is mitigated. We may also associate this with Maslow (1943, 1967) term self-actualization, or Jung's (1967) concept of individuation. We might consider this position as someone who possesses high levels of insight, ego strength and self-regulation. An individual who is well aware of their value systems has the capacity to live in alignment with them. This individual can build upon their world of truth and follow a balance of their intuition and logic in moments of challenge, to such a degree that they have reached "...the most successful adaptation to universal conditions of existence coupled with the greatest possible freedom for self-determination" (Jung, 1954, p. 171). The capacity to fully operate from this third dimension implies a high level of resistance, or of the third degree, as they are capable of incorporating information and affect from previous dimensions, tolerate ambivalence, and behaviorally implement their insight and experience in accordance with who they aspire to be. The individual is active, and the majority of their decisions and actions are based on the insight and experiences gained from a successful therapeutic relationship alongside a process of continual reflection and behaviors stemming from their conclusions.

TEMPORAL DYNAMICS IN PSYCHOLOGY

This model incorporates both implicit and explicit processes into William James' stream of consciousness, and his characterization of the stream as emerging from "buds or drops" of experience (James, 1911, p. 1). Following Panksepp (2012), consciousness is considered in this model to be endogenous to the brain, beginning at the brain stem (anoetic consciousness). In earlier movements, flights relate to spontaneous activity in the brain, and in later movements, transitions between substantive perchings which may be characterized by an ascending recruitment of cortical regions. Perchings are culminations into substantive processes of consciousness, which are more stable in nature (Pred, 2005). We identify these flights and perchings through the lens of temporospatial dynamics between the brain and environment.

Time in this approach refers to the passage of time and consists of seven iterative movements. Importantly, movements are not unidirectional. Rather emotions and thoughts may evolve or devolve. Moreover, each movement has a transitional or transitive process before reaching one which should be considered substantive. The task of the psychotherapist is to help facilitate the transitive processes in between each substantive process. These substantive "perchings" can be remembered through the mnemonic NAP ALARM and include:

1) **N**euroecological
2) **A**ffect-Soma
3) **P**rotothought-Image
4) **A**ssociative-Non-linear
5) **L**inear-Concrete
6) **A**bstract-**R**elational
7) **M**erging-Integration

Patients may present with psychological challenges which may be localized at any phase within the movements. These movements may be sequential but they are not necessarily hierarchical, meaning an abstract movement, for example, may not fully incorporate previous movements, though previous movements allow for abstraction to occur. This is due to the recursive nature of consciousness. An individual may know what the ideal behavior expressed may be in any particular context, but they still might not go through with it. Feedforward and feedback loops in the brain enable information to flow in many directions, such as subcortical-cortical (i.e., bottom-up), left hemisphere-right hemisphere and their corresponding inversions (i.e., top-down, right left). Similar to spatial dimensions, therapeutic action entails the incorporation of higher temporal movements. Following this model, each preceding phase is nested in every proceeding phase, temporally. Each movement labeled describes the substantive perchings, whereas each transitive portion alludes to the task of the therapist. **Table 2** refers to a summary of neuroanatomical regions that have been associated to each movement, further explicated in each section description.

TABLE 2 | Seven temporal movements and neuroanatomical correlates.

Movements	Neuroanatomy
Neuroecological	Brain stem, hippocampus, periaqueductal gray, bilateral insula, prefrontal cortex, visual cortex, cortical midline structures
Affect-Soma	Brain stem, limbic, hippocampus, amygdala, ventromedial prefrontal cortex, mesolimbic dopamine system, basal ganglia, thalamic sensory relay nuclei, parahippocampal gyrus
Protothought-Image	Precuneus, Parietal, occipital, visual cortex, posterior parietal cortex, posterior occipito-temporal cortices, anterior cingulate
Associative - Non-linear	Precuneus, insula, left middle frontal gyrus, left superior parietal gyrus, supplementary motor area, inferior frontal gyrus, temporal lobe, posterior temporal cortex, temporo-parietal occipital junction
Linear-Concrete	Amygdala, prefrontal cortex, ventrolateral prefrontal cortex, occipital gyrus, angular gyrus, culmen
Abstract-Relational	hippocampus, ventromedial prefrontal cortex, rostrolateral prefrontal cortex, the right frontotemporal region, medial prefrontal cortex, anterior cingulate cortex, posterior cingulate/retrosplenial cortex, precuneus, temporal poles, and temporo-parietal junction Hippocampus-medial prefrontal cortex
Merging-Integration	Association cortex, motor and sensory cortex, cerebellum, dorsolateral prefrontal cortex, basal ganglia

Movement 1: Neuroecological

The neuroecological movement constitutes the initial interactions between objects/events in the world and the brain's intrinsic activity. There are two levels within the neuroecological movement, that of the brain's natural predisposition as a result of genetic interactions with the environment and interactions that have been formative within an individual's development. The brain is an experience dependent organ, requiring interactions in order to form properly. This first movement is implicit in nature.

Perceptual and cognitive systems have been shaped over many generations through extensive interaction between environment and brain, e.g. natural selection, epigenetics, experiences. Such systems evolve because enhanced performance in tasks such as identifying materials, navigating environments, and detecting predators/prey led to enhanced survival and reproduction. Under a Bayesian framework, natural scene statistics and other properties of an organism's environment (e.g., availability of prey), interact with its genes and subsequently determine the evolution of perceptual and cognitive systems. Bayesian statistical decision theory utilizes "ideal observers," or models of optimal decision-making performance, as both a benchmark to compare to human performance as well as to be able to consider constraints within a perceptual or cognitive task. In simulations of co-evolution of a predator and prey species, Geisler and Diehl (2003) found that organisms' perceptual and cognitive systems appear to prioritize reproductive payoff above accuracy. They have been shaped by natural selection and consequently, shape our experience.

One formulation of the Bayesian brain developed by Karl Friston is the free energy principle. According to Friston (2010), individuals as self-organizing systems seek to limit prediction errors (i.e., discrepancies between top-down predictions based on prior information and actual sensory information) by continually updating beliefs and probabilities using newly sampled data, a process known as active Bayesian inference. Models of Bayesian inference have exhibited temporal nestedness in which state transitions proceed at different rates at different levels of the hierarchy, generating outcomes over different, nested timescales (Friston et al., 2017).

In Solms' (2020) neuropsychoanalytic model, memories serve as predictions for future event sequences and are represented by "outgoing" neurons, neurons in a permanently altered state which are only partially affected by stimuli. According to Solms, memory lies within a predictive hierarchy in which deeper layers of outgoing neurons are increasingly resistant to excitation or change from incoming sensory data. Non-declarative subcortical memory traces are more certain and resistant to change compared to declarative cortical memories because they prioritize simplicity and in turn, generalizability,

over accuracy. While subcortical memory appears to reflect core homeostatic predictions and behave like reflexes, the cerebral cortex accounts for uncertainty in unpredictable situations through contextual memory; by integrating context-specific aspects of an event, the brain creates a more accurate though less generalizable model which may progressively consolidate toward the core layer of certainty and resistance.

With the primary goal of minimizing prediction errors, individuals and organisms in general may alternate between changing sensory input to match predictions (performing actions) or changing predictions to better explain incoming sensory data. Such learning already begins in infancy; through their caregiver's predictable input, an infant can integrate sensory information into stable models of emotional and interpersonal consequences (e.g., caregiver physically soothes when infant performs action of crying). Actions as well as the generation and updating of beliefs allow them to exchange material and information with the environment while maintaining the Markov blanket boundary. For example, a hungry infant increasingly develops a differentiated sense of self as they are introduced to predictable combinations of intero-exteroceptive sensory signals and actions which facilitate breastfeeding. However, free energy (i.e., entropy) in the form of unresolved uncertainty or prediction errors may disrupt the infant's internal secure base from which to explore their environment (Holmes and Nolte, 2019). The boundary is destabilized and they are unable to properly evaluate their environment as a separate agent in order to manipulate it to their advantage. Consequently, early traumatic events may limit future sampling of environmental information (i.e., exploration/engagement of environment) and thus hamper one's ability to correct prior erroneous beliefs in light of new inputs. Future attachment-related psychopathology such as learned helplessness and deficient collaborative mentalizing may manifest as a result of selective informational intake and simplistic, dysfunctional internal models.

The neuroecological layer may be indirectly assessed through observable responses and neuroanatomical correlates of encoding information. Harnett et al. (2017) demonstrated positive association over time between glutamate/glutamine concentrations and post-traumatic stress severity in recently traumatized individuals. As glutamate is crucial to memory formation, alterations in glutamate networks may reflect cognitive symptoms of trauma. Higher availability of metabotropic glutamate receptors, specifically the subtype mGluR5, which mediate neuromodulatory effects of glutamate is reported in individuals with PTSD and is associated with an increase in avoidance symptoms (Holmes et al., 2017). It is possible that the higher glutamate receptor availability reflects synaptic adaptation in face of glucocorticoid signaling deficits within PTSD.

Entropy also appears to be a promising clinical diagnostic marker. Schizophrenia patients exhibited decreased temporal brain entropy in the right middle prefrontal cortex, bilateral thalamus, right hippocampus and bilateral caudate as well as increased temporal brain entropy in the left lingual gyrus, left precuneus, right fusiform face area and right superior occipital gyrus (Xue et al., 2019). A resting-state functional MRI analysis revealed that patients with Alzheimer's disease demonstrated increased entropy in the middle temporal gyrus and precentral gyrus as well as a negative correlation between entropy and network connectivity of intrinsic brain activity (Xue and Guo, 2018). As previously mentioned in Duncan et al. (2015), perception of events as traumatic was related to higher entropy and lower levels of glutamate in the PACC. A key insight from their data was that life events were measured through whether participants subjectively perceived them as traumatic or not. For example, one subject may consider an instance of bullying as traumatic whereas another would not perceive their own experience of bullying as traumatic at all. Therefore, entropy and glutamate levels do not reflect the nature of the life event "as real" but rather spontaneous activity's modification of one's perception of the event.

Trauma-related symptoms can be modeled within memory dysfunction as a result of altered resting-state functional connectivity. Cracco et al. (2020) found preliminary evidence of dysfunctional spontaneous activity in adult women with experience of childhood abuse as participants showed hypoactivation of the right temporo-parietal junction during a spontaneous cognitive mentalizing task, a region commonly implicated in the individual's "theory of mind" network (i.e., attributing states, beliefs, or perceptions to others). Using resting-state mean amplitude of spontaneous low-frequency fluctuation, Li et al. (2020) found that visual working memory was negatively correlated with severity of PTSD symptoms of earthquake survivors. For individuals with PTSD, visual information processing may be impaired and declarative memory of visual information subsequently. Symptoms such as flashbacks (i.e., visual re-experiencing of traumatic events), may occur due to altered functional connectivity related to vision. In particular, intrinsic functional connectivity between the visual cortex and cerebellum was shown to predict individual PTSD symptom severity and previous research has associated hyperactive function of visual cortex with PTSD symptom severity (Suo et al., 2020).

Spontaneous activity appears to play a critical role in continually shaping the processes of encoding and retrieving information which construct one's sense of self and their beliefs and actions. Northoff's neuroecological model of the brain describes spontaneous activity as the bottom most layer, formed through encoding of early life events utilizing spontaneous activity's internal modifying power which is reflected in the second layer of inter-individual variation in entropy and glutamate. Finally, these inter-individual differences relate to the surface layer of symptomology and clinical distress observed in clients. The incorporation of temporospatial neuroscience into clinical interventions should address the client's early hierarchical construction of bottom-up and top-down processes which influence how they relate to their environment and utilize relevant neurological markers in diagnosing a possible disorder. In contrast to models of the brain that involve passive modification, the neuroecological model recognizes the bottom layer, the brain's ability to actively modify its own temporospatial structure through attenuation or amplification of perception of events into temporospatial memory.

TRANSITIVE 1-2

The neuroecological layer is an underlying process behind all other functions which can be defined neurobiologically by signature patterns and rhythms of spontaneous activity. Emotional feelings and the content surrounding them operate on an implicit level. The aim of psychodynamic psychotherapy is helping make the unconscious conscious. The analysis of dreams may be particularly applicable for this phase, alongside interpretations of transferential dynamics. Insight and experience, in combination with a reduction of emotional valence of a traumatic experience, may allow previously compartmentalized information to be integrated into a coherent temporospatial structure.

More recently, dissociative symptoms which have been difficult to clinically treat have been hypothesized to be a disorder of integration, interrupting dynamic temporospatial activity at regional (e.g., insula, PACC, PCC, mPFC), network (e.g., DMN, Salience Network, Central Executive Network) and global levels (spontaneous activity; Scalabrini et al., 2020a). Subjectively, developmental trauma may result in the disconnection of self-experiences which may dysregulate the capacity of an individual to organize self-states into a cohesive overarching self (Schimmenti and Caretti, 2016). Physiological hyperarousal, spurred by consolidation of the traumatic event "threatens to overwhelm the mind's ability to think, reflect, and process experience cognitively. This is especially true of affective dysregulation that carries the person to the edge of depersonalization and sometimes self-annihilation. Continuity of selfhood is here most truly at risk, and it is here that shame contributes its own terrible coloring." (Bromberg, 2011, p. 23). Consequently, this can prevent the requisite transition from occurring.

Therapists and clinicians may be able to help traumatized individuals by addressing the relational verbal and non-verbal skills of the patient in the context of a secure therapeutic alliance. The therapist aims to facilitate a continuous and temporally extended and integrated sense of self and sense of relatedness, as well as an upregulation of the capacity for affect regulation. Neurologically, this process may be reflected by a reorganization of cortical/subcortical activity such that higher cortical areas (orbitofrontal cortex) can regulate, reprocess, and dampen affective arousal arising from subcortical areas (amygdala). Traditional approaches such as CBT (Kennedy et al., 2013), and psychodynamic therapy (Spermon et al., 2010) may address distressing symptoms associated with dissociation, yet these treatments alone necessitate advancement, especially for more severe cases. Adjunctive novel psychotherapeutic approaches, such as transcranial magnetic stimulation (TMS), have been beneficial particularly for treatment-resistant depression and potentially dissociation. TMS can be used to facilitate neural temporal-integration by stimulating areas such as the DMN in order to enlarge spatial and temporal scales and thus help with states of mental dissociation (Northoff and Scalabrini, 2021). Psychotherapeutic approaches designed to impact spontaneous activity have yet to be fully formed, though its inception has begun and is currently labeled spatiotemporal psychotherapy (ibid).

Movement 2: Affect-Soma

In this movement, the individual's cognitive functions may be recruited by one of their primary process affective experiences, or by somatic impulses. They identify with the emotion as they are not reflecting upon them. As such, they feel the emotion but there is no meta-awareness. Acting out may be a common phenomenon during this movement, for example an individual who identifies with anger may react by being physically aggressive. Another example may be a patient who has struggled with authority figures throughout his or her life and is now displaying some form of aggression toward the therapist. There is no subject-object distinction in this phase, which is why it would also fall within the spatial realm of anoetic consciousness and undifferentiated dimension.

In Panksepp's (1998) model of emotions and affectual systems (see **Table 3**), he concentrates on developing ideas behind individual systems interrelated within the neuroanatomical modulates within the brain impacted by a particular affective response. This correlation examines our predecessors, our "reptilian brain," and our developed forebrain establishing all executive functioning and everything in between. Panksepp discusses two types of consciousness: affective and cognitive. As psychotherapy evolves, a core concept in the evolution of psychotherapy is on fostering our cognitive control over our affective (or emotional) processes (Panksepp and Biven, 2012).

Many scientists define affectual experiences as a derivative of cognitive reflection based on bodily response as opposed to responses to only brain mechanisms. Panksepp, aiming to provide foundational relevance to our affective systems, focused on ancient aspects of our minds as essential for other higher mental states, noting "to understand the whole mind, we must respond to ancestral forms" (Panksepp and Biven, 2012, p. 14) which were first to be developed in our brain's evolutional maturity. Through a series of electrostimulation based studies, Panksepp investigated how instinctual behavior relates to emotional responses while engaging with various levels of conscious thought within affective awareness. Higher brain functioning would unequivocally fail as they are built upon a primary/affective foundation. Affects are primary experiences – emotional, instinctual affective-responsive behaviors – with visceral responses. All which are composed within several different subcortical systems within the brain (Panksepp and Biven, 2012).

Previous research presents cognition and emotion as separate entities and now we understand their integration in more depth. It is widely accepted that appraisals do not require conscious recognition. Hence emotions can be present without explicit stimuli. The mere presence of an emotion, without an obvious stimulus, involves historically based implicit memories (LeDoux, 1996). Anoetic consciousness is an affective implicit state of sensory-perceptual mental experiences. Outlined by its unreflective nature, anoetic conscious states involve an individual's "self-experience" (Vandekerckhove et al., 2014,

TABLE 3 | Seven core emotional systems.

Panksepp's core emotional systems	Structure	Functions
SEEKING system: Expectancy and Motivation	Ventral tegmental area (VTA), medial forebrain and lateral hypothalamus (MFB-LH), nucleus accumbens, medial prefrontal cortex via mesolimbic and mesocortical dopamine pathways Dopamine Norepinephrine Serotonin	Sensory perception Appetitive learning Addictions Emotional Needs Memory integration General arousal
RAGE system: Anger	Medial areas of the amygdala, hypothalamus, periaqueductal gray (PAG) ventromedial hypothalamic (VMH), acuate nucleus, lateral septum, neocortex(frontal executive regions), cerebellum and cerebellar cortex Gamma-aminobutric acid (GABA) Testosterone	Hormonal impacts Inhibition/Disinhibition of arousal Emotional "control" Social aggression (non-violent) Increase/decrease in aggressive response Energy depletion Sensitivity to touch Behavioral tendency toward aggression
FEAR system: Anxiety	Central amygdala, interior and medial hypothalamus, PAG in the midbrain, nucleus reticularis pontis caudalis	Autonomic nervous system Physiological and behavioral responses Arousal from pain Conditioned avoidance Anxiety (specific to fear response) Opiate receptor response Serotonin depletion or augmentation Distressing thoughts
LUST system: Sexuality	Medial region of anterior hypothalamus, interstitial nuclei of anterior hypothalamus (INAH), POA, VMH	Sexual urges and abilities Arousal Hormonal impacts Sexual bonding and competitiveness(vasopressin in males) Sexual and social motivation
CARE system: Nurturance	Anterior hypothalamus, paraventricular nucleus (PVN), dorsal preoptic area (dPOA), strial terminals (BNST), VMH	Dysfunction resulting in reduction of maternal behavior Nurturing offspring Hormonal changes (estrogen, progesterone, oxytocin) Regulation of separation distress
PANIC/GRIEF system: Separation	Paraventricular nucleus (PVN), hypothalamus, hippocampus, anterior pituitary gland	Stress hormone release (cortisol, adrenocorticotropic hormone) Energy production Separation distress control Creation of episodic memories Development of social memories and bonds Facilitates social cognition and benefits Self-regulation
PLAY system: Joy	Neocortex, thalamus, parafascicular complex, posterior dorsomedial thalamic nuclei, cerebellum, VMH, basal ganglia, amygdala, temporal lobes	Regulation of movement Arousal of emotional states Aggressive pathology Social capabilities and responses Symbolic interpretations of PLAY

p. 1). This state is foundational for acquiring knowledge and memory as well as the development of consciousness ("knowing-consciousness") which allows our memories to travel through space and time. The brain-body state within this movement of anoetic streams of consciousness depend on subcortical neural networks, thalamic sensory relay nuclei, basal ganglia, mesencephalic and diencephalic attentional and affective systems – all allowing further development of our anoetic state into a noetic state of world perception (IBID, 2014).

Anoetic affective awareness or consciousness transpire through ancestral aspects of our brain functioning. Positive emotions may reflect certain survival instincts and negative emotions may anticipate potential threats (Vandekerckhove et al., 2014). For example, Panksepp identifies neuro-coordinates within the SEEKING system associated with anoetic states of consciousness within individuals who are suffering from addictive behaviors. This driven state is involved in all appetitive behaviors motivated in stimulation of mental activity (Alcaro et al., 2021). Prior to the expansion into a noetic state of awareness, the anoetic state represents a disconnect between the self-concept in connection with the world around them or external experiences. Without the development of self-concept in a noetic state, the individual is unable to differentiate specific features of their surroundings or connect with conceptual past and present awareness. The eldest entity of our evolved brain is the medial temporal lobe inclusive of the hippocampus and parahippocampal gyrus. This area processes spatial routing and formation of abstract thinking which helps spatio-temporal and declarative memory, learning, and certain aspects of collective perception. Dysfunction within the SEEKING system is reasonably linked to addictive behavior when there is a disruption in the system's exploration to "maintain spontaneous and unfocused attention" (Alcaro et al., 2021, p. 6). There is a disconnect between weakened intrinsic exploration and impulsive functioning within the mind-brain. Panksepp solidifies research in support of this hypothesis, indicating patients with addictive disorders exhibit alterations during their resting-state brain activity with "intrinsic functional connectivity of medial cortical structures." (Alcaro et al., 2021, p. 6).

Neurobiological processes involved in addictive behavior revolve around the mesolimbic dopamine (MLDA) system. This system is cohesively involved in both classical conditioning and operant conditioning and is responsible for learning-associated

emotional and behavioral outcomes. Panksepp and colleagues hypothesize the involvement of the MLDA system with reinforcements by limbic structures and cognitive and motor sequences (IBID, 2021). Through the learning process of the SEEKING system, its function can be narrowed down to specific boundaries within its operations – narrowing its functioning to an individual's exploration toward a specific object or stimuli. For example, an individual who has learned to obtain a drug to achieve their desired state will continue to do so through reiteration which eventually reaches a complexity occurring without conscious thought or deliberation. An individual in recovery from drug addiction is known to still experience cravings after withdrawal symptoms disappear and act on habitual behaviors when presented with drug-associated triggers long after they restrict drug use (IBID, 2021).

Psychologists including Pat Ogden and Bessel Van Der Kolk have extensive research within client populations who experience somatic responses in their recovery post trauma. These clients are experiencing what constitutes an anoetic form of a natural bodily response within in response to a conditioned stimulus, such as a reaction to a loud noise from fireworks a war veteran would exhibit after they are reintegrated into society. There are conditioned emotional and cognitive processes that tend to disrupt an individual's ability to function interpersonally (Ogden and Minton, 2000). For example, in a disrupted emotional state, feelings of fear may heighten the individual's sensorimotor processes. Ogden and Minton state that in order for disruptive sensorimotor processes to be addressed clinically, we must also include the integration of the emotional and cognitive processing (IBID, 2000).

During this anoetic state and during sensorimotor processing within this movement, the client may be asked to start the integration of physical and emotional state to cultivate awareness and integrate these sensations as a way to understand their own cognitive processing. Awareness and self-regulation may not be achievable during this movement, but following this movement as the integration occurs cognitively, emotionally, and somatically. What is going on in the brain in the meantime is specific within this movement, systematically comprising various hierarchical higher and lower-level functions. The cortical (higher) levels of the brain are seen as mainly involved in our ability of abstraction, reasoning, understanding, language, and learning. Lower parts of the brain mature prior to the higher levels and are mainly associated with sensory integration and intersensory association (Ogden and Minton, 2000). The development of such higher levels is dependent on the development and functioning of the lower levels of the brain. Sensorimotor processing is foundational in the development of other areas, including integration of primitive areas (IBID, 2000).

Clients may experience an override of somatic or sensory experience. For example, from a top-down perspective, our higher cortical areas pursue our schedule for the day, optimally overriding any sensation we may feel during this period such as hunger or fatigue. "It's as though we hover just above our somatic and sensory experience, knowing it's there, but not allowing it to be the primary determinant of our actions" (Ogden and Minton, 2000, p. 153). The top-down and bottom-up perspectives offer two distinct directions for processing of information. The cortex offers top-down processing with cognition involved, observing and regulating the lower levels. Sensorimotor and emotionality is widely initiated from bottom-up levels of processing, fundamental to functionality (IBID, 2000).

In Damasio's somatic marker hypothesis, the non-conscious is acknowledged through a convergence of signals which influence decision making. This concept was proposed in recognition of acute disruption in social behavior due to damage in the ventromedial sector (Bechara et al., 2000). These defects impact the ability to apply logical reasoning, maintain attention, or develop language in response to thought. This hypothesis marks crucial components in overall decision making. Since emotions are mostly occurring through somatic changes in response to transient changes within the brain, the term "somatic" is referring to internal milieu, visceral, and musculoskeletal within the somatic experience (IBID, 2000). These somatic experiences are a reply to the body's response to regulation of experienced emotions, without direct experience in the body but in the brain's momentary representation of the body (IBID, 2000).

These somatic markers are experienced within the ventromedial prefrontal cortex (vmPFC) and the amygdala (Damasio et al., 1996). The vmPFC links authentic knowledge and bioregulatory states, which include emotionality (Bechara et al., 2000). An integral role of emotions fall within our ability to make rational decisions quickly even in more complex scenarios. Frontal lobe damage specific to the vmPFC is known to decrease one's ability to utilize emotions in guiding decision making processes. Given this, Damasio proposes that these changes in the body in response to certain stimuli are both a body and brain state including physiological states like increased heartbeat, changes in hormonal activity or digestive states in response to previously categorized stress. These corresponding bodily changes (somatic markers) become linked with certain stimuli over time (Damasio et al., 1996).

For example, a client who experiences symptoms of PTSD after exposure to a traumatic event may face similar situations where their brain has previously categorized fear and certain reactions are now activated in "higher-order association cortices" leading to vmPFC emotional re-activation from a previously adopted "factual-emotional set" where the brain adopts a pattern as an authentic experience when envisioning a futuristic outcome (Bechara et al., 2000, p. 297). During one phase of re-activation, called the "body loop," the brain has adopted a specific response to a stimulus where a somatic response distinctly changes in response to the activation, then relays those changes to somatosensory cortices. In the second re-activation phase, the "as-if body loop," the body is bypassed and the signals are sent to somatosensory structures within the brain which then adopt those patterns of re-activation. Establishment of these markers parallel to the situation qualifies the scenario deciding whether it is a positive or negative experience (Damasio et al., 1996). This hypothesis suggests that the individual's decision making process is impacted due to the patterns associated with uncertainty of future outcomes, thus the space and time to make this decision is limited, impairing effective cognitive processing (Bechara et al., 2000).

TRANSITIVE 2-3

Gestalt psychology often employs techniques that draw awareness to non-verbal non-conscious movements. Attention is diverted, and may be used to facilitate awareness. Psychodynamic systems may follow with a clarification, confrontation and/or interpretation of emotions at play (Kernberg, 2016). One may further use bottom-up approaches to target somato-affective processes, such as Pat Ogdens sensorimotor psychotherapy, Peter Levine's somatic psychotherapy and Bessel Van der Kolk's limbic psychotherapy. Other examples include (but are not limited to) dance therapy and yoga.

Movement 3: Protothought-Image

In this movement, the individual perceives the environment through images as a result of interactions between predictive and sensory-perceptual systems. Mental imagery in one's stream of consciousness is also now available as the parietal cortex is capable of influencing the visual cortex. Mental images may enable an individual to contain visceral emotions and responses by forming associations and giving shape to a representation which can be further explored in a clinical environment. In this sense, mental images may be considered a form of proto-thought. Inherent in this movement are somato-affective experiences alongside perception and images. Primary process emotions compose our experience but there is no discernment or discrimination of emotions. There is now some subject-object distinction. Bion (1963/2018) considered dreams to be a form of proto-thought, necessary for the functioning of the whole.

Mental imagery constitutes visual representations and accompanying sensory information in absence of an external stimulus (Blaisdell, 2019). There is evidence that an individual's early visual cortex (V1 and V2) contributes to the ability to perform visual imagery and distinguish between different imagined stimulus exemplars (i.e., imagined variations of a reinforced stimulus) (Ragni et al., 2020). Vividness of visual imagery, however, varies widely from pervasive disorder-related hallucinations to a complete absence of mental images (i.e., aphantasia), related to hypoactivation of posterior occipito-temporal cortices and hyperactivation of the anterior cingulate (Zeman et al., 2010). Visual imagery vividness appears to be related to posterior brain regions (e.g., higher order visual cortices), but inversely related to activity in frontal regions, illustrating a possible compensatory function of frontal region activity when experiencing difficulty in generating mental images.

The ability to generate images in the individual's "mind's eye" may be rooted in animals' common ability to engage in associative and causal learning. In forming predictions and causal knowledge, humans and other animals retrieve representations of associated events which inform and guide behavior. Fast et al. (2016) demonstrated that a functioning hippocampus in rats was related to their ability to behave according to previous representations of events (i.e., act in absence of a previously conditioned visual stimulus). As the hippocampus is involved in the retrieval of representations of missing events (i.e., memories), environmental cues may trigger related sensory information or outcomes such as the presence of food. As a result, animals can form novel combinations of associated representations which enable them to anticipate and simulate future events. This primordial form of mental imagery and representation may remain in our dream-thought and dream imagination. Some form of archaic mind-wandering may have already evolved before the arrival of endothermic animals (mammals and birds) as reptiles have been shown to exhibit neurophysiological correlates of REM sleep (Shein-Idelson et al., 2016). According to Jung, dreams and related thinking such as active imagination are not only the symbolic content of our inner affect but are also a type of primary process thinking in which noetic images form complexes that shape the verbal narratives which define our identity and behavior (Alcaro and Carta, 2019). However, if an individual's respective imagery is unable to sufficiently contain their affective states, then they may be projected onto their external perceptual world such that the individual is unable to differentiate between impressions from external reality and internal projections.

The neural mechanisms of mental imagery may be compromised in certain disorders. Individuals with chronic schizophrenia exhibited lower activation of the posterior parietal cortex compared to healthy controls when performing mental imagery tasks (i.e., mental hand-rotation; Mazhari et al., 2015). Hach et al. (2014) demonstrated within depressed patients relatively lower recruitment of brain regions related to memory specificity (e.g., the hippocampus, during autobiographical memory tasks). Mental imagery may be clinically assessed in its impact on the individual's emotions and behavior. For example, one might experience a maladaptive kind of "mental time travel" in which they visualize images of future situations that ultimately foster actual distress or danger to them. Pile and Lau (2020) found that adolescents' experience of negative intrusive prospective imagery or flash-forward, may be associated with generalized anxiety (GAD) and depression (i.e., the impact of flash-forward is positively related to GAD and depression). Their data also suggest that the use of suppression as an emotional regulation strategy does not alter the vividness of mental imagery but rather worsens the impact of flash-forward within GAD. Consequently, clinicians working with generalized anxiety may also involve exploring suppression.

Suicide-related flash-forward may play a unique role in bipolar affective disorder. Hales et al. (2011) found that individuals with bipolar disorder relative to unipolar depression (1) had greater trait propensity to use mental imagery in general and (2) were more than twice as likely to report that suicide-related imagery was compelling in completing suicide. Such imagery was considered as both comforting and/or distressing. Suicide-related flash-forward may be experienced as comforting if the image is consistent with the individual's goals to complete suicide or distressing if the imagery is in conflict with their ambivalence on suicide. Further development of a functional analysis of suicide-related imagery and assessment risk may provide a helpful tool for clinicians working at an image-level with clients experiencing intrusive prospective imagery of self-harm or suicide.

In one of the most commonly diagnosed disorders, depression, clinical reports of negative intrusive imagery include scenes of past early physical or sexual assault/abuse, humiliation, failure, and overwhelming sadness (Holmes et al., 2016). For example,

one might visualize the loss of a loved one or being bullied/yelled at. In addition, depressed individuals appear to experience (1) less vividness in positive self-generated imagery relative to negative imagery, and (2) retrieve less specific memories or more over general memories (OGMs) when recalling positive events. This impoverished positive mental imagery may impede depressed individuals' ability to experience positive affect and navigate interpersonal problems.

TRANSITIVE 3-4

Existing at the border of non-conscious and conscious experience, images precede linguistic thought, and may be used to facilitate greater awareness. In psychodynamic literature images may arise as an attempt to process the potentially overwhelming impact of affect. As a consequence of this rigidity, psychological events are frozen in service of mastery. Free association in relation to representations may enable the expression of affect and somatic based signals considered to be subconscious. Examining intrusive images or the spontaneous generation of an image while experiencing a somato-affective experience (such as Cycling; Chan, 2021) may be quite productive in the pursuit of insightful experiences.

Movement 4: Associative-Non-linear

This movement is primarily concerned with passive mind wandering and actively, an associative action that may facilitate the development of linear thought. It is creative by nature, non-linear. Free association capitalizes on this capacity and may be passively recruited by primary process affect. Associative introspection induces the exploration of content related to the Default Mode Network (DMN), a neural network dedicated to resting state activity correlated to functions such as self-referential processing, social cognition, prospection, and autobiographical recall.

Although resting-state activity may enable an individual to generate spontaneous and imaginative thoughts, it appears that aberrant functional connectivity within regions related to the DMN are related to the dysfunctional thoughts observed in some disorders. Philippi et al. (2018) demonstrated in women with varying depression histories that negative self-focused thoughts (SFT), repetitive thoughts about negative aspects of oneself (e.g., feelings of worthlessness and self-blame), were associated with increased resting-state functional connectivity (rsFC) between the DMN and the frontoparietal network (FPN). Because the DMN is related to internally focused contents while the FPN involves goal-directed behavior and externally related information, the increased rsFC between these two networks during resting-state may reflect an over-recruitment of FPN regions in order to compensate for high levels of negative-SFT that occur in depression. Similarly, major depressive disorder has been related to increased global connectivity within the DMN, i.e., abnormal strong connections with non-DMN networks (Scalabrini et al., 2020b). This increased global representation of DMN activity may represent the "enslavement" of input-output processing in which brain activity increasingly revolves around the DMN. Consequently, a depressed individual may have difficulty switching attention from self-generated thoughts toward external stimuli and from rumination to thoughtful reflection. In regards to adolescents with major depression, participants who had attempted suicide compared to those without a history of suicide attempts and healthy controls showed decreased rsFC of the left middle frontal gyrus with the left superior parietal gyrus (Schreiner et al., 2018). They also exhibited decreased rsFC between the left superior frontal gyrus and the right anterior cingulate cortex. It appears that an abnormal left fronto-parietal circuit which is involved in decision-making and choice is an underlying neural mechanism related to suicidal behavior associated with depression. Taken together, if an individual experiences a reduced ability to exert cognitive control, then such aberrant functional connectivity may allow for dysfunctional, sometimes dangerous, thoughts to pervade their experience.

How may functional affective content which motivates our regular behaviors sometimes develop into depression or ultimately suicide-related thoughts? This progression may manifest when self-generated thoughts (SGT; e.g., mind-wandering, memory retrieval), lose spontaneity and become increasingly cognitively inflexible. Patients with major depressive disorder MDD tend to engage in maladaptive SGTs such as excessive rumination and worry (Hoffmann et al., 2016). Depressive rumination involves repetitive and passive focus on causes and implications of distressing symptoms, while worry constitutes future-oriented thoughts and images in an attempt to anticipate threats. Rumination appears to be related to (1) vulnerability for developing MDD (2) duration of MDD episodes and (3) probability of relapse (Nolen-Hoeksema et al., 2008). Under a cognitive framework, early traumatic events may cause an individual to internalize negative self-referential schemas which alter their encoding of information and later retrieval of memories. Depressive rumination and worry may occur as a result of ineffectual processing and reflection. Compared to controls, depressed subjects evidenced higher levels of negative SGTs, and even positive SGT's were rated lower and more negatively (Hoffmann et al., 2016). These results are in concordance with the notion that individuals with MDD experience a lack of positive affective content from which to explore solutions to their distressful symptoms. Sharifi et al. (2017) found increased levels of depression and anxiety among elderly individuals who exhibit deterministic thinking which were mediated by loneliness. It appears that losses or distress in personal and social functioning may foster increasingly inflexible narratives which constrain our subsequent attitudes and behaviors in the future.

Similar to depression, aberrant functional connectivity within the DMN appears to relate to dysfunctional cognitive processes in schizophrenia (e.g., association, retrieval, attribution), which may contribute to disorganization and disturbance of thought. Stegmayer et al. (2017) found that negative formal thought disorder (FTD) (i.e., poverty of thought), was associated with increased resting-state cerebral blood flow (rCBF) in regions of semantic processing in the temporal lobe. Their data suggest that patients with negative FTD may be ineffectively attempting to access words or meaning within their lexical-semantic memory. In addition, increased blood flow in the precuneus, involved in

working and semantic memory, may be part of the individual's neural effort to retrieve verbal information. Patients with positive FTD (e.g., distractibility or illogicality of thought), showed increased rCBF in the supplementary motor area, inferior frontal gyrus, and frontal lobe, suggesting that they experience increased speech production as well as difficulty in suppressing inappropriate mental activity. In a morphometric study of FTD in schizophrenia, Palaniyappan et al. (2015) found that a reduction of gray matter volume involving the striatum, insula, precuneus, and lateral prefrontal regions predicted severity of negative FTD. Interestingly, severity of negative FTD was also predicted by an increased gray matter volume in the prefrontal regions and dorsal anterior cingulate cortex. Social cognitive impairments and symptoms of schizophrenia are reported to correlate with abnormal over-activation of the posterior temporal cortex and temporo-parietal occipital junction, related to self-processing and face recognition (Yildirim et al., 2017). In addition, patients with schizophrenia exhibited increased misrecognition of facial emotions that correlated with disorganized thought, suggesting that the inaccurate or disorganized representation of another person's mental or emotional state disrupts the integration of external contextual information and internal emotional representations. As a result, the individual with schizophrenia may experience disorganized thinking (e.g., bizarre speech, derailment, withdrawal). Because stable, accurate identification of emotional states of the self and others are important in organized thought-processing related to relationships and daily functioning, programs for individuals with schizophrenia may benefit from helping to build social cognitive skills (Horan et al., 2017).

TRANSITIVE 4-5

Free association or the continual exploration of sensation, images, feelings and thoughts (SIFT; Siegel, 2012) eventually coalesce into linear thought as it applies to concrete thinking, which transitions into abstract coherence. Rogerian paraphrasing and reflection may assist the patient in developing more organized forms of thinking while developing therapeutic rapport. Mindfulness based approaches such as open monitoring may increase one's awareness toward the content and process of an individual's mind.

Movement 5: Linear-Concrete

Concrete linear thinking describes a mode of thinking that relies heavily on what we observe in the physical world around us. The prefrontal cortex (PFC) lies as the seat of thinking, but different neural regions within the PFC are activated depending on the level of concreteness/abstraction of thought. Using fMRI, Christoff et al. (2009) investigated the neural correlates of different modalities of thinking (i.e., level of concreteness/abstraction), the results of which revealed that concrete concepts recruit more posterior PFC regions (vlPFC). These results are consistent with the developmental trajectory of the PFC; posterior regions develop first, followed by more anterior regions, mirroring the growth and progression of concrete to abstract thinking that emerges as children develop. Evidence from lesion studies also support these findings by showing that posterior PFC lesions can result in an impaired ability to perform concrete tasks (Badre et al., 2009).

Evidence pointing to more posterior PFC regions has also emerged via studies on the temporospatial dynamics of different neural regions recruited during object-recognition tasks. Wutz et al. (2018) found that concrete, stimulus-based object recognition was associated with increases in gamma-band oscillations in the vlPFC. Gamma-band oscillations have been shown to be associated with bottom-up cortical processing (Engel and Fries, 2010). Thus, concrete object recognition may be governed by bottom-up processing, involving the vlPFC which receives direct input from the inferior cortex via the ventral stream (i.e., the "what" stream). Further, a meta-analysis of neuroimaging studies on the neural representations of concrete concepts found that concrete concepts more heavily recruited the perceptual system (Wang et al., 2010). More specifically, thinking in concrete concepts consistently activated the left superior occipital gyrus, the angular gyrus, and the culmen. These findings suggest concrete conceptual representation and concrete linear thinking may involve mental imagery vis-a-vis the perceptual system.

Developmental psychologist Jean Piaget, known for his work on child development and cognitive development, delineated cognitive developmental stages through which children mature through as their cognitive functions develop and grow in capacity over the life span. The ability to engage in concrete linear thinking roughly corresponds to what Piaget termed as the "Concrete Operational Stage" (ages 7–11 years old). As children reach this stage, they develop the capacity for logic and reasoning, and they gain the capacity to organize objects into hierarchies of classes and subclasses. However, logical thinking and mental organization is still limited to concrete information they can perceive directly (Berk, 2018). This can also be conceptualized as stimulus-bound thinking, in that thinking is directly related to the stimulus by which the thought is provoked.

Linear concrete thinking also includes what Jaak Panksepp termed as *tertiary-processes,* which can be thought of as higher-order cognitions/thoughts that are elaborated by medial-frontal regions and permitted by the massive encephalization as humans evolved from primates (Panksepp, 2010). Such higher-order, neocortically based cognitive processes rest on a foundation of *primary-process emotions* (basic-primordial affects, sub-neocortical) and *secondary-process* emotions (learning via basal ganglia, limbic-based). The blending of *primary* and *secondary* process emotions and affects with a linguistically based neocortical analysis allows for an elaborated interpretation of experience, a conception of a felt-experience that can be put into words and given meaning (Davis and Montag, 2019). For example, an individual in a state of hunger will start to formulate emotional-thoughts related to their hunger (e.g., "I feel hungry"), and may begin to virtually simulate ways in which food can be attained. Such processes are cortically elaborated cognitions pertaining to felt affects. The ability to linguistically describe felt affects can also serve a positive function, correlating with a

decreased amygdala response and an increase in right prefrontal activation (Cozolino, 2014).

In a clinical setting, maladaptive concrete linear thinking and feeling may manifest when the patient's thoughts are solely populated by current mood congruent ideas and feelings. This often occurs in the context of Borderline Personality Disorder (BPD), a mental disorder characterized by unstable moods, behaviors, and relationships. Specifically, a patient with BPD may engage in what is known as dichotomous thinking, a form of concrete linear thinking in which an individual thinks in terms of binary, all-or nothing categories. Individuals with BPD have been shown to engage in higher levels of dichotomous thinking when making appraisals and interpretations of others compared to non-BPD patients (Arntz and ten Haaf, 2012). For example, an individual with BPD may oscillate between feelings of love and feelings of intense hatred toward a significant other, depending on their current mood and situation. Such dichotomous thinking and cognitive appraisal of the significant other lacks the nuance and complexity characteristic of healthy social cognition, which would be more balanced and well-rounded. In addition, there is a marked absence of abstract, temporally based thinking which would enable the patient to think of all aspects of the relationship at once, rather than only positive or negative aspects as they appear in the current moment. Linear concrete thinking in this manner may keep the client trapped in the present moment, unable to think about aspects of the relationship that occurred in the past or that could potentially occur in the future. High emotion sensitivity combined with a bias toward negative emotion may result in diminished cortical activity, causing deficits in cortically mediated emotional regulation, and an upregulation of more primitive, limbic emotional-based responses that are triggered by the present emotion-laden moment. Clinicians may find it helpful to encourage the individual to reach into their memory and take into account other past experiences in order to build a more nuanced interpretation during emotionally charged situations.

Another clinical illustration of maladaptive concrete linear thinking can be seen in individuals presenting with substance use disorder, for whom thought processes related to obtaining and using a certain substance often dominates their mental space. Such individuals may find themselves constantly thinking about the substance in question, especially in situations in which the substance in question is present. Thoughts about the substance can also be triggered by environmental cues. Depending on the degree of dependence, some clients may think about a substance to the exclusion of almost every other area of their life, demonstrating the strong mental grip that substance abuse can have on a client's mental life. As a consequence of tolerance and withdrawal, such individuals may experience strong urges to use, resulting in *tertiary-process*, affect-congruent thoughts that revolve around the substance.

TRANSITIVE 5-6

The transition from linear thoughts to abstract thought entails the necessity for the individual to develop multiple perspectives about singular events, beyond what is physically and temporally available. There is a connection to be made as information is assimilated or accommodated into pre-existing frameworks of knowledge. Approaches such as mentalizing affords the patient the capacity to begin incorporating other perspectives beyond their own. Logotherapy in the form of externalized thought and dereflection may enable sufficient mental space for a client to imagine novel approaches (Baumel and Constantino, 2020). Socratic questioning in cognitive behavioral therapy may also be beneficial. New questions facilitate the development of new paradigms, increasing the complexity and veridicality of a concrete perspective. Furthermore, the introduction of thought records provides a structured approach allowing the individual to have less biased perspectives. Journaling can also be used as an effective intervention to facilitate the emergence of divergent perspectives and emotional development.

Movement 6: Abstract-Relational

As individuals mature into adolescence and adulthood they develop the ability to form and employ abstract conceptual thought processes in order to build abstract models of the world and apply those models to various situations. Abstract concept formation entails the ability to extract commonalities and distinctions across a set of experiences in order to structure and organize knowledge. Neural structures critical to concept learning include both the vmPFC and hippocampus, which have been found to form a functional alliance when encoding new information that overlaps with prior experiences (Preston and Eichenbaum, 2013). This functional circuit is thought to underpin both the acquisition of conceptual and abstract knowledge and serve as a foundation for conceptual decision making (Kumaran et al., 2009). Hippocampus functioning is thought to facilitate pattern completion, pattern separation, and memory integration (Mack et al., 2018), while the vmPFC mediates the active integration and evaluation of such associative information provided by the hippocampus. The vmPFC may also play a further role in down-weighing irrelevant stimuli features and up-weighing relevant stimuli features to efficiently categorize and structure new information into existing abstract and conceptual models (Mack et al., 2019). The rostrolateral prefrontal cortex (rlPFC), one of the final neural regions to reach maturity in humans and also one of the largest cytoarchitectonic areas in the brain (Dumontheil, 2014), constitutes one of the main neural regions supporting higher order abstract thought. It appears to support the ability to temporarily disengage from space and time, which allows for mental time-travel, social cognition, mentalization, and theory of mind.

These processes also correspond to Panksepp's *tertiary-process* emotions as prefrontally elaborated higher order cognitions and include memory-related cognitive functions such as "Episodic Memory." "Episodic Memory" entails the encoding of specific information of a particular occasion within a particular context, the reactivation and explicit representation of which form the foundation on which a continuous and temporospatial sense of "self" develops. This capacity permits a deep self-consciousness and meta-cognition, allowing an individual to mentally represent themselves as a

continuing existence embedded in specific episodic contexts. Also permitted is the ability to escape the phenomenal present vis-a-vis mental time travel, directed to past events, to potential opportunities in the present time, and to future, "prospective" possibilities. Such autobiographical self-processes engage widespread networks within the right frontotemporal region, including the hippocampus, related medial temporal lobe structures, mPFC, ACC, posterior cingulate/retrosplenial cortex, precuneus, temporal poles, and the temporo-parietal junction (Vandekerckhove and Panksepp, 2011).

Closely related to the process of abstract thought formation is a notion that Piaget first introduced called "schemas" (Piaget, 1926). Schemas can be conceptualized as superordinate knowledge structures that individuals use to organize and categorize information in order to facilitate the perception and organization of new knowledge. Such structures dynamically evolve with new experiences and memories, and individuals can either assimilate new knowledge into an extant structure or modify their schemas to accommodate new knowledge that is inconsistent with the current model. Research into schema instantiation and reformulation has implicated the vmPFC as a key brain area involved in schema networks, interacting with the hippocampus to activate prior knowledge and assess the resonance between incoming information and existing schematic representations (Gilboa and Marlatte, 2017). The new schematic representation then becomes instantiated as a schema and integrated as a new memory, which is underpinned by hippocampus-mPFC theta-band coupling (Backus et al., 2016). Evidence has also emerged pointing to the anterior cingulate cortex as a structure critical for schema expression and assimilation (Wang et al., 2012), as well as mental flexibility (Mogadam et al., 2019).

The ability to form schemas and engage in higher order abstraction corresponds to a stage of cognitive development that Piaget termed the "Formal operational stage" (11–16 years old and onward). At this point, children develop the capacity for abstract and systematic thought, higher-order logic, and metacognition. Logic is no longer limited to concrete information, and children begin to develop the capacity for scientific thinking (Berk, 2018).

In a clinical context, neurodevelopmental disorders such as Autism Spectrum Disorder (ASD) may result in an impaired ability to engage in abstract thinking. Many individuals diagnosed with ASD experience limitations in their ability to think abstractly and instead rely more heavily on concrete thinking in order to solve problems and navigate the social world. For many such individuals, thinking is limited to what is in front of them, and they are often unable to generalize information into concepts. A study by Mogadam et al. (2019), using Magnetoencephalography (MEG), found that children diagnosed with ASD showed a stronger reliance on the posterior parietal cortices to complete a mental flexibility task compared to controls, suggesting that their ability to think abstractly to solve mental flexibility problems relies more heavily on the perceptual system, which is typically recruited when individuals engage in concrete linear thinking. Empathy, creativity, and flexibility may be impaired in individuals experiencing deficits in abstract thinking, who instead rely more heavily on what they can currently perceive to solve problems, interact with others, and engage with the world. Creative cognition appears to underlie response inhibition that proactively prevents previous responses or behaviors from interfering with novel ideation. Beaty et al. (2016, 2017) demonstrated that response inhibition requires dynamic interactions of large-scale brain systems, in particular, between the default mode and executive control networks. While these two networks generally have an antagonistic relationship, they dynamically interact to enhance creative cognition.

Abstract thinking, and in particular social cognition, may also depend on the brain's motor system. Based on empirical findings, Khalil et al. (2018) propose a multilayered neural network model of ASD that includes the motor neuron system (MNS; motor system, basal ganglia, insula), and a "mind-reading network" (prefrontal cortex, anterior cingulate cortex, temporoparietal junction). The MNS is critical for understanding and imitating the behavior of others, whereas the "mind-reading network" allows for reasoning about others' mental states, social decision making, and cognitive perspective taking. Under this framework, observation and imitation of behavior acts as a base layer of information that is elaborated into higher-order functions such as theory of mind skills and complex social cognitions. Khalil and colleagues contend that dysfunction of the MNS and its dynamical interaction with the "mind-reading network" may underpin the motor and social cognition based symptoms of ASD, resulting in deficits in action imitation, learning motor actions, and social cognition.

Maladaptive abstract thinking may also take the form of excessive rumination, often seen in patients diagnosed with depression. These patients may constantly ruminate on negative thoughts/emotions and engage in negative self-talk and self-criticism, finding it difficult to think more concretely and in the present moment. Abstract rumination is a common thinking process reported by depressed individuals (Watkins, 2016), which typically involves repeated thinking about higher-order aspects of a situation. This can take the form of reasons for and implications of a situation, and can include over-focusing on the meanings and consequences of one's negative emotions. For example, abstract rumination can take the form of thoughts such as "what is wrong with me" and "why can't I handle this better." Dey et al. (2018) examined the extent to which high dysphoric and low dysphoric individuals engaged in abstract thinking while completing a decision-making task, and found that high dysphoric participants demonstrated more abstract thinking and worse outcomes on decision-making measures before and after they made decisions about both personal and hypothetical scenarios. They also found an association between depressive symptoms and longer task completion time when these individuals engaged in abstract thinking, relative to concrete thinking. These results suggest that abstract thinking in depressed individuals could contribute to decision-making difficulties, and that facilitating the use of concrete thinking may reduce these difficulties. Watkins et al. (2011) found that when people with depression were asked to think about a recent upsetting event and encouraged to break down the event into concrete details and consider how those concrete details

influenced the outcome, depressive symptoms (e.g., rumination, worry, etc.) were reduced. In this context, concrete thinking may be beneficial because it encourages individuals to vividly imagine an event happening in the present moment and prompts them to confront it. Watkins et al. (2009) developed an intervention called concreteness training (CNT), which assists patients in stepping out of abstract thinking styles and stepping into more concrete ones.

Dysregulation of self-processes may also manifest as an unstable mental self. For example, social anxiety disorder (SAD) is characterized by intense feelings of fear and anxiety related to social situations, excessive self-attention, and somatic interoceptive sensations. SAD has been linked to hypoconnectivity within the DMN and to hyperconnectivity between the DMN and the amygdala and salience network during the resting state. This pattern of neural activity is thought to reflect a predisposition to emotional dysregulation and decreases in self-reflection and social cognition during resting states, which Angeletti et al. (2021) describe as a trait feature of an "unstable social self." During SAD-sensitive situations, this "unstable social self" is abnormally aggravated, inducing hyperactivity between the DMN and the amygdala and salience network.

TRANSITIVE 6-7

There exists a subtle but important difference, when considering abstraction and the subsequent phase termed merging. The difference is the employment of abstractions; more specifically into behavioral manifestations of insight and awareness that have been achieved. An example of this from a psychodynamic perspective might be an individual suffering from maladaptive relational patterns. After treatment, they may become aware of the pattern's historical development and function, plan for the future and exercise self-regulation in moments of vulnerability. This encapsulates the idea of working through. From a CBT perspective, behavioral experiments, such as "acting as if", may be implemented and then consequences examined. As evidence increases for potentially beneficial behaviors, abstractions become verified, consolidated and embodied. From an ACT approach, this would entail the identification of an individual's value system, and the pursuit of living a life more in accordance with this system via identifying and applying novel behaviors.

Movement 7: Merging-Integration

Movement 7 refers to a stage in which all prior layers are now integrated and abstractly related to each other, and tested out in reality. At this stage, the goal is to use newfound conceptual experiences and apply them in reality, which will facilitate their imprinting in implicit systems. By using newfound conceptual experiences and applying them to the real world, the individual will start to accrue evidence that either supports or disproves conceptual experiences.

The facilitation of conceptual knowledge into embodied real-world knowledge happens as top-down processing from higher cortical areas converges with bottom-up processing from sensory/perceptual areas, as our pre-existing conceptual models converge with incoming perceptual and experiential information to integrate, synthesize, and construct new representational models. This process of continual refinement of mental representational models via experience corresponds to a contemporary framework of neural functioning that views the brain as a predictive inference machine, always working to optimize probabilistic representations of the world by comparing incoming sensory input to its own extant representational models (Friston, 2010). Conceptual learning and the formation of ever-more predictive abstract models of reality can be conceptualized as a process of continual refinement in which incompatible sensory/perceptual experiences prompt us to modify our current schemas to make better sense of the world. Alternatively, we can alter our relationship to the environment such that incoming sensory/perceptual information is compatible and can be assimilated into our current schemas. Conceptual learning under this framework occurs as a consequence of iterative feedforward and feedback loops unfolding in the context of brain-environment relationships.

At this stage, a clinician might assist an individual to live in accordance with all of their inner self-processes (i.e., all of the previous layers). Chan (2021) defines this state as "Embodied Symbiosis": "the relating of the conscious self-process with complex and primordial self-processes in service of experiential truth and meaning" (p. 235). Embodied Symbiosis results in the harmonization of both conscious and unconscious processes, resulting in novel conceptual paradigms and new emotional experiences that can be embodied and tested out in the real world. In a clinical setting, it is typical for clients to present with a history of cyclical maladaptive patterns in relationships. From a psychodynamic perspective, these relationships may be re-enacted in the therapeutic relationship, taking the form of rupture and repair. As insight and a corrective emotional experience is acquired, there is the expectation that the client will begin shifting their capacity to relate to others through the new internalized therapeutic relationship. To bolster this process, it may be beneficial to implement a behavioral experiment, in which the clinician can encourage and guide the client into testing out novel ways of relating to others.

Key to the corrective therapeutic process is the quality of the therapeutic relationship which has been found to be a critical ingredient of psychotherapy and the largest factor mediating positive therapeutic outcomes (Koole and Tschacher, 2016). A strong therapeutic alliance, characterized by empathy, trust, and mutual understanding, may facilitate what Scalabrini et al. (2018) term "relational alignment", a base-layer of self-processes given by the first relational encounter with a caregiver and instantiated as a consequence of continued interactions with a caregiver and their capacity to attune with the mind-brain of the infant in the context of a secure attachment and safe environment. Attunement with the infant facilitates the process by which their mind-brain becomes relationally aligned with the world, both in time and space. Disruptions in "relational alignment", for example through trauma or the lack of nurturing attunement, may lead to dysregulation of self-other processes and the development of personality pathologies. A strong therapeutic

alliance promotes relational healing by fostering the creation of a healthy relational alignment between the therapist and patient in a safe and secure environment, allowing for the development and maturation of healthier self-processes.

One of the ways relational alignment can be (re)-equilibrated in the context of the therapist-patient dyadic relationship is through what Stern et al. (1998) define as "now moments." "Now moments" refer to an emergent property of the complex, dynamic therapeutic process, representing moments that challenge the habitual therapeutic process (i.e., the way the particular therapeutic process had been operating so far) and open the space for a potential transition to a new intersubjective and relational context. These moments represent opportunities for non-linear jumps in the therapeutic process, creating anxiety for both the therapist and patient as they are both on unfamiliar ground. During this unstable moment, the therapist and patient can either resort to habitual ways of interacting, or can introduce novelty into the relationship, accompanied by alterations in the intersubjective environment. In turn, should the "now moment" be seized upon, therapy resumes with a new "way-of-being-with-the-other."

TEMPOROSPATIAL GRID

When combined, we have a series of temporal movements matched to dimensions of space. These movements operate through iterative cycles. As soon as thoughts and emotions are integrated to high levels of maturity they eventually (re)consolidate, moving from explicit to implicit modes of functioning. The undifferentiated (U-D) dimension of space is the ground on which everything else functions. It is completely relational and paired with the neuroecological layer. These dimensions are continually defined and redefined, as one builds upon their narratives that develop into different relationships with themselves and the world. This grid should not be used to define the entirety of an individual, as there are varying degrees of development within the biopsychosocial-existential spheres. It is useful with particularly salient challenges, or in classical terms the presenting problem.

CASE EXAMPLE

The following is a brief example of how this grid may be used to guide practice. Sessions are generally not as "clean" as what is about to be presented; nonetheless, it is an example that can clarify direction. Many times, one may find a problem lies in a transition between movements, or dimensions, in which case, one may simply mark an X between the dividing lines. The question to ask oneself is," Where in the developmental process of emotions and thoughts is the client operating from in relation to their presenting problem(s)?"

A 40-year-old, married Hispanic male presented with a propensity to cheat. He has three children. In addition, his medical history was unremarkable. He arrives at the behest of his wife who desires to maintain the relationship. He also notes his interest in continuing his marriage. Initially, he does not see cheating as a problem. He repeats "this is just how men are, women will never understand." He could not provide a narrative about why he cheated other than simply claiming that when a biological urge arose, his job was to satisfy it. At this point an X can be marked on the spatial dimension UD and the neuroecological temporal movement (TM1). He was operating from attachment patterns he was unaware of, and could see no substantive consequence of his actions.

In another session, the client arrived and revealed that he met somebody new, and that he was interested in pursuing her. When asked to share any bodily or emotional experiences, he revealed high levels of lust and concluded that "when I am with

Temporospatial Grid	**Undifferentiated Dimension (U-D) Non-Conscious -Non-duality -Attachment -Implicit, Body, Autonomic System -Secondary Emot. -Passive**	**1-D Anoetic Consciousness - Primary Emot. - Preconscious - Acting out, projection, transference -Passive-Active**	**2-D Noetic consciousness -ToM, self-rep -Thinking -Semantic -Insight w/o application -Active-Passive**	**3-D Autonoetic consciousness -Meta-cog. -Mentalizing -Self-regulation -Explicit Mem. -Active**
Temporal Movement 1 (TM1) Neuroecological				
Temporal Movement 2 (TM2) Affect-Soma				
Temporal Movement 3 (TM3) Protothought-Image				
Temporal Movement 4 (TM4) Associative-Non-linear				
Temporal Movement 5 (TM5) Linear-Concrete				
Temporal Movement 6 (TM6) Abstract-Relational				
Temporal Movement 7 (TM7) Merging-Integration				

her, I feel the impulse, and am unable to think and control my actions." While talking about her, he began to feel them once more. He was asked to "sit with the experiences, and share any sensations he was having." More minute experiences of lust were uncovered, and previous bodily experiences he was not aware of were brought to his awareness (TM2 and UD). After a few minutes of processing sensations, they passed. As the patient continued to undergo psychotherapy, he was able to trace back his belief to how his father cheated on his mother and she simply accepted this. When asked to share any other spontaneous thoughts, he recalled old memories, such as reinforcement from his friends and moments his father expressed pride in his capacity to maintain his relationship alongside the quantity of extramarital affairs. He began to consider how his past was influencing his present, and began experiencing psychological incongruence (but did not know why), though he continued to cheat due to a failure to regulate his strong impulses (TM4 and 1D).

The client's narrative began to develop, but he was still basing his actions on physical stimulation being a necessity for stability and he was unable to think beyond his immediate environment (TM5). The therapist decided to engage his theory of mind. She begins to ask questions regarding the effect that his behaviors may be having on his wife. His responses were self-centered at large, responding that she should not care and just recognize that this is who he is. When asked how he would feel in her position he divulges that his reaction would be quite negative. The process of questions led to the examination of her intentions of sending him to therapy, her reactions to her discovery of him cheating and consideration of her as a human being. He slowly begins to incorporate her experiences into his own. He begins to feel guilt when he cheats although he continues to do it. He begins to reduce the amount of cheating as a result of the guilt and thoughts of his family. He is taught mindfulness-based practices to assist with tolerating the compulsive urge to seek gratification outside his relationship. He continues to cheat but with less frequency (TM5 and 2D).

After several sessions, the client attempted to seek out another female therapist. He justified this by sharing that while in the past he was at peace with his activities he is now struggling and feeling guilt (regression to TM5, 1D). Through several sessions, transferential dynamics were explored in depth, emotions processed and interpretations implemented. He resonated with the idea that he was "cheating" on his therapist whom he saw as a mother figure, and began to see himself as a "prisoner to" his "past," and felt motivated to "free" himself. He also began to recount the feelings he had as a child when he first found out his father was unfaithful (TM6, 2D).

After gaining a greater understanding of his relational patterns, an activity was given using ACT techniques to identify his values, which led to an incongruence between his behaviors and beliefs system. He began to recognize how his family culture differs from that of society at large, and that of his wife. In tandem, his desire to live a life oriented toward satisfying pleasures was reasoned to be an ineffective route and that cheating and the effort necessary to successfully do so frequently impacted his productivity in life. As incongruence grew, with the incorporation of his wife's perspective, his children's future, and his desire to respect himself, his mindfulness practices increased in frequency, duration and intensity. He progressed to the point whereby he was capable of tolerating many of his sexual urges. With insight, a greater sense of self and others, and increasing the power of descending inhibitory pathways, he gained the ability to subvert the influence of antiquated operating systems. Although he continued to deal with "temptations" he was capable of pausing himself, reflecting on his values and acting in accordance with them. At the end he reported an enhanced sense of peace and a much-improved relationship with his wife. At this point, an X can be marked on TM7 and 3D.

CONCLUSION

This *Temporospatial Model* is a novel framework guided by neuropsychological studies, the purpose of which is to help clinicians become more informed about when certain techniques may be best used. The techniques mentioned in this article are not exhaustive by any means and only serve as examples that may provide assistance. Energy and information are metabolized through a variety of phases, before reaching behavior. The quality of psychoneurophysiological "metabolic" activity rests on a spectrum and will require continual modification as new context-dependent adaptations are needed. From this perspective, the therapist's responsibility is to facilitate experiences occurring in each movement, the goal of which is to achieve increasing levels of integration and well-being. This model takes into account the idea that individuals exist in a continual relational process of becoming, serving as a tool that clinicians can use to track progress and help conceptualize and inform techniques. With time, neuroplastic changes impact the structure and function of the brain which furthermore alters electromagnetic activity being emitted. Clients become more flexible, adaptive, coherent, energetic, and stable (FACES; Siegel, 2012). The therapeutic process itself is consolidated and internalized, and clients become more creative and resilient toward challenges in the future.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

AC conceived the theory and core ideas, contributed to the guidance, and drafted the abstract/intro, spatial, and temporal sections, transitive sections, conclusion, and large scale integration of writing and edits. GN contributed to the temporospatial domains, edits, integrating relevant research, and guidance. RK, JO, and KW drafted the temporal movements. All authors contributed to manuscript revision, read, and approved the submitted version.

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Uses of Energy Psychology Following Catastrophic Events

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Energy psychology, as most widely practiced, integrates the manual stimulation of acupuncture points with imaginal exposure, cognitive restructuring, and other evidence-based psychotherapeutic procedures. Efficacy for energy psychology protocols has been established in more than 120 clinical trials, with meta-analyses showing strong effect sizes for PTSD, anxiety, and depression. The approach has been applied in the wake of natural and human-made disasters in more than 30 countries. Four tiers of energy psychology interventions following the establishment of safety, trust, and rapport are described, including (1) immediate relief/stabilization, (2) reducing limbic arousal to trauma-based triggers, (3) overcoming complex psychological difficulties, and (4) promoting optimal functioning. The first tier is most pertinent in psychological first aid immediately following a disaster, with the subsequent tiers progressively being introduced over time with complex stress reactions and chronic disorders. Advantages of adding the stimulation of acupuncture points to a conventional exposure approach are identified, and challenges around cultural sensitivities and unintended effects are discussed. After establishing a framework for introducing energy psychology in disaster relief efforts, reports from a sampling of settings are presented, based on interviews with this paper's author. These include accounts of relief work with survivors of mass shootings, genocide, ethnic warfare, earthquakes, hurricanes, tornadoes, floods, wildfires, and the COVID-19 pandemic. Hundreds of other reports from the field show a pattern of strong outcomes following the use of energy psychology in the days or weeks after a disaster and in the subsequent treatment of trauma-based psychological problems. Many of these accounts corroborate one another in terms of rapid relief and long-term benefits. Finally, examples of more efficient delivery methods utilizing large groups, lay counselors, digital technology, and cultivating community resilience are presented.

Keywords: acupressure, acupuncture, catastrophic events, disasters, emotional freedom techniques, energy psychology, thought field therapy

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> While natural disasters capture headlines and national attention short-term, the work of recovery and rebuilding is long-term.
>
> –Sylvia Mathews Burwell
> Former U.S. Secretary of Health and Human Services

INTRODUCTION

Energy psychology is a novel treatment for emotional healing and psychological development that involves the somatic stimulation of acupuncture points (acupoints) by tapping on them with the fingertips. Evidence for its speed and effectiveness has been rapidly accumulating, demonstrated in more than a 120 clinical trials and reviewed in the book, *The Science of Tapping* (Stapleton, 2019). Stapleton refers to energy psychology and other somatic interventions as comprising the "fourth wave" of psychotherapy, following psychoanalysis, behavior therapy, and cognitive approaches (p. xxiii). A credible estimate by Harvard psychiatrist Leskowitz (2016) placed the number of therapists incorporating techniques from energy psychology into their practices in the "tens of thousands" (p. 181). When brought to individuals and communities following a disaster, the performance of the approach has been particularly promising due to its ability to rapidly regulate the physiological aftermath of trauma, an assertion we will be examining in this paper.

INCIDENCE AND PSYCHOLOGICAL CONSEQUENCES OF MAJOR DISASTERS

The number of major recorded *natural* disasters in the decade from 2010 to 2019 worldwide nearly doubled compared with the decade of 2000 to 2009 (from 4,212 to 7,348) as "extreme weather events have come to dominate the disaster landscape in the 21st century" (United Nations Office for the Coordination of Humanitarian Affairs [OCHA], 2020, p. 1). Meanwhile, an analysis of databases focusing on *human-made* disasters in industrialized countries in the 20th century revealed "an exponential growth" in their frequency as well (Coleman, 2006, p. 3). Mass shootings, terrorism, genocide, warfare, and violent conflicts impacting civilian populations combine with an increased frequency of industrial accidents in producing this escalation.

Whether natural or human made, disasters lead to serious disturbances and disruptions not only to the lives of individuals but to "the functioning of a society" (Karácsonyi et al., 2021, p. 28). Disaster response management has focused on physical and economic needs, while the mental health issues caused by disasters have often been a "neglected area" (Makwana, 2019, p. 3091). Among the mental health issues enumerated by Makwana, in addition to Post Traumatic Stress Disorder (PTSD), are widespread anxiety, depression, shock, despair, grief, sadness, anger, denial, maladaptive behaviors, substance abuse, insecurity, sleep disturbances, moodswings, suspiciousness, paranoia, obsessions, loss of accustomed role in the community, and stress-related physical illness. These psychological effects of disaster have been found to be particularly severe among children, women, and dependent elderly populations.

PSYCHOLOGICAL INTERVENTIONS FOLLOWING DISASTERS

Mental health service providers "first began responding to disasters in large numbers in the 1990s" (DeAngelis, 2014, p. 63). They originally used group interventions in which survivors, responders, and family members would all share their experiences. Interventions today are more refined. They involve recognition that, for most people, a natural recovery process will occur over time. Appropriate interventions in the days following a disaster include easing agitation, explaining and normalizing extreme emotional responses, promoting a sense of safety and stabilization, facilitating connections with support systems, and making referrals for those in need of more focused psychological support. Mental health crisis teams usually work in conjunction with disaster relief agencies such as the Red Cross as well as local community resources.

DeAngelis based her article, "What Every Psychologist Should Know About Disasters," on interviews with pioneers in developing and delivering psychological interventions following catastrophic events, along with the special November 2011 issue of the *American Psychologist* on the theme of "9/11 10 Years Later." While emphasizing that many people show resilience after a disaster without receiving psychotherapy, she also noted that for those who do show severe distress or difficulties functioning, psychological first aid can help them to restabilize and pull their lives back together. For those who are still traumatized several weeks after the disaster, various forms of crisis counseling have been developed.

Lasting from a single session to however many sessions are needed, DeAngeles explains that crisis counseling differs from other forms of counseling by being more direct and pragmatic, focusing on practical as well as emotional concerns. Crisis counseling also emphasizes skills for psychological recovery. Simple techniques for managing stress might include diaphragmatic breathing, journaling, or engaging in activities that are pleasurable and grounding. Cognitive techniques for reframing the experience and the conclusions drawn from it are also utilized in crisis counseling, as are exposure methods for reducing limbic system responses to triggering memories and cues.

One of the first organizations to systematically bring mind-body interventions into post-disaster deployments is the Center for Mind-Body Medicine in Washington, D.C. In a study of its approach conducted 5 years after the war in Kosovo had ended in 1999, 82 adolescents who had still been children during the war and who met the criteria for PTSD were randomly assigned to a 12-session group program learning mind-body techniques or a wait-list control group (Gordon et al., 2008). The program included "meditation, guided imagery, and breathing techniques; self-expression through words, drawings,

and movement; autogenic training and biofeedback; and genograms" (p. 1469). Decreases in the PTSD symptoms of those who went through the program reached a high degree of statistical significance in comparison with the control group ($p < 0.001$). Benefits were maintained on 3-month follow-up. The control group then went through the program and showed similar improvements on the pre/post-measures. The Center has for some three decades been offering and expanding its mind-body programs for addressing "population-wide psychological trauma and stress[1]."

COMPARISON STUDIES OF PSYCHOLOGICAL INTERVENTIONS FOLLOWING CATASTROPHIC EVENTS

Several studies have used meta-analytic methods to compare the outcomes of psychotherapies that have been applied following disasters or other forms of severe mental duress (Brown et al., 2017; Morina et al., 2017; Purgato et al., 2018; Bangpan et al., 2019; Mavranezouli et al., 2020a; van Ginneken et al., 2021). These reviews found a range in the effectiveness of the various methods studied for reducing trauma-based symptoms and improving functioning. The majority of approaches studied were variations of Cognitive Behavioral Therapy (CBT), such as Narrative Exposure Therapy (NET) and a trauma-focused form of CBT (TF-CBT). CBT is considered by many to be the "Gold Standard" for treating serious psychological conditions (David et al., 2018). However, other therapies were also included in the comparisons, such as meditation, play therapy with children, family therapy, Eye Movement Desensitization and Reprocessing (EMDR), Thought Field Therapy (TFT), and the Emotional Freedom Techniques (EFT).

Both TFT and EFT are forms of energy psychology, the focus of this review. In each of the six studies cited above, an energy psychology modality was included in the comparison, and the approach demonstrated strong outcomes. For instance, Brown et al. (2017) conducted a meta-analysis of psychological treatments for children who had experienced the effects of trauma following manmade or natural disasters. Only one of the 36 studies used an energy psychology approach, TFT. Effect sizes ranged from 0.09, a small effect, to 4.19, an extremely large effect. The average pre-treatment to post-treatment effect size across the groups was 1.47, a large effect. The largest effect of the treatments investigated, 4.19, was produced by TFT. In the comparison study by Mavranezouli et al. (2020a), EFT was among 17 interventions reviewed for treating traumatized youth. EFT was one of the two most effective therapies in reducing PTSD symptoms at treatment endpoint and the most effective of the 17 interventions in retaining improvement in PTSD symptoms on follow-up. Tapping therapies have, in fact, held up well to the "gold standard" of CBT. Of 10 head-to-head studies comparing the two modalities, all 10 found at least equivalent outcomes and, in several studies, the energy psychology protocols outperformed CBT in speed and durability on follow-up (reviewed in Feinstein, 2021b).

Eight of the ten head-to-head comparisons between CBT and energy psychology approaches were randomized controlled trials (RCTs). One of the two that was not a controlled trial gives a feel for the differences as experienced by those receiving the treatments. It was a retrospective study in Kurdistan with individuals who had experienced ongoing violence, atrocities, and political upheavals during and after the Iraq War (Seidi et al., 2021). Treatment outcomes were evaluated for clients who had been assigned to a single psychotherapist over a 2-year period. The therapist had been trained in CBT and subsequently in TFT. Thirty-one clients met the study criteria and were assigned to CBT or TFT using purposive sampling. Of the 13 clients who received traditional CBT treatments, one improved and the others showed either no change in symptoms, deterioration of symptoms, or dropped out of treatment. All 11 clients who received the TFT treatment showed symptomatic improvement. Seven of those who had received CBT treatment and showed no improvement and no promise of improvement (reasons given by the therapist included cultural factors, education level, difficulty applying theoretical concepts such as overgeneralization, failure to complete homework assignments, and fatigue from the number and length of therapy sessions) were subsequently provided TFT treatment. The TFT treatments led to improvement in each case.

While it is certainly possible that the single therapist in this study was simply more adept with TFT than CBT, the therapists I have interviewed for this and previous reports who learned an acupoint tapping protocol after having used CBT in their practices uniformly commented that adding tapping to conventional exposure techniques increased the speed and power of methods that involve revisiting traumatic events. Mollon (2008), for instance, has written that energy psychology is not an alternative to CBT, but a "crucial additional component that greatly enhances its efficacy," providing more effective means for "affect regulation, desensitization, and pattern disruption" (p. 619). We will later explore the reasons that acupoint tapping combined with exposure techniques is proving to be more effective than exposure techniques alone.

THE NATURE OF ENERGY PSYCHOLOGY

Energy psychology is an umbrella term for treatment approaches that incorporate an "energetic" component (Feinstein, 2022b) into the psychotherapeutic process, often adapted from time-honored healing and spiritual systems such as yoga and qi gong (Gallo, 2004). The somatic stimulation of acupoints by tapping on them is the most widely used and well-investigated technique within energy psychology. More than 120 clinical trials demonstrate the efficacy of acupoint tapping as a psychotherapeutic intervention, often with unusual speed and durable outcomes (Feinstein, in press). A recent meta-analysis has shown that acupoint tapping is an essential ingredient for these strong effects (Church et al., 2020). The studies

[1]https://cmbm.org/

reviewed compared acupoint tapping protocols with otherwise identical protocols except that a different intervention—such as diaphragmatic breathing or tapping on "sham points"—was substituted for the acupoint tapping component. Most therapists who incorporate acupoint tapping into their practices do not identify it as their primary modality but rather integrate the technique into their existing clinical frameworks (Feinstein, 2016).

A mechanism by which acupoint stimulation enhances clinical outcomes involves the generation of signals that activate or deactivate specific brain regions. A 10-year research program at Harvard Medical School using imaging devices to investigate the effects of stimulating acupuncture points using traditional needling found that certain points send signals to the amygdala and other parts of the limbic system which reduce arousal almost instantly (Fang et al., 2009). Although acupuncture and energy psychology are vastly different practices, traditional needling on an acupoint and stimulating it manually have been shown to generate similar effects. For instance, a double-blind study comparing penetration by acupuncture needles with non-penetrating pressure that simulates the sensation of penetration found equivalent clinical improvements for both interventions (Takakura and Yajima, 2009).

The few imaging studies of acupoint tapping within a psychotherapeutic context to date have revealed brain changes that correspond with clinical improvement. For example, an fMRI study of acupoint tapping treatments with obese individuals showed that brain regions involved with food cravings that were activated when images of junk foods were shown before treatment were no longer activated after the treatment (Stapleton et al., 2019). This decreased brain activation paralleled a diminished desire for those foods. Other imaging studies have shown that acupoint tapping increased activity in frontal executive regions that are involved with rational choices and the management of emotional responses in stressful situations (Di Rienzo et al., 2019; König et al., 2019). This ability to activate or deactivate targeted regions of the brain by combining acupoint tapping with the mental activation of issues of concern is perhaps a cardinal advantage of the method. It is presumably at the core of the unusually rapid elimination of maladaptive stimulus-response pairings, as demonstrated in the clinical trials. Beneficial effects on the vagus nerve's regulatory and social engagement functions have also been observed following acupoint tapping treatments (Schwarz, 2018).

Meta-analyses of acupoint tapping protocols applied in the treatment of anxiety, depression, and PTSD—three of the diagnostic categories that appear the most frequently in clinical practice—showed large effect sizes (above 0.8) for each condition. In the meta-analysis focusing on the treatment of anxiety, 14 RCTs included a total of 658 participants (Clond, 2016). The overall effect size for these 14 studies, pre-treatment to post-treatment, was 1.23. In the study of depression, 12 RCTs with a total of 398 participants had an overall pre-treatment to post-treatment effect size of 1.85 (Nelms and Castel, 2016). In the analysis of PTSD treatments, seven RCTs with a total of 247 participants also demonstrated an unusually high effect size (2.96; Sebastian and Nelms, 2017). Other psychological conditions that have been shown to respond to acupoint tapping, based on studies listed in a database maintained by the Association for Comprehensive Energy Psychology[2], include phobias, anger, stress, concentration difficulties, food cravings, insomnia, and performance blocks. Physical conditions that have shown statistically significant improvement after acupoint tapping include fibromyalgia, pain, headaches, frozen shoulder, psoriasis, obesity, immune function, inflammation, and cardiovascular function.

While the meta-analytic reviews show strong effect sizes for using tapping protocols with PTSD and depression, the efficacy studies to date have not distinguished between single-incident PTSD and complex PTSD or between symptoms of depression and major depressive disorders (Feinstein, in press). Clinicians should, therefore, proceed cautiously with the more severe forms of either condition. Another caveat is that little data exists at this point on the effectiveness of tapping protocols in reversing conditions such as psychotic disorders, dementia, autism, bipolar, or deeply ingrained personality disorders. An occasional limitation due to the mechanics of the approach is that because tapping can appear "odd," not everyone feels comfortable doing it. The safety of a clinical modality is of particular concern when working with disaster survivors. The risk of retraumatizing people while attempting to help them overcome emotional difficulties following catastrophic events is an ongoing challenge for trauma therapists (Duckworth and Follette, 2011). Acupoint tapping protocols seem less vulnerable to this risk than many other methods because they "are designed to approach distress in a graduated and tolerable way, titrating exposure to otherwise unbearable trauma that may have previously overwhelmed the client's coping capacities" (Mollon, 2013, p. 355). A review of clinical trials of energy psychology treatments involving more than a thousand subjects found that no adverse events were reported (Church, 2013). Schulz (2009) conducted in-depth interviews with 12 psychologists working with adult survivors of childhood sexual abuse and reported that a common theme throughout the interviews was that energy psychology protocols were seen as allowing clients to "relieve the trauma in a non-invasive manner [that] lessens the possibility of retraumatization" (p. 17).

A DIFFERENT TYPE OF EXPOSURE

Psychological exposure involves the use of imagination or recall to mentally evoke an anxiety-provoking situation in a safe context. The procedure is applied to reduce the threat response to fear triggers, and it has been found to be "highly effective for patients with anxiety disorders, to the extent that exposure should be considered a first-line, evidence-based treatment for such patients" (Kaplan and Tolin, 2011, p. 33). Frequently used in working with PTSD, the most fundamental difference between acupoint tapping protocols and other psychological approaches to long-term emotional healing following disasters may be in the components of the procedure.

[2]https://www.energypsych.org/researchdb8c71b7

TABLE 1 | Two contrasting approaches to exposure.

Conventional Exposure Treatments	Exposure with a Somatic Intervention
(1) Brief exposure, as is used in systematic desensitization (10 to 15 s in each round of the protocol), may be effective for low levels of arousal, but not for highly distressing stimuli. In addition, a large number of sessions over an extended period of time is required for brief exposure to be effective even with low levels of arousal (Rothbaum and Foa, 1996/2007).	(1) Brief exposure combined with acupoint stimulation has been found to be effective with conditions that involve high as well as low levels of arousal, and a few rounds of brief exposure during a single therapy session are often able to uncouple the association between a stimulus and a maladaptive fear response.
(2) Prolonged exposure is in fact generally needed in the treatment of anxiety disorders, with 20 min often being required before the anxiety associated with a simple phobia begins to diminish and up to 60 min with agoraphobia (Foa et al., 1989). For trauma scenes, up to 100 min of flooding (where anxiety-provoking triggers are presented in an intense, sustained form) were required before decreases in anxiety were reported (Keane, 1995).	(2) Prolonged exposure or a long series of repeated exposures are not required to obtain desired clinical outcomes.
(3) Clients are required to "focus their attention on the traumatic material and... not distract themselves with other thoughts or activities" (Brewin, 2005, p. 272). In fact, allowing the client to shift away "from the most traumatic cues" is believed to be "no more effective in attaining extinction to the anxiety than past episodes of intrusive recall have been" (Lyons and Keane, 1989, p. 147).	(3) The focus during the exposure sessions is not fixed but is instead, while the tapping continues, allowed to shift among traumatic memories and other thoughts, beliefs, physical sensations, emotions, and expectations.
(4) Exposure works for fear and anxiety but does not seem effective in the treatment of guilt or other complex emotions that require higher order cognitive constructs (Foa and McNally, 1996).	(4) Emotions that require higher-order cognitive constructs such as guilt, shame, or grief have responded to the approach.

Sources for the "Conventional Exposure Treatments" boxes include observations from developers of the approach which still correspond with current practices. The "Somatic Component" boxes were corroborated in an analysis of over 800 interviews or survey responses from energy psychology practitioners (Feinstein, 2021a).

Conventional Exposure Treatments

A 2008 study by the Institute of Medicine (IOM) of the National Academy of Sciences, *Treatment of Posttraumatic Stress Disorder: An Assessment of the Evidence,* found that despite nearly three decades of research since the adoption of PTSD as a formal diagnostic category, the existing studies "do not form a cohesive body of evidence about what works and what does not" (Committee on Treatment of Posttraumatic Stress Disorder, 2008, p. 10). The single type of intervention (psychological or pharmaceutical) whose efficacy was judged as having been empirically established, however, was prolonged imaginal exposure.

While the view that exposure is necessary for the successful treatment of PTSD has been questioned, in part due to the possibility of retraumatization (Farrell et al., 2013), and alternative treatments have been proposed (Markowitz et al., 2015), prolonged exposure is still the most widely recommended approach for treating PTSD. The American Psychological Association's (2017) *Clinical Practice Guideline for the Treatment of Posttraumatic Stress Disorder* strongly endorsed prolonged exposure therapy, or prolonged exposure therapy with cognitive restructuring, as the primary recommended interventions for treating PTSD. Eye Movement Desensitization and Reprocessing (EMDR) was given a conditional recommendation. Energy psychology was not evaluated.

Inconsistencies in Clinical Experiences With Exposure Treatments

Although EMDR and acupoint tapping are very different approaches, both utilize imaginal exposure and combine it with a somatic intervention. The somatic interventions in EMDR may include bilateral stimulation in the form of back-and-forth eye movements, alternating buzzers, or other means of mixing right-left stimulation, such as tapping, alternately, on the knees, legs, or shoulders. As efficacy studies were establishing EMDR as an effective treatment for PTSD, outcome data began to accumulate that were not consistent with the guidance derived from experiences with other exposure treatments (Rogers and Silver, 2002). Rogers and Silver noted, for instance, that "previous research suggests that repeated brief exposures only result in fear decrement when stimulus intensity and arousal are both low. Yet EMDR uses very brief (20-30-s) exposures [even though] stimulus intensities are high, since clients are asked to start by focusing on the most distressing scene" (p. 49).

Four differences between *conventional formulations of exposure therapy* (as delineated in the literature establishing the approach) and *exposure paired with a somatic intervention* (based on reports from clinicians) have been delineated (Feinstein, 2010) and are summarized in **Table 1**.

Conventional Exposure Methods Do Not Eliminate the Original Fear Learning

What might account for these differences? A surprising discovery within neuroscience was that conventional exposure approaches *overwrite* rather than *replace* the learnings that generate fear while other approaches are able to generate a new learning that completely *eliminates* the old learning, a difference with substantial clinical implications (Dunsmoor et al., 2015). Specifically, if the old associations are overwritten instead of eliminated, the client is vulnerable to recurrences via (a) *spontaneous recovery* of the conditioned fear response, (b) *renewal* of the fear when the original cue is presented outside of the extinction context, or (c) *reinstatement*, where the original aversive stimulus is presented without the original cue but renews the original cue's ability to trigger a fear response. If the old associations have been neurologically extinguished, however, these recurrences would not be possible without the occurrence of a new traumatic event.

Frequent recurrences of the old learning following conventional exposure treatments have been found in both

laboratory and clinical settings (Dunsmoor et al., 2015). Exposure was not proving to be as effective as hoped, even with the addition of cognitive restructuring techniques. In fact, recent studies and meta-analyses have suggested that CBT, with exposure treatments being one of its primary strategies, only slightly outperforms the placebo effect (Leichsenring et al., 2018), a controversial but provocative finding.

The initial commonsense understanding of exposure therapy had been that extinction (the elimination of a conditioned response such as a fear of spiders) is brought about by the eradication of an old association through repeated presentations of the trigger (the conditioned stimulus) in a safe context. But because the response could spontaneously return, it was undeniable that the original learning had not been eliminated, requiring that the theory be revised. Foa and McNally (1996) explained that based on abundant evidence, "fear reduction does not involve the weakening of associations *per se*, but rather involves the formation of new associations [that] override the influence of pathological ones" (p. 339).

Meanwhile, neurochemical studies indicated that the administration of certain drugs when paired with fearful experiences make it possible to eradicate old fear associations at the neurological level (Berlau and McGaugh, 2006). This was deduced by multiple experiments showing that the original fear couldn't be reactivated using any known methods for reactivating extinguished fears. Another, more powerful mechanism than the accepted understanding of extinction had been discovered. It explained a second way the brain updates itself on the basis of new experience. This was further demonstrated when behavioral rather than pharmaceutical interventions were created that completely removed the fear, first with laboratory animals (Monfils et al., 2009) and then with human subjects (Schiller et al., 2010). Monfils et al. noted that comparisons of conventional extinction methods with those that eliminate rather than override old associations "engage different mechanisms in the lateral amygdala and lead to a drastically different behavior outcome" (p. 953).

Another prevailing belief among neuroscientists had been that once a new learning is consolidated into long-term memory, it is permanently installed. It could be modified, or even eclipsed by subsequent experiences, as in the extinction process brought about by conventional exposure techniques, but it nonetheless remained and could be reactivated. Hundreds of studies over several decades have shown, however, that this is not the only possibility. Rather, "a consolidated memory can...be modified, strengthened, changed or even erased!" (Nader, 2003, p. 65). For the learning to be erased, a sequence must occur in which the outcome predicted by the original learning does not take place, a mismatch neuroscientists call a "prediction error" (Exton-McGuinness et al., 2015).

Combining Acupoint Tapping With Psychological Exposure

Acupoint tapping protocols accomplish this by having the client mentally activate the old learning—we'll stay with the fear of spiders—while sending deactivating signals to the amygdala via acupoint tapping. After a few rounds of tapping, the image of a spider can be vividly accessed but the expected fear is not experienced. This process is illustrated in a 13-min video showing excerpts from a 30-min treatment (available at http://phobiacase.EnergyPsychEd.com, accessed February 10, 2022). As you can see by the surprise on the client's face, a prediction error has been created. This is the basic sequence necessary for the neural pathways that maintain the old learning to become "depotentiated" at the synaptic level. The learning is reconsolidated in a new way, one that corresponds with the recent experience. A more detailed explanation of this process is available elsewhere (e.g., Feinstein, 2019), but for the purposes of understanding the role of energy psychology in disaster relief work, the key concepts are that: (a) *brief* exposure is adequate if accompanied by acupoint tapping, (b) retraumatization can be prevented, and (c) the changes are lasting.

ENERGY PSYCHOLOGY IN THE TREATMENT OF DISASTER SURVIVORS

Energy psychology has been applied in the wake of natural or human-made disasters in Australia, Bosnia, Brazil, Burundi, Columbia, the Democratic Republic of Congo, Ecuador, Germany, Guatemala, Haiti, India, Indonesia, Israel, Japan, Kenya, Kosovo, Kuwait, Liberia, Mexico, Moldavia, Nairobi, New Zealand, Nicaragua, Nigeria, Rwanda, Sierra Leone, South Africa, South Sudan, Sweden, Tanzania, Thailand, Venezuela, Uganda, and the United States. Teams in the United States have worked with survivors of fires, earthquakes, hurricanes, tornadoes, industrial accidents, and school shootings as well as communities and health care institutions hard-hit by the COVID-19 pandemic.

Several international humanitarian relief organizations have adapted energy psychology as a treatment in their post-disaster missions. Capacitar International ("Capacitar" is a Spanish word meaning to empower, to awaken, to bring each other to life) has been working with communities in transition – including those in the aftermath of trauma, violence, war, and other disasters – since the 1980s[3]. Their staff has won multiple international awards, and their reach has extended into five continents. Among Capacitar's primary somatic interventions are EFT, TFT, and other acupressure techniques for alleviating physical and emotional pain. Charles Figley, who served as the chair of the committee of the Department of Veteran Affairs that first named PTSD and who is also the founder of Green Cross, allowed this to be posted on an energy psychology website in 2005: "Energy psychology is rapidly proving itself to be among the most powerful psychological interventions available to disaster relief workers for helping the survivors as well as the workers themselves."

Most individuals who bring psychological services to a disaster area follow the generally accepted guidelines articulated by DeAngelis (2014) in terms of prioritizing the alleviation of distress, explaining and normalizing extreme emotional

[3]https://capacitar.org/

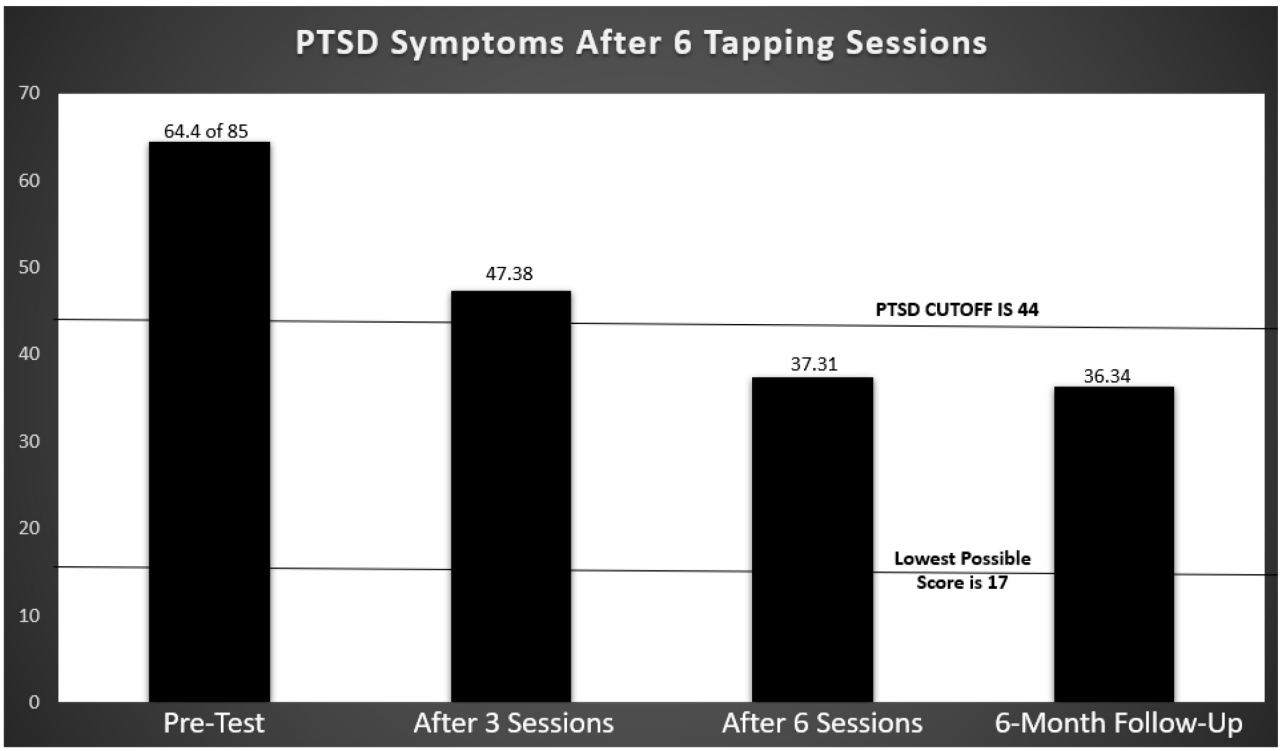

FIGURE 1 | Post Traumatic Stress Disorder Checklist-Military (PCL-M) scores before and after PTSD tapping treatments with 49 combat veterans. Based on Church et al. (2013).

reactions, facilitating stabilization and a sense of safety, linking survivors with appropriate support systems, and collaborating with the local community and any relief agencies that have been deployed.

An Early Study

The first RCT investigating the use of energy psychology with PTSD involved 49 combat veterans who scored in the PTSD range on a symptom checklist that had been standardized with veterans (Church et al., 2013). Dramatic improvement was found after six treatment sessions, with 42 of the 49 participants no longer scoring above the PTSD cutoff. The participants had been recruited from throughout the United States and treated by volunteer practitioners. The gains persisted at 6-month follow-up (see **Figure 1**). The study has been replicated with similar findings (Geronilla et al., 2016).

By way of comparison, approximately two-thirds of service members and veterans completing a course of prolonged exposure treatments and/or cognitive processing therapy in peer-reviewed studies published between 1980 and 2015 still met PTSD diagnostic criteria after treatment (Steenkamp et al., 2015). There was only one drop-out in the Church et al. study. In contrast, nine of every ten of the 49,425 veterans of the Iraq and Afghan wars with newly diagnosed PTSD who sought care from facilities run by the U.S. Department of Veterans Affairs dropped out before completing the conventional treatments as recommended (Seal et al., 2010).

Four Tiers of Energy Psychology Interventions Following Catastrophic Events

While exposure treatments are generally used for long-term healing rather than immediately following a disaster, acupoint tapping protocols can be applied at any point after a catastrophic event. If a person is experiencing acute trauma, it is not necessary for them to imagine the traumatic event. They are already in it. You can direct them to tap to immediately decrease their emotional distress, as with any other potent relaxation technique. Tapping can then also be applied at a later stage of recovery for defusing intrusive or otherwise unprocessed memories about the trauma. After attending to physical needs, establishing safety, and fostering trust and rapport, a four-tier framework categorizes energy psychology interventions in post-disaster situations according to their purpose (Feinstein, 2008):

First Tier: Immediate Relief/Stabilization

Much as a paramedic might instruct a patient having an anxiety attack in a breath control technique that is incompatible with hyperventilation, energy psychology utilizes interventions which rapidly down-regulate the limbic system mediated fight-or-flight response. Tapping on specified acupuncture points whose stimulation has been shown to decrease activation signals in the amygdala (Hui et al., 2005), for instance, appears to rapidly decrease elevated emotional responses in stressful

situations. This simple procedure can be a potent intervention for providing psychological first aid in the immediate aftermath of disaster. Practitioners often start with the most comforting interventions available for fostering relief and stabilization–such as diaphragmatic breathing, self-hugs, gentle rocking, and offering reminders that the person survived and is safe now—introducing tapping as appropriate.

Second Tier: Reducing Limbic Arousal to Trauma-Based Triggers

Beyond immediate relief, acupoint tapping can be applied to change maladaptive stress response patterns that develop after a disaster. Amplified fear, rage, or anguish may have become neurologically associated with a particular internal or external cue. By reducing limbic hyperarousal in the presence of the cue, self-defeating affective, cognitive, and behavioral patterns may be interrupted, including avoidance behaviors, a learned proclivity that serves to reinforce PTSD (Badour et al., 2012). Uncoupling extreme stress responses from memories, chilling fantasies, or external triggers is a key to the successful treatment of PTSD (van der Kolk, 2014).

Third Tier: Overcoming Complex Psychological Difficulties

Complex issues involving early attachment experiences, current relationships, personal goals, coping styles, work setting, and physical health may have surfaced because of the trauma experience and can be effectively addressed, particularly once adequate progress in the first two tiers has been accomplished. An energy psychology approach is able to identify and target salient aspects of complex problems. Contributing factors to low self-esteem, for instance, might include unresolved memories of parental emotional abuse, self-defeating beliefs, exaggerated appraisals of interpersonal threat, and anxiety in social situations. The combination of acupoint stimulation with the mental activation of carefully selected scenes, feelings, or beliefs may be applied to the elements of a complex psychological problem, one by one. A tapping protocol for "neutralizing negative core beliefs and for instilling positive ones" (Gallo, 2004, p. 181) is often applied. Whether using tapping to resolve an earlier traumatic memory that is tied to obstacles in overcoming the more recent trauma or addressing a childhood belief that contributes to pessimism and hopelessness, untangling such constellations frequently becomes a focus of ongoing treatment and may be necessary in post-disaster counseling for a complete healing to occur.

Fourth Tier: Promoting Optimal Functioning

Even after having restored stabilization, neutralized limbic responses to traumatic cues, and taken steps toward resolving self-defeating patterns that trace to childhood, the existential issues of life remain. In fact, a catastrophic experience may accentuate questions of meaning, uncertainty about the future, the reality of evil, and awareness of the inevitability of death. Yet people who have seen the worst of life do prevail emotionally and spiritually. As Tolstoy observed, "There is something in the human spirit that will survive and prevail, there is a tiny and brilliant light burning in the heart of man that will not go out no matter how dark the world becomes."

Many people, in fact, discover that previously unknown strengths and resilience follow a catastrophic event. The term *post-traumatic growth* describes "positive psychological changes that are experienced as a result of struggles with highly challenging life circumstances" (Jayawickreme and Blackie, 2014, p. 312). Interviews with energy psychology practitioners suggest that an energy-attuned approach can help uncover and strengthen that "tiny and brilliant light," fostering feelings of spiritual connectedness and promoting serenity, confidence, and courage (Feinstein, 2021a). Although these are ongoing issues and often involve intense challenges, greater personal stability and a higher level of functioning are attainable outcomes following traumatic experiences.

At these third and fourth tiers, energy psychology is often integrated with other clinical or personal development approaches. In enhancing personal resilience, for instance, strategies from Positive Psychology (such as the "building of buffering strengths" like perseverance or a capacity for pleasure, Seligman, 2002, pp. 6-7) may provide a framework as energy psychology techniques are employed to instill such strengths.

Situational Considerations

Beyond the method is the context. Energy psychology interventions in post-disaster settings must be applied with an understanding of the phases of disaster relief, a sensitivity to cultural issues, vigilance about counter-intuitive dynamics that often accompany psychological interventions following catastrophic events, and the practitioner's own vulnerabilities. Each is discussed in this section.

Calibrating Interventions to the Three Phases of Disaster Relief

Applications of energy psychology following a disaster need to be calibrated to the unique needs and constraints of each individual and to an understanding of the kinds of intervention that are appropriate at various timeframes after a disaster. A seminal volume, *Interventions Following Mass Violence and Disasters: Strategies for Mental Health Practice* (Ritchie et al., 2007) includes chapters discussing principles for *immediate responses* to disaster (Ruzek, 2007; Young, 2007; Ørner et al., 2007), interventions *1 to 4 weeks* after exposure to a trauma (Bryant and Litz, 2007), and longer-term interventions (Raphael and Wooding, 2007). The four tiers of energy psychology interventions are keyed to these three phases of disaster relief interventions in Feinstein (2022a).

Cultural Sensitivity

In providing mental health interventions with disaster survivors, cultural and demographic considerations are sometimes critical (Norris and Alegria, 2007). While little empirical evidence exists based solely on work with disaster survivors to guide energy psychology practitioners in establishing differential treatments for specific stricken populations, MacKay and Alfred (2013) have outlined general principles for using tapping protocols with ethnic and cultural groups different from those of the

practitioner. These can be applied in post-disaster situations as well.

Dr. Carl Johnson, a pioneer in applying energy psychology (specifically TFT) in post-disaster settings, emphasized in our interviews that treatment success can sometimes "hang on the use of a culturally or personally sensitive word." An ABPP level clinical psychologist, Dr. Johnson retired from a career as a PTSD specialist with the Veterans Administration. He learned TFT toward the end of his time at the V.A. and found it to be far more effective than the tools that had previously been at his disposal. At the time of the interviews I conducted with him in 2005, Johnson had for the nearly two decades following his retirement regularly traveled to the sites of some of the world's most terrible atrocities and disasters to volunteer psychological support using TFT.

He offered an example to illustrate the ways in which constraints on men about expressing emotional distress may make it challenging in post-disaster work to even name the specific issues that need to be mentally activated during the tapping. An ethnic Albanian who spoke English brought a former Kosovo Liberation Army soldier to Johnson's hotel. The translator said, "He's here for help with his war trauma." Johnson explained the 0-to-10 scale and asked the man to give him a number for the intensity of his trauma. The translator conferred with the man and then said, "No number, none." Johnson asked, "Isn't he here because he is suffering from trauma?" The translator restated, "No number, no trauma." Johnson continued:

> I sensed that while the man had come for help, he was also obeying the Albanian taboo which forbids suffering in males. I decided to bypass any mention of his suffering and said to the translator, "Okay, but could you ask him to just think about the traumatic event." The response: "No traumatic event." It dawned on me that by definition, to qualify as a traumatic event, it would have had to cause a personal trauma, which he couldn't admit to. So I asked if he had had a challenging experience, a bad moment that he had overcome." To this, he could say "Yes." So I had him think about the bad moment he had overcome. I asked him if he would enjoy having a tune-up on his strong body to get it ready for his next victory, like tuning up the engine of a magnificent race car that has won but needs to have a tune-up to win again." He said, "That would be fine."
>
> As he focused on the event he had overcome, I used an energy assessment procedure to find and then treat his energy disruptions. Finally when I could find no further disruptions in his energy system, I asked him if anything more had to be done or if the tune-up had been complete. He looked relaxed. Then he spoke through the translator: "He wants me to tell you he thanks you very much for healing his trauma." Once the trauma had been resolved, it was no longer an issue for him to use the word.

Many variations of this story may be encountered by relief teams deployed to unfamiliar cultures. The use of energy psychology with children also requires calibration. Children respond at least as well as adults to tapping for reducing arousal, according to practitioner reports, but the approach must be framed at a level that is appropriate to the child's age, situation, and level of understanding.

Even explaining energy psychology in terms that are respectful of and congruent with the person's worldview and assumptions about healing may be problematic. Explaining an approach that is rooted in a paradigm adopted from ancient healing traditions has, in fact, proven to be a substantial challenge for Western energy psychology practitioners within their own culture. On the other hand, people from cultures rooted in an energy or spirit-based outlook, such as Native Americans and members of various African tribes, can often intuitively relate to energy psychology theories and methods.

Counter-Intuitive Snares

Common-sense assumptions about working with disaster survivors have sometimes been refuted by clinical observation, and various counterintuitive aspects of early post-disaster interventions have been identified. Ruzek (2007) discusses several assumptions at the core of various intervention models that should be examined rather than uncritically accepted. For instance, Critical Incident Stress Debriefing—in which trauma survivors share, within a supportive professional context, their experiences, thoughts, and emotional reactions with other survivors who were involved in the same trauma—once seemed to make a great deal of sense and was widely applied. Yet strong evidence shows that it can interfere with natural coping strategies in resilient people and increase rather than prevent PTSD incidence in vulnerable individuals (McNally et al., 2003).

Disaster relief workers are routinely taught to "normalize" acute stress reactions. This validates the natural resilience of survivors and helps them understand that their responses are normal and transient rather than signs of personal weakness or mental illness. It serves individuals for whom acute distress symptoms are going to be temporary, and it may be therapeutic since many affected individuals are highly suggestive immediately following a trauma. But it may also create negative consequences for survivors whose symptoms persist. Research on survivors of mass violence, in fact, shows high percentages with enduring problems, considerably higher than in survivors of *natural* disasters (Quarantelli, 2000). Overemphasis on the fact that most symptoms of acute stress reactions following trauma will spontaneously dissipate over time may, therefore, unintentionally stigmatize people who need treatment and ultimately keep them from receiving it. In short, people may, following a disaster, become extremely sensitive, their stability erratic, and their responses to seemingly innocuous statements surprising.

Another assumption, one that traces back to combat psychiatry, is that it is important for mental health specialists to actively intervene as soon as possible after a trauma. Various outcome studies, however, along with concerns about pathologizing normal reactions, give "reason to question whether intervening sooner will result in better care" (Ruzek, 2007, p. 20). Responders are taught that the most viable working assumptions 24 h after a disaster may be substantially different from the most viable working assumptions 3 weeks later or 6 months later. Applications of energy psychology following a disaster must be calibrated to the unique needs and constraints of each individual

and to an understanding of the kinds of intervention that are appropriate at various timeframes after the disaster.

Other counter-intuitive dynamics have also been identified. For instance, Levine (1997) has shown that people (as well as animals) who shake and quiver after a trauma are less likely to develop PTSD symptoms. So holding and invasively soothing a person who is shaking may actually interfere with recovery.

Even meditation may lead to unintended outcomes (Lyford, 2022). Fay (2021) explains that meditation practices "can engender a state of bliss that may be scary for people with trauma histories. Saying anything even remotely positive can generate intense self-hatred.... In a blissful state, boundaries may be experienced as too diffuse, leaving us feeling unsafe or out of control. It can also trigger regression" (p. 39).

Given the widespread favorable reports in the clinical literature on the benefits of meditation, however, I was curious about its use in post-disaster situations. When doing the interviews for the "Reports from the Field" section below, I asked Dr. Lori Leyden if she had used meditation in working with the survivors of the Sandy Hook Elementary School shooting. She replied:

> In my experience, meditation without the kind of somatic release that occurs with acupoint tapping is often contra-indicated for acute trauma and PTSD because the client's physiology isn't regulated enough to deal with intrusive memories and other trauma symptoms that may arise. This can leave them feeling even more unsafe in their bodies. I have witnessed a number of people, including parents of murdered children, being told by meditation teachers that meditation is an appropriate trauma healing tool even after the traumatized parents had expressed major discomfort while trying to meditate.

Disaster Relief Worker Vulnerability

A delicate issue is the vulnerability of the practitioner administering disaster relief services. The psychological health and stability of the healer is generally assumed to surpass that of the client, yet local health care providers have often been part of the same traumatic event as those they are serving. They may also be offering care to people whose stories are recent, horrific, and triggering. Providing training and support for working through their own unresolved traumatic experiences is a vital element in preparing health care personnel to provide disaster relief services. Because tapping therapies can yield rapid results and be self-applied, they can serve the practitioner's personal healing and evolution while the practitioner is learning how to use them in post-disaster situations.

REPORTS FROM THE FIELD

In the decade following the 2001 attacks on the Pentagon and the World Trade Center, advances have been made in: (a) assessing the needs of individuals and communities impacted by catastrophic events, (b) creating programs that address those needs, and (c) evaluating those programs (Watson et al., 2011). Nonetheless, the unexpected nature, chaos, and pressing demands that suddenly emerge when a disaster strikes mitigate against systematic evaluation when trauma response teams arrive immediately after a catastrophic event.

The research on tapping protocols in post-disaster situations that does exist was usually conducted long after the disaster occurred, when systematic research procedures were more achievable. Positive outcomes after treating chronic PTSD in civilian populations in the years following a disaster have, in fact, been striking. For instance, in a clinical trial nearly two decades after the 1992-95 wars in Bosnia, 18 adults were selected based on severe ongoing emotional distress tracing back to their experiences during the wars, which included severe injuries, torture, beatings, rape, sexual humiliation, and watching others being assaulted or murdered. Each of the 18 participants received four 1-h sessions using a tapping protocol over a 2-week period. A standardized civilian PTSD symptom checklist was administered prior to the treatment, at the end of treatment, and at 4-week follow-up (Boath et al., 2014). Significant reductions were found in symptoms ($p = 0.009$) and sustained on follow-up.

In another study of civilian survivors of systemic violence years earlier, Connolly and Sakai (2011) randomly assigned 145 adult survivors of the 1994 genocide in Rwanda to TFT treatment or a waitlist control. Differences between the post-treatment and waitlist groups on PTSD symptom scales were highly significant ($p < 0.001$), with moderate to large effect sizes on changes in both the frequency and severity of symptoms. Imrpovements were sustained at 2-year follow-up.

While systematic research on energy psychology interventions immediately after a disaster is still unavailable, hundreds of reports from the field show a pattern of strong outcomes following the use of energy psychology in the days or weeks after a disaster and in the subsequent treatment of trauma-generated symptoms. Many of these accounts corroborate one another in terms of rapid relief and long-term benefits, yet the state of the art in applying energy psychology immediately following disasters still resides largely with the practitioners who have been carrying out such work. In the remainder of this section, I will present a small sampling of the accounts from those I interviewed (in person, telephone, Zoom, or e-mail) who have been bringing energy psychology to communities following natural or human-made disasters.

Sandy Hook Elementary School Shooting

This widely reported heart-breaking tragedy occurred on December 14, 2012, in Newtown, Connecticut A 20-year-old former student of the elementary school shot and killed 28 people, including 20 children between 6 and 7 years old, six adult staff members, the shooter himself, and his mother. Nick Ortner, a long-time resident of Newtown, happens to have founded one of the most influential organizations promoting an acupoint tapping approach to healing and personal development[4]. His mother, Dr. Maria Ortner, was a school psychologist at a nearby elementary school. She had worked closely in the past with both the school psychologist and the principal who were killed at Sandy Hook.

[4]https://www.thetappingsolution.com/, retrieved February 10, 2022.

Deeply touched on many levels, Nick was determined to bring his knowledge of energy psychology and EFT, as well as his local and global connections, to do something that would generate genuine healing for the traumatized community. On the day after the shootings, he contacted Dr. Lori Leyden, a colleague and internationally known trauma expert. She has introduced acupoint tapping and other disaster relief methods following some of the world's worst recent disasters involving genocide and mass shootings[5]. Nick asked Dr. Leyden's advice about providing an immediate response and facilitating long-lasting healing. That discussion turned into a collaboration. Three days later, Dr. Leyden arrived to begin organizing a long-term therapeutic and self-care initiative for the many people in Newtown who were affected by the shooting.

From the day Dr. Leyden arrived, she began conducting sessions with individuals as well as groups. Because the effects of long-term trauma are well-known, and because of her success working with other survivors of horrific violence, Dr. Leyden was able to immediately bring this experience to the task of establishing a community approach for Newtown that incorporates long-term, sustainable practices for relief. She made a commitment to the project and wound up living in Newtown for the next 3 years, though the work is ongoing nearly a decade later. The goal was "to come in quietly, listening and observing, supporting local efforts, and providing the team an unobtrusive method for assessing needs while also offering therapeutic and self-care assistance to those who needed it most."

Nick sent out a request for volunteers to his 500,000 strong mailing list. Nick and Dr. Leyden then hand-picked 35 volunteer tapping practitioners, out of hundreds of responses, to help create and build a long-term model for Newtown. Training in applying their facility with acupoint tapping to post-disaster situations began on January 5, 2013, 22 days after the shooting. The volunteers spent 35 to 60 h in training, along with many more in supervision, to prepare for the immediate and long-term needs of those directly and indirectly affected by the tragedy. Particular focus and outreach went to the parents and other family members of those killed, the children who survived the shooting, the school's teachers and other staff, and first responders, including police, firefighters, emergency medical technicians, medical examiners, and funeral directors. Rather than attempt to summarize the vast number of individual and group tapping sessions or related workshops and community events, a few comments by recipients or providers of the services follow (source: Ortner et al., n.d.):

> **Scarlett Lewis, Mother of 6-Year Old Jesse Lewis, Slain During the Shooting: "**In my attempt to heal from the tragedy of losing my son, an experience that has broken my heart and made me question going on with my own life, I sought many different types of help. Initially I sought traditional 'talk' therapy that left me retraumatized and feeling worse. Nick Ortner introduced me to Tapping, and I always finish these sessions with a deeper understanding of myself, feeling better, with a lightness of being, and hope. Tapping makes me feel better when nothing else does. . ."
>
> **Physician and First Responder, from the Office of the Medical Examiner:** "Dr. Leyden offered her services just days after the tragedy. She has been out to our office three times and done multiple sessions each visit, spending several hours with technicians, doctors, investigators, and other staff directly involved with the Sandy Hook shootings. Her tapping and breathing exercises, as well as the group discussions have been very helpful to me and my staff. She has continued to check in with me regarding our progress and offers to help us in any way she can. I personally am sleeping better and functioning better."
>
> **Lynn Johnson, MS LPC LADC, Director, Center for Serenity, Hartford, CT.** "I have been so honored and moved to be a part of this project. Dr. Lori Leyden, Nick Ortner, Jondi Whitis, and the whole group have really inspired me. I have developed a program for young children, called the "Feel Free Tap," which is a version of EFT for grades K to 3. I loved sharing it with the group and can't wait to take it out to the wider community!"
>
> **Bonnie Skane, Volunteer.** "Being part of this volunteer team is such an honor and a blessing. In spite of this terrible tragedy, we have been seeing many little miracles happening every day. It's such a joy to help someone who is experiencing tremendous emotional pain, anxiety, and stress find relief with EFT! I truly believe that we change the world by changing ourselves, and EFT is simply an amazing tool that gives us the ability to release our negative emotions and choose positive ones instead.
>
> **Alison Held, Volunteer:** "There is significant positive change happening in Newtown and beyond as a result of tapping! The EFT Stress and Trauma Relief Project is unfolding in the most beautiful way imaginable, with a core community of talented volunteers with a clear and unified vision of hope, love, and healing.
>
> **Eric Leskowitz, a Psychiatrist at Harvard Medical School:** Dr. Leskowitz provided this advice to the organizers: "Based on my clinical experience and reading of the research literature, EFT is the treatment of choice for rapid intervention in traumatic situations like Newtown that trigger overwhelming emotions in individuals and groups. Its use can prevent the future development of full-blown PTSD by empowering people to develop control over their own nervous systems."

A poignant "full-circle" story following the Sandy Hook tragedy involved a 12-year-old boy whose 6-year-old brother was killed during the shooting. While the boy's mother had quickly embraced tapping, the boy was highly skeptical. He was understandably extremely angry about losing his brother and hadn't attended school since the tragedy 2 months earlier. Dr. Leyden had previously worked with orphaned genocide survivors in Rwanda, first for healing, but then teaching them to become "heart-centered" leaders. The program was later formalized

[5]https://www.createglobalhealing.org/, retrieved February 10, 2022.

as "Project LIGHT: Rwanda." Graduates of the program are referred to as "Ambassadors," and a goal of the initiative is to connect traumatized young people around the world to support one another.

A Skype meeting was arranged between the 12-year-old boy in Newtown and two of the Rwanda Ambassadors, young people like himself who had been through the worst of human tragedies. During the long call, they shared deeply, tapped together, and genuinely bonded. The boy in Newtown was so inspired that he returned to school the next day to make a speech to his classmates about why it is important to care about people who have experienced even worse tragedies. Completing the full circle, he went on to create a non-profit organization that raised money for two of the Rwanda Ambassadors to attend university. Several years later, he traveled to Rwanda for an emotional reunion with the Ambassadors who had helped him so much while he was deep in grief about his brother's death.

Refugee Camp Challenges

By the end of 2020, 82.4 million people worldwide had been forcibly displaced as a result of persecution, conflict, violence, human rights violations, or other events that seriously threatened their security (UN Refugee Agency, 2021). According to credible estimates, about one in three of these individuals suffer with chronic depression, anxiety, or PTSD (Turrini et al., 2017), and all are facing substantial mental health challenges.

The Moria Refugee Camp in Greece was Europe's largest camp when Gunilla Hamne and Ulf Sandström, co-founders of the Peaceful Heart Network[6], were called to the camp to assist with a disturbed 8-year-old boy who was "out of control." The Peaceful Heart Network has developed an acupoint tapping approach, called the Trauma Tapping Technique (TTT), which relies on a minimal use of words. Derived from TFT and EFT, this streamlined approach is particularly well-suited for healing the wounds of trauma. It can readily be taught to disaster survivors and paraprofessionals or brought to large groups. In addition to tapping, TTT uses a self-soothing technique called "Havening," another approach that employs touch to trigger electrochemical reactions in the body that can reduce escalated emotional responses to a memory or trigger (Ruden, 2019).

The boy in the Moria camp was acting out violently within his family and against others in the camp: "biting, throwing objects and stones, destroying tents, peeing everywhere, and tearing his clothes." The father was very caring and patient and tried his best to manage the boy. The mother had become numb and passive. The whole situation was creating chaos in the family, and with people so cramped, it had reached the point where the family was at risk of being forced to leave the camp with no place else to go. Hamne and Sandström describe their experience:

> We went to one of the tents and did some drawing and acrobatic activities to connect. Suddenly the boy started to destroy everything in the tent including the books and toys, fetching big stones and throwing them at everyone. He broke the metal legs of a table and demonstrated that he could use them as weapons. He demanded more pens, which he then broke into pieces. When the boy had calmed down, we demonstrated our exercises and techniques to the father and the other children of the family. The interpreter also participated. We had seen that the father could hold the boy and hug him, and therefore it should be possible for him to do the tapping with the boy.
>
> When we had finished, we told the father that he should do the tapping and Havening as much as possible. Some days later we got a message from the interpreter: "I want to give you wonderful news. The father told me that he is using the tapping with the boy, and it is going extremely well! The father was super happy and the boy super calm and lovely." The interpreter hugged us.

Along with their work with refugees, the Peaceful Heart Network has collaborated with local aid workers and groups in bringing TTT sessions and trainings to an estimated 250,000 people in 30 countries, addressing a wide range of post-disaster challenges. In Nepal, more than 900 tornado survivors received individual or group TTT sessions. In the most violent areas of Beni in the Democratic Republic of Congo, approximately 3,000 internally displaced persons, mainly youth and women, were served. Following Cyclone Idai in Zimbabwe, the Network reached approximately a hundred of the people whose homes had been swept away. In the world's largest refugee camp, BidiBidi in Uganda, the Network has continuous engagement with refugees through a local pastor whose trainers have reached more than 2000 people since 2018. In Colombia, they have been training social workers in a group that supports victims of trafficking. Individuals and groups can connect with their services through https://peacefulheart.se/.

California Fires

Kristin Miller, a clinical psychologist and a resident of Northern California, is a member of the Humanitarian Committee of the Association for Comprehensive Energy Psychology (ACEP). She has brought ACEP's "Resources for Resilience"[7] and the TTT approach developed by the Peaceful Heart Network to those impacted by the devastating fires that have raged through her community year after year. She has found utility and efficiency in this "highly portable set of non-verbal, self-administered skills for managing stress and trauma." She started by "showing up at every possible place where people were gathered and to listen to their stories and share skills." Dr. Miller further reflected:

> My stunning realization following wave after wave of outreach in my community was that no one had the skills to calm their survival system and to process the trauma. This was true whether I was working with the fire fighters, other first responders, hospital staff, county mental health providers, trained counselors, school staff, or the Red Cross

[6]https://peacefulheart.se/, retrieved February 10, 2022.

[7]https://www.r4r.support, retrieved February 10, 2022.

shelters. But as these skills are becoming more embedded in our community, the road to recovery becomes more clear. When the exhausted medical personnel, county workers, and fire fighters came off our blackened, treeless hills, we met them to process their post-event distress. Many had worked 70 and 80 days straight, trying to control the wildfires. Many had seen much death, some having to drive past dead bodies to get people out of towns that were on fire. Others had circled their trucks around people to keep the flames at bay as people were grappling for their lives. All experienced feelings of powerlessness as the fires roared indiscriminately, dismantling all plans for an effective fire fight, as when the whole town of Paradise burned down in less than 2 h.

A fire supervisor came in completely unraveled with symptoms of traumatic distress. We did two long TTT sessions. I called him a few months later, and he said, "I am fine. That tapping was a great band aid!"

Employees of a utility company grieved the loss of colleagues while at the same time being blamed for causing the fire. In one incident within these dire circumstances, we used TTT in the hallways of a hotel and were able to tap through their trauma and clear their overwhelm before they proceeded to investigate the death of a crew member.

I came into a room of men in a Red Cross shelter just hours after they had escaped from the November 2018 Camp Fire (which caused 86 deaths) with only their lives. One man was in fight mode, angrily screaming into his cell phone. Another was rocking back and forth, trying to regulate his system. Another was checked out totally, frozen in a vacant stare. Another man seemed somewhat relaxed and open for engagement. He recounted gruesome collective stories about what the men in the room had experienced. I had him do some regulating breathing with me. Soon, one by one, each man joined in. We were then able to add some tapping. They all settled, and their nervous systems were regulated in about 20 min. Not long after, this team came out of their "cave" and began serving everyone else. While they had been as traumatized as all the others, they became a calming force within the shelter.

A more recent outreach was to medical staff at a hospital during the fifth wildfire of the 2021 season to visit our community. This one was during the COVID Delta surge. I stood with staff, tapping and breathing. They had suffered through days of 18-h shifts and multiple deaths in the hospital. People were surprised by how quickly they could regulate their nervous systems together, even in the midst of often fatal emergencies. The house supervisor walked me out in tears after a nurse, who had become a patient, had just succumbed. One of this supervisor's heart-breaking responsibilities was to enforce the rule that no family is allowed on the COVID units. This triggered her own grief every time as she had not been able to be with her husband when he died. We sat and tapped and honored the grief together. A smile returned to her face.

Several additional members of the ACEP Humanitarian Committee have also been called to provide on-the-ground services following major wildfires. Others have been working with the trauma experienced by communities due to the pandemic. Some members have responded to mass shootings and other disasters. The Committee itself initiated the Veteran-to-Veteran Project in Nevada, training leaders in the veteran community to teach energy psychology self-help methods to other veterans to reduce the symptoms of combat-related trauma. Over a dozen groups now have "Peer Support Leaders" trained in TFT by the Veteran-to-Veteran Project, including the Veteran Transition Resource Center in Las Vegas, the Elizabeth Dole Foundation Hidden Heroes Program, a Veterans Administration regional hospital, and local chapters of the American Legion, the Veterans of Foreign War, and women vet groups.

The ACEP Humanitarian Committee also created "Resources for Resilience," referred to above, a project that seeks to alleviate suffering by teaching self-help techniques to those experiencing the effects of violence, trauma, and natural disasters. The Resources for Resilience initiative includes a free emotional first aid training program and slides for community use, available from www.r4rtraining.support. The Committee has also, in collaboration with the Peaceful Heart Network, created a series of videos designed to help professionals who wish to become involved in humanitarian outreach projects. The Committee also partnered with the Peaceful Heart Network in training staff members from five different organizations, uniting medical doctors, psychologists, psychiatrists, and social workers in the use of TTT for working with Syrian refugees. This training was recorded on video with Arabic translation. The Committee has also partnered with Project LIGHT in bringing tapping to 48 facilitators who have worked with more than 400 youth and families in Rwanda.

A Rwanda Orphanage

In 2006, Caroline Sakai, Suzanne Connolly, and Paul Oas conducted a study of TFT treatments with 50 Rwandan orphans who suffered with severe symptoms of PTSD (Sakai et al., 2010). The outcomes vastly exceed those of any existing peer-reviewed study of a single-session PTSD treatment in terms of speed, degree of effectiveness, and percentage of subjects who were helped. After a single session, 48 of the 50 children, many who had witnessed their parents being slaughtered during the genocide, were no longer in the PTSD range based on ratings on a standardized checklist completed by their care-givers prior to and following the treatment. Benefits were sustained on 1-year follow-up on the same measure. In the following account, Dr. Sakai described the experience of one of the study's participants, a 15-year-old girl who was three at the time of the 1994 genocide:

> She'd been hiding with her family and other villagers inside the local church. The church was stormed by men with machetes, who started a massacre. The girl's father told her and other children to run and to not look back for any reason. She obeyed and was running as fast as she could, but then she heard her father "screaming like a crazy man."

She remembered what her father had said, but his screams were so compelling that she did turn back and, in horror, watched as a group of men with machetes murdered him.

A day didn't pass in the ensuing 12 years without her experiencing flashbacks to that scene. Her sleep was plagued by nightmares tracing to the memory. In her treatment session, I asked her to bring the flashbacks to mind and to imitate me as I tapped on a selected set of acupuncture points while she told the story of the flashbacks. After a few minutes, her heart-wrenching sobbing and depressed affect suddenly transformed into smiles. When I asked her what happened, she reported having accessed fond memories. For the first time, she could remember her father and family playing together. She said that until then, she had no childhood memories from before the genocide.

We might have stopped there, but I instead directed her back to what happened in the church. The interpreter shot me a look, as if to ask, "Why are you bringing it back up again when she was doing fine?" But I was going for a complete treatment. The girl started crying again. She told of seeing other people being killed. She reflected that she was alive because of her father's quick thinking, distracting the men's attention while telling the children to run.

The girl cried again when she reexperienced the horrors she witnessed while hiding outside with another young child. The two of them were to be the only survivors from their entire village. Again, the tapping allowed her to have the memory without having to relive the terror of the experience.

After about 15 or 20 min addressing one scene after another, the girl smiled and began to talk about her family. Her mother didn't allow the children to eat sweet fruits because they weren't good for their teeth. But her father would sneak them home in his pockets and, when her mother wasn't looking, he'd give them to the children. She was laughing wholeheartedly as she relayed this, and the translator and I were laughing with her.

We then went on to work through a number of additional scenes. Finally, when she was asked, "What comes up now as you remember what happened at the church," she reflected, without tears, that she could still remember what happened, but that it was no longer vivid like it was still happening. It had now faded into the distance, like something from long ago. Then she started to talk about other fond memories. Her depressed countenance and posture were no longer evident.

Over the following days, she described how, for the first time, she had no flashbacks or nightmares and was able to sleep well. She looked cheerful and told me how elated she was about having happy memories about her family. Her test scores had gone from well above the PTSD cutoff to well below it after this single treatment session and remained there on the follow-up assessment a year later.

The powerful impact of the single sessions provided to each of the 50 adolescents surprised the investigators. Their plan for the study had included three treatment sessions, but an emergency in the country diverted half the clinical staff. Since the pre-tests had already been conducted, the investigators decided to proceed with the one session they were able to offer and hope for the best. The outcomes and the stability of the benefits on 1-year follow-up, according to my interviews with Dr. Sakai, exceeded their hopes.

The study was conducted in collaboration with the Trauma Relief Committee of the Thought Field Therapy Foundation, the first organization to systematically send disaster relief teams trained in acupoint tapping to trouble spots throughout the world. More than 20 of their past projects, including deployments to Rwanda, Haiti, Mexico, Uganda, the Democratic Republic of Congo, New Orleans, and Tanzania, are chronicled on http://www.tftfoundation.org/category/past-projects. The first clinical trial of TFT in treating people who had been repeatedly exposed to traumatic events (N = 31) showed a significant drop in all sub-groupings of PTSD symptoms (Folkes, 2002), and four studies investigating outcomes of the Foundation's early projects demonstrated TFT's speed and potency in post-disaster situations (Dunnewold, 2014). Dr. Sakai's, 2014 book, *Overcoming Adversity: How Energy Tapping Transforms Your Life's Worst Experiences – A Primer for Post-Traumatic Growth* is a poignant and insightful account of many of her experiences.

Hurricane Katrina

A hurricane can wreak horrific devastation in minutes. On August 29, 2005, Hurricane Katrina hit New Orleans and the surrounding areas, causing more than 1,800 fatalities and $125 billion in damage. A team of twelve TFT practitioners from eight states was invited by three medical and social service organizations in New Orleans to provide treatment and training to their staffs 4 months following Hurricane Katrina. These medical and social service personnel were inevitably victims of the disaster as well as helpers, and the strategy taken was to make their treatment part of their training. A total of 161 participants received treatment and training at six different sites, with the largest number in an army tent at the Charity Hospital's "MASH unit" in the New Orleans Convention Center. Written evaluations were obtained from 87 of the participants. Of these, 86 stated that they experienced positive changes and/or elimination of the problems they were experiencing at the time. Data compiled by Dr. Sakai (who had also done the work in Rwanda) on the 22 participants she treated showed that their presenting complaints included anger, anxiety, depression, eating to counter anxiety, frustration, guilt, survivor guilt, hurt, loss, loss of control, need for improved performance, overwhelm, panic, physical pain, resentment, sadness, shame, stress, traumatization, and worry. Each problem area was given the 0-to-10 SUD (Subjective Units of Distress) rating. Before treatment, the average (mean) score for the 51 problem areas described by the 22 clients was 8.14. After treatment, usually consisting of a single individual session of under 15 min (which followed a half-hour group orientation), it was down to 0.76, a remarkably large decrease.

In addition to the TFT team, EFT practitioners also worked in the immediate aftermath of the hurricane and later with those who had been displaced. Sophia Cayer, who is highly experienced with tapping, described to me her experience with a woman who had not only been traumatized by the hurricane, but also by her subsequent time in a shelter after her home had been destroyed. A month after Katrina, she was so depressed that she was unable to function, spending much of her time crying uncontrollably. Cayer continued:

> When I sat down with her, she had one hand over her face, sobbing and unable to speak. I gently asked for permission to take her hand and see if I could help her relax. She agreed, and I began gently tapping on the energy points on her hand. Within a few moments, her tears began to subside. She was still unable to voice her experience, so I just kept tapping and talking with her. I used a specific EFT technique which offers relief without the person having to verbally describe the event. Among other issues, she was haunted by the screams and sounds of gunshots during the nights she spent in the shelter. While she was still, for the most part, unable to speak, I continued working with her, with her tears coming and going. After several minutes, her head was held high and she was able to speak. Then she smiled. Later that evening, I saw her at a gathering for survivors. Her friends, who had initially put me together with her, seemed amazed, reporting that she was her cheerful self again. I will always remember her smiles and hugs of gratitude.

Cayer reflected that with tapping, "even if it is only a single session, it doesn't leave the person stranded. It is not a matter of just soothing them and then letting them go. They are given powerful tools they can regularly use as they move through the crisis and beyond."

Combat Veterans

After learning of the first RCT demonstrating the effectiveness of tapping protocols in the treatment of 49 combat veterans (Church et al., 2013), I contacted the study's principal investigator and asked whether I could interview some of the therapists involved. I wanted to get a sense about the *experiences* summarized in the statistics. One of the therapists, Ingrid Dinter, described to me her work with Keith, an infantry soldier who had served in the Mekong Delta during the Vietnam War. He reported that in his initial therapy session with her that he had seen "many casualties on both sides." More than three decades later, he was still tormented with nightmares and repeated flashbacks: "Sometimes I think I see Viet Cong soldiers behind bushes and trees." His severe insomnia, complicated by the nightmares, made him fatigued and unable to function during the day. He'd been diagnosed with PTSD and reported that his group and individual therapy through the Department of Veterans Affairs (VA) hadn't helped with his symptoms.

Keith received 6 h-long sessions with Ingrid, during which she had him tap on acupoints while he focused on traumatic war memories and other psychological stressors. In their first session, he reported that since the war's conclusion, he'd rarely gotten more than 1 to 2 h of sleep at a stretch and averaged about two nightmares each night. By the end of the six sessions, he was getting 7 to 8 h of uninterrupted sleep and was having no nightmares. He said that other symptoms, such as intrusive memories, startle reactions, and overwhelming obsessive guilt had abated as well. A 6-month follow-up interview and further testing showed that the improvements held.

At this point, more than 21,000 veterans have received free or low-cost tapping sessions from the Veterans Stress Solution[8]. A 10-min clip containing brief excerpts of interviews with four combat veterans before and after energy psychology treatments, along with snippets from the treatments they received, can be found at www.vetcases.com.

Earthquakes and Floods

A 2010 earthquake in Haiti caused more than 200,000 deaths and eight billion dollars in damage. Seventy-seven of the survivors were assessed for PTSD on a standardized symptom inventory. Forty-eight scored in the clinical range. After two days of instruction in EFT, none of the participants showed a score in the clinical range on post-test ($p < 0.001$). Posttest symptom and symptom severity scores decreased by an average of 72%, ranging between a 21% reduction and a 100% reduction (Gurret et al., 2012). Another team went to Haiti 6 months after the earthquake to provide training in TFT. In addition to reporting on the effectiveness of the tapping treatment, they discuss challenges, such as limited healthcare resources and poor infrastructure, that had to be overcome for the program's success (Robson and Robson, 2012).

An earthquake in Indonesia in 2006 killed more than six thousand people and destroyed 60,000 homes. The Tapas Acupressure Technique® (TAT), an energy psychology approach in which acupoints are held (rather than tapped) during the verbal component, was taught to local relief workers, leading to some six thousand adults and children receiving the treatment in individual and group settings. The Mexican Association for Crisis Therapy has used TAT in training hundreds of frontline service personnel working with floods and other natural disasters in Mexico, Nicaragua, Venezuela, and Columbia. Ignacio Jarero, the Association's president, stated on the TAT website, "Children and adults reported significant reductions in SUD scores at the completion of the protocol.... TAT is our favorite technique to reduce distress because it is easy to teach and apply" ([9]retrieved February 10, 2022).

EFFICIENT DELIVERY OF ENERGY PSYCHOLOGY SERVICES

In the wake of a disaster, community and emergency response resources are often overwhelmed. When hundreds or thousands or tens of thousands of people have been affected, the need

[8]https://www.stresssolution.org/

[9]https://tatlife.com/disaster-relief/

for delivery systems that are more efficient than individual counseling emerges with unyielding urgency.

A meta-analysis of 10 therapies treating PTSD in adults found that the one which used an acupoint tapping protocol was more cost-effective than trauma-focused CBT, selective serotonin reuptake inhibitors (SSRIs), and six of the other seven therapies that were evaluated (Mavranezouli et al., 2020b). A reason for this cost-effectiveness is that energy psychology treatments tend to work so rapidly in reducing trauma-induced limbic system hyperarousal. They are also highly flexible in that they can be delivered as one-on-one therapy provided by professionals or lay counselors, in classes and workshops, online as tele-therapy, and/or taught as a self-help technique.

Four approaches that have emerged for providing energy psychology services more efficiently involve the use of large groups, lay counselors, digital delivery, and training local professionals and institutions to field the long-lasting effects of a major catastrophe. Each is discussed in this section.

Large Groups

The energy psychology approaches that are in widest use for disaster relief (EFT, TAT, TFT, TTT) have all been applied in group as well as individual formats. Simple energy techniques for self-soothing can quickly reduce the symptoms of acute stress and be efficiently taught in group settings. Because it is not necessary to verbalize their traumas in order to experience benefits from basic energy psychology procedures, participants are able to obtain immediate relief without having to reveal to other group members specific memories or emotions.

A group approach that takes participants beyond the first tier of energy psychology interventions in the aftermath of a disaster (immediate relief/stabilization), though still anonymously for most group members, has also been developed. It involves having each person bring to mind a troubling memory or emotion and giving it the 0-to-10 SUD rating. A volunteer from within the group is then selected for a tapping session, led by a trained practitioner while the group watches. At the same time, group members are instructed to shift their focus from their own issues to the volunteer's psychological distress. They self-apply the procedures being used with the volunteer as if the volunteer's issue were their own issue. This causes the volunteer to feel the focused support of the group while the group members are experiencing attunement and compassion for the volunteer. They are also witnessing, practicing, and further internalizing the tapping procedure. The approach also has an unexpected effect. When the group members go back to re-assess their own initial situation by giving it a second SUD rating, most of them find that the amount of emotional intensity or distress has diminished.

Called "borrowing benefits," this phenomenon is widely reported by tapping practitioners and has been investigated. A within-subjects design was used with 102 participants who attended either of two 3-day Borrowing Benefits workshops conducted by EFT originator, Gary Craig (Rowe, 2005). The participants were given a well-established, standardized symptom checklist 1 month prior to the workshop, immediately prior, immediately after, 1 month after, and 6 months after the workshop. No significant difference was found in the mean test scores 1 month prior to vs. immediately prior to the workshop. Following the workshop, however, a highly significant decrease ($p < 0.0005$) was found on the checklist's global measure of psychological distress as well as all nine subscales. These improvements held at the 6-month follow-up. The majority of the participants did not experience individual treatments during the workshops. While the mechanisms for such positive "contagion" have not been established, practitioners are consistently describing similar findings (Church and House, 2018). The value of utilizing such an effect following a mass disaster—where survivors have gone through parallel experiences—is obvious.

For example, during Dr. Leyden's work in Rwanda, the organization that arranged which villages and which groups she would meet with had allotted six days for her to work with a hundred orphans who were also heads of their households. They ranged in age from 19 to 25. At the time of the genocide, they were only 5 to 11 years old, yet they were left to care for two to six other orphans with no visible means of support for food, rent, education, or daily living expenses. With close to 100,000 orphans from the war and hundreds of thousands more children being orphaned as a result of their parents dying of HIV/AIDs, the Rwandan government did not have the resources or capacity to care for these orphans.

Since individual counseling with 100 people over a six-day period wasn't going to go very far, Leyden decided to meet with the entire group on each of the six days. She was still able to have one-on-one sessions, but she could amplify their impact by conducting them in front of the large group. Using the borrowing benefits model, everyone in the group would, before each one-on-one session, tune into their own area of greatest concern, give it a SUD rating, and then bring their attention to tapping along with the person working with Dr. Leyden in the front of the room, using the wording that person used.

The first individual session was with a young man, about 20 years of age, who had been caring for three other orphans since the time of the genocide. He was still struggling with intrusive memories about the genocide 14 years earlier. He rated his distress as being "above 10" on the 0-to-10 SUD scale. He, Dr. Leyden, and the entire group tapped on these and similar statements, one at a time:

- My mind does not feel safe.
- My memories will never go away.
- I will be terrorized by these memories for the rest of my life.
- I'm afraid to sleep because of these memories.

After 25 min of tapping, he reported that he was at a two on the SUD scale. He commented, "my mind feels safe now. I know I am safe right now. I'm looking forward to sleeping tonight." Meanwhile, Dr. Leyden reported sensing a palpable shift in the room. There was a quiet sense of peacefulness that wasn't there before the session. As she checked in with the rest of the group, all one hundred participants reported being at a two or below on their original issue. Specifically, one person after another reported feeling

safer in his or her body than they could ever remember having experienced.

As the week progressed, the young man reported that his sense of calm persisted at home each evening. He was able to sleep peacefully. Others who had one-on-one sessions addressed additional themes, including these, as the group tapped along with them:

- Helplessness of being an orphan.
- Hopelessness of not having a bright future to look forward to.
- Healing for the wound of rape.
- Terror about the return of intrusive memories of their parents and families being murdered in front of them.
- Pain of often going hungry.
- Anxiety of not being able to provide basic needs for the younger children they were caring for.

During the sessions, the participants reported how the new sense of safety helped them cope better with the challenges they faced on a daily basis. They also taught their "families" to tap at home, which made them feel more in control of their situation and better able to help other family members when they were feeling stressed or traumatized. Dr. Leyden commented that it was for her, "another reminder of what I've seen hundreds of times: the power of the tapping to re-regulate the physiological dysfunction that occurs when a person is traumatized."

Lay Counselors

Since so many more volunteers can be made available for disaster relief efforts than trained mental health professionals, efforts to quickly and efficiently train laypeople to provide safe and effective emotional support services have been carried out and appear promising. A study published in the *Bulletin of the World Health Organization* reviewed 20 clinical trials involving 5612 participants. It investigated outcomes following a variety of treatments provided by lay counselors, with a focus on PTSD, depression, anxiety, and alcohol use. The review concluded that the "use of professionally trained lay counselors to provide mental health interventions in low- and middle-income countries was associated with significant improvements in mental health symptoms across a range of settings" (Connolly et al., 2021, p. 572).

An analysis of the practitioners in a study of EFT in the treatment of PTSD with combat veterans was conducted by Stein and Brooks (2011). Of the 59 volunteer practitioners, 26 were licensed mental health counselors (LMPs) and 33 were "lay coaches." Based on the selection criteria of the original study, all of the veterans had scored above the PTSD cutoff on a PTSD inventory that had been standardized for veterans. After six sessions, 90% of the veterans treated by the LMPs no longer scored in the PTSD range as contrasted with 83% who were treated by the lay coaches. This trend for better outcomes with the LMPs did not reach statistical significance, and the authors concluded that EFT provided by lay coaches was "an effective strategy to address PTSD in this population" (p. 11).

Two clinical trials of TFT treatments following the genocide in Rwanda (Connolly and Sakai, 2011; Connolly et al., 2013) and the report of the use of TFT after the 2010 earthquake in Haiti (Robson and Robson, 2012) were notable not only for their effectiveness. They each also used lay counselors to provide the services.

In the 2011 Connolly and Sakai study of 145 survivors of the Rwanda genocide, the 28 community leaders who administered the treatments each received two full days of training in TFT, including hands-on practice and hands-on supervision while providing the treatments. The participants were randomly assigned to a single-session treatment group or a no-treatment condition. All reported PTSD symptoms that had persisted for more than a decade after the genocide (which was one of the selection criteria). These symptoms were significantly reduced ($p < 0.001$) for the treatment group but not for the controls. Gains were maintained at 2-year follow-up. The study's authors concluded:

> While it is desirable to utilize experienced mental health professionals in treating severe PTSD, the possibility of enlisting community leaders to treat fellow community members employing an efficacious, non-narrative therapeutic modality that does not require years of clinical training vastly enhances the potential mental health care resources in a community devastated by large-scale trauma (p. 171).

The Connolly et al. (2013) study was a partial replication of the 2011 investigation, again using a single-session design with lay counselors who had been provided with two days of TFT training for treating trauma symptoms, working with a different population of Rwanda genocide survivors. As with the earlier study, self-reported symptom reduction was highly significant for the treatment group.

Having reached some 250,000 individuals who have experienced disasters in more than 30 countries, the Peaceful Heart Network probably has the most experience in utilizing large groups and lay counselors in bringing tapping to post-disaster areas. They explained to me how their reach multiplies so quickly: "One of our trainings in an African village for self-applying TTT was attended by 40 people. We asked each participant to teach 4 others. We also requested that they ask each of the people they teach to teach four more. Within 2 months, TTT had spread to several thousand people in the area". Hamne and Sandström's (2021) book, *Trauma Tapping Technique: A Tool for PTSD, Stress Relief, and Emotional Trauma Recovery* (2021), outlines their approach.

Digital Delivery

The COVID-19 pandemic caused many psychotherapists to innovate ways for delivering their services online. Growing evidence shows that telehealth delivery of mental health services can be effective. A recent meta-analysis found that in some circumstances online cognitive behavioral therapy was more effective than face-to-face sessions (Luo et al., 2020). Acupoint tapping protocols are particularly amenable to online treatments,

and digital delivery has been used with the approach for well over a decade (Church, 2012). Church listed numerous advantages of online treatment and self-help resources, such as greater reach, user access to 24/7 support, anonymity, and lower costs. He also discussed potential disadvantages, such as the possibility of abreactions or retraumatization with no immediate hands-on support, inappropriate self-treatment for severe mental health diagnoses like schizophrenia or bipolar disorder, and a lack of quality control or unclear accountability for the developers and providers of online services.

The first systematic study of digital energy psychology treatments showed that an 8-week online EFT program significantly reduced pain, anxiety, and depression while improving vitality, social function, and mental health measures in 26 women diagnosed with fibromyalgia (Brattberg, 2008). The majority of the 21,000-plus tapping sessions provided by the Veterans Stress Solution (see text footnote 8) have been online. The ACEP Humanitarian Committee's "Resources for Resilience" program posts a variety of online tools that can help "alleviate suffering by teaching self-help techniques to those experiencing the effects of violence, trauma, and natural disasters" (see text footnote 7). A cell phone app that guides users in applying acupoint tapping protocols for anxiety and stress was investigated in a large-scale study including 270,461 app users and found highly significant ($p < 0.001$) symptom reduction (Church et al., 2020).

An online format can not only make services more accessible, it can also facilitate large group sessions. The ACEP Humanitarian Committee members reported in an informal survey the frequent use of group Zoom sessions or telehealth classes. In an RCT investigating outcomes of EFT treatments on stress, anxiety, and burnout levels during the pandemic, 72 nurses were randomized into a tapping group or a no-treatment control group (Dincer and Inangil, 2021). Based on a single guided online group EFT session, reductions in stress level, anxiety, and burnout indicators reached high levels of statistical significance ($p < 0.001$). The control group showed no statistically significant changes on these measures.

Training Local Professionals and Institutions

A single major catastrophe can change a community forever. While disaster relief teams coming in from other areas can bring indispensable resources, their time in the community is relatively brief. Energy psychology disaster relief teams from Newtown to Parkland to Rwanda to Aboriginal communities in Australia have been evolving ways for training and empowering the local leaders and disaster survivors for enhancing the community's long-term resiliency. Before their departure, relief teams are increasingly providing training in acupoint tapping protocols to local mental health professionals and agencies who will be serving the long-term needs of their communities. For example, following the high school shooting in Parkland, Florida, which is part of Broward County, a community of 2.2 million that was deeply affected, trained professionals are now providing EFT services in 20 agencies in the county. This was made possible because of recognition by government agencies as well as private foundations—including the local Children's Services Council and the New York Life Insurance Foundation—of the need to scale and replicate tapping therapies so they would be widely available.

Trends in Service Delivery

Based on my interviews with practitioners who have incorporated the stimulation of acupoints into disaster relief work, these four trends have been appearing for increasing the impact of energy psychology interventions. Supporting the first two trends (large group applications and the use of carefully selected community members so they can be taught the method and then teach it to other survivors with the response team's supervision) has been a tendency to simplify tapping protocols. This allows tapping protocols to be readily and widely applied for immediate relief and restabilization. A primary way of accomplishing this has been to focus the tapping on the *felt sense* (after Gendlin, 1982) of traumatic memories or other disturbing emotions rather than relying on verbal descriptions or formulistic phrasings. The third trend, utilizing digital technology, is appearing both for making the best instruction for coping with a disaster widely available and also for conducting personally tailored treatment sessions remotely with individuals and groups. All three of these developments may be utilized in the fourth trend, which is to empower the local community to address ongoing mental health challenges and to develop greater resilience from having lived through the tragedy.

TRAINING

Training and certification in the various forms of energy psychology are available from numerous organizations. Among the largest and most widely respected include the Association for Comprehensive Energy Psychology[10], EFT Universe[11], Thought Field Therapy®[12], EFT International[13], and Evidence Based EFT Training[14]. In addition to the basic skills necessary for addressing psychological issues utilizing acupoint tapping protocols, training for serving as a disaster responder is widely available from organizations such as the Red Cross[15], the Green Cross Academy of Traumatology[16], and the International Trauma Training Institute[17]. A list of other in-person and online courses can be found at https://www.apa.org/practice/programs/dmhi/dmh-training/disaster-mental-health-training. More than a dozen books are available for examining the issues any disaster responder needs to understand. Three of my favorites are the already-mentioned *Interventions Following Mass Violence and Disasters* (Ritchie et al., 2007), *The Body Keeps the Score*

[10]https://www.energypsych.org/
[11]https://eftuniverse.com/
[12]https://tfttapping.com/
[13]https://eftinternational.org/
[14]https://evidencebasedeft.com/
[15]https://www.redcross.org/take-a-class/disaster-training
[16]https://greencross.org/
[17]https://traumaonline.net/certified-clinical-trauma-professional-cctp/

(van der Kolk, 2014), and *The Worst Is Over: What to Say When Every Moment Counts* (Acosta and Prager, 2014).

FUTURE RESEARCH

Additional systematic research is called for as growing numbers of disaster relief teams are utilizing energy psychology protocols. Among the topics needing further investigation: (a) Are energy psychology interventions in the immediate aftermath of a disaster more effective than other modalities in preventing post-traumatic symptoms long-term? (b) Which energy psychology strategies are most effective during each phase of post-disaster recovery? (c) What adjustments need to be made based on the type of disaster? (d) When is it best to utilize or not utilize strong reliance on the verbal components of energy psychology protocols? and (e) How can efficient delivery approaches such as the use of large groups and digital technology be fashioned to enhance rather than dilute the effects of the method?

CONCLUSION

The escalating incidence of natural and human-made disasters has resulted in a critical shortage of mental health resources for addressing the emotional consequences and compromised functioning of millions of people who have lived through catastrophic events worldwide. Applications of energy psychology interventions following disasters in more than 30 countries have been promising, and efficient means of delivery include large groups, lay counselors, digital technology, and community empowerment. Reports from those providing these services as well as a limited number of empirical studies appear compelling, with the technique's ability to quickly ease the neurological aftermath of trauma standing out as a major advantage.

HISTORY AND PERMISSIONS

This article is a thorough revision and update, adapted from the author's 2008 "Energy Psychology in Disaster Relief," published in *Traumatology*, 14(1), 124–137. Copyright © 2008 by the American Psychological Association. Selected passages reproduced with permission.

AUTHOR CONTRIBUTIONS

The author conducted each stage in the development of this manuscript.

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Conflict of Interest: DF conducts trainings, provides clinical services, and has written books related to the approach examined in this manuscript.

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First-Session Therapeutic Relationship and Outcome in High Risk Adolescents Intensive Group Psychotherapeutic Programme

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Background: An important determinant of therapy outcome is the quality of the therapeutic relationship. This study evaluated the association between the client's assessment of first-session therapeutic relationship (FSTR) and outcome in an intensive treatment for adolescents with personality disorders.

Method: Patients (N = 92) were measured weekly during intensive group treatment. The therapeutic relationship was measured with the Child version of the Session Rating Scale (C-SRS) that was completed after each group therapy session by the patient. Outcome was measured with the Child version of the Outcome Rating Scale (C-ORS). Reliable change index (RCI) was calculated for the both instruments to determine significant changes in therapeutic relationship and outcome.

Results: A good FRST gave twice as much chance of a significantly better outcome. Especially for those with moderate FSTR, establishing and maintaining a good working relationship during treatment could increase the chances of a good outcome considerably. In contrast, adolescents with low FSTR had little chance of positive outcome regardless of any improvement in the therapeutic relationship.

Conclusion: Adolescents assessment of FRST is indicative of the chance of a good outcome.

Keywords: therapeutic alliance, therapeutic alliance in the initial phase, treatment outcome, psychotherapy, group therapy, adolescents', personality disorder, MBT

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INTRODUCTION

The positive association between the therapeutic relationship and outcome is demonstrated to be robust for both adults and adolescents (Flückiger et al., 2018; Karver et al., 2018; Norcross and Lambert, 2018; van Benthem et al., 2020). This therapeutic relationship remains consistent across various variables such as assessor perspectives, alliance and outcome measures, treatment method, patient characteristics, and countries (Flückiger et al., 2018). Since the effect of the technical aspects of psychotherapeutic treatment turns out to be overestimated (van Os et al., 2019) the therapeutic relationship attracts more and more attention in research and clinical practice as an important working mechanism of psychotherapy which potentially can improve the outcome,

especially concerning psychotherapy in severely distressed patients (Norcross and Lambert, 2018). For adolescent mental health therapists, paying attention to therapeutic alliance in general and especially at the start of the treatment may be particularly relevant as a result of distrust of adult authorities and a desire for autonomy (De Haan et al., 2013; Hauber et al., 2020). We investigated the potential role of first-session therapeutic relationship (FSTR) ratings from the clients' perspective to serve as an early marker of treatment outcome in a high risk adolescent sample.

The therapeutic relationship—also referred to as a working alliance—is defined as a mutual collaboration and partnership between therapist and client (Bordin, 1979). Research on predictive power of and feedback into this therapeutic relationship in ongoing psychotherapy sessions has the potential to enhance treatment outcomes (Tam and Ronan, 2017) and efficacy (Janse et al., 2017), especially for more severely disturbed patients (Norcross and Lambert, 2018) and adolescents with an increased risk of treatment failure or drop-out (De Haan et al., 2013; Hauber et al., 2020). However, relatively little research has been conducted on psychotherapy among severely disturbed adolescents with multimorbidity, a group of patients that often is excluded from scientific research (Hauber et al., 2017). Therefore, high risk adolescents' evaluation of the therapeutic relationship combined with information on treatment outcome, in order to obtain generalisable knowledge of association between the two, are needed for clinical practice.

Studies specifically looking at the influence of the quality of FSTR on treatment outcome are rare. In a recent study on adolescent and therapists' judgement of the therapeutic alliance, FSTR had a medium and robust association with treatment outcome. Youth with substance use disorders with a strong FSTR according to both perspectives, had an eightfold odds of favourable treatment outcome compared with adolescents with a weak FSTR according to both perspectives (van Benthem et al., 2020). The association between the client's assessment of FSTR and outcome among high risk adolescents is unstudied.

The aim of our study was to investigate the association between the therapeutic relationship at the start of treatment and outcome in a high risk adolescent sample following intensive group psychotherapy. The therapeutic relationship was measured at the end of each group psychotherapy session with the authorised Dutch version of Child-Session Rating Scale (C-SRS) (Duncan et al., 2006; Hafkenscheid et al., 2006). Outcome was measured with the authorised Dutch version of Child-Outcome Rating Scale (C-ORS) (Miller and Duncan, 2004; Duncan et al., 2006; Hafkenscheid et al., 2010). Studies evaluating the (C-)ORS and (C-)SRS have confirmed the psychometric quality and usability of the instrument, and showed an association between the therapeutic relationship and therapeutic change or outcome (Duncan et al., 2003; Campbell and Hemsley, 2009; Boon et al., 2012; Sundet, 2012; Owen et al., 2016). Based on previous studies, it was assumed, first, that there is an association between the FSTR and treatment outcome in high risk adolescents; and second, that patients with a strong FSTR will have a higher chance of a favourable outcome compared to those with a moderate or low FSTR.

MATERIALS AND METHODS

Setting

The studied group psychotherapy was part of a five days a week structured and integrative psychodynamic group psychotherapy programme for adolescents with personality disorders of Youz, YMHC centre in The Netherlands. This adolescent clinical psychotherapy programme commonly starts as residential treatment and converts into a day treatment halfway through. It is a mentalization based treatment (MBT) programme, manualised and adapted for adolescents (Bateman and Fonagy, 2006, 2012; Hauber, 2010) facilitated by a multidisciplinary team trained in MBT. The programme differentiates from the MBT programme for adolescents in Great Britain (Rossouw and Fonagy, 2012) because of its focus on psychodynamic group psychotherapy instead of the original more individual group psychotherapy approach. The main focus of the different therapies in this programme is not only on the adolescents' subjective experience of oneself and others, but also on the relationships and interactions with the group members and the treatment staff. The optimal group therapy size is 6 members instead of 8. Besides the weekly group psychotherapy, other (non-verbal) group therapies as well as individual- and family psychotherapy are offered. In case medication is needed in addition to the treatment, this is prescribed by a psychiatrist of the YMHC centre.

During the 1.5 h group therapy session, the group members were stimulated to focus on oneself and others mental states that underlie overt behaviour in the group. They were invited to share their problems and focus not only on what is shared but also on how things are shared by each group member and the therapeutic alliance. Conflicts or therapeutic alliance ruptures were extensively examined and discussed. In this way, group psychotherapy is a shared attentional process which strengthens mentalising capacities and interpersonal functioning. For more details and examples of the treatment programme (Hauber et al., 2019).

Participants

The sample consisted of 92 adolescent patients who followed the programme between 2013 and 2018. All participants were referred to the facility with clinically diagnosed personality disorders according to the DSM-III (APA, 2013), because outpatient treatment had proved insufficient. Based on the diagnostic report of the referring therapist, during the intake process, experienced clinicians of the treatment team double checked the diagnostic classifications in combination with the commitment for the treatment of the patient itself and the parents. Comorbid pervasive developmental disorder and psychosis was set as an exclusion criterion. Adolescents' mean age at the start of treatment was 17.7 (SD = 1.81 range = 15–22), (females 85.9%). Average duration of treatment during this study was 215.2 days (SD = 100.8, range = 21–640). Most of the patients (90.4%) were clinically diagnosed with a personality disorder often with comorbid axis-I disorders (mood disorder 48.5%, anxiety disorder including PTSS 57.3%, eating disorder 8.7%, ADHD 7.6%, substance dependence 3.9%, dissociative

disorder 1.9% and ASD 4.8%). Of the 94 patients diagnosed with a personality disorder, 49 (52.1%) were diagnosed as Personality disorder NAO, 16 (17%) Borderline, 16 (17%) Avoidant, 2 (2.1%) Dependent, and 1 (1.1%) Antisocial. Intelligence estimated based on level of education was average to above average. Most patients 94.4% had a native Dutch background and the Dutch language was fluently spoken by all participants.

Instruments

The C-ORS and the C-SRS (Miller and Duncan, 2004; Duncan et al., 2006) is a measure that can be used to monitor progress during (group)psychotherapy. Both measures are four item visual analogue instruments. The versions for adolescents differ from the adult version of the ORS and SRS because it uses emoticons: a smiley (positive) and a frowny face (negative) in between 10 cm line, with instructions to place a mark on each line with low estimate to the left and high to the right. The C-ORS and C-SRS know an authorised Dutch version (Hafkenscheid et al., 2006), which has already been used in Dutch research (Boon et al., 2012; De Haan et al., 2014; Hauber et al., 2020).

The C-ORS assesses areas of life functioning known to change as a result of psychotherapy prior to the start of the treatment session. These areas are symptom distress, interpersonal well-being, social role, and overall well-being. The reliability (internal consistency) of the Dutch version of the C-ORS was satisfactory (Cronbach's $\alpha = 0.84$) (Hafkenscheid et al., 2010). The scores on these four items (the 10 cm line represents scores between 0 and 10) result in a total session score, varying between 0 and 40. This means that a high average total score indicates a low symptom distress and high well-being.

The C-SRS assesses the therapeutic relationship at the end of the psychotherapy session. This therapeutic alliance of the C-SRS consists of three interacting elements: (1) the relational bond between the patient, therapists and the group members; (2) concordance on the goals of psychotherapy; and (3) concordance on the tasks of psychotherapy. The first item assesses the feeling of being listened to; the second item assesses if the discussed topics in the session was evaluated as relevant for the patient; the third item evaluates the way the patient was approached by the therapists and group members; and the fourth and last item asks to evaluate the total session and feeling of belonging to the group. The scores on these four items (the 10 cm line represents scores between 0 and 10) result in a total session score, varying between 0 and 40. This means that a high average total score indicates a high quality of the therapeutic relationship. The reliability (internal consistency) of the Dutch version of the C-SRS was satisfactory (Cronbach's $\alpha = 0.86$) (Hafkenscheid et al., 2010).

Procedure

At the start of the programme, all patients (N = 92) and their parents were requested permission by means of a consent form to use their data anonymously for scientific research after a verbal explanation of the treatment protocol. This written informed consent was obtained according to legislation, the institution's policy, and Dutch law (Eurec, 2017). All subjects (N = 92) agreed to participate, and, in concordance with the institutional policy, they took part without receiving any incentives or rewards. All procedures in this study were aligned with the 1964 Helsinki declaration and its later amendments, or with comparable ethical guidelines.

The C-ORS was offered to the patients at the start of each weekly group therapy session and the C-SRS at the end of the session, after which it was collected and viewed by the therapist. According to protocol the patients were to fill in the forms during every therapy session. Although therapists sometimes forgot to hand out the C-ORS and C-SRS, the C-ORS and C-SRS were completed during most of the group therapy sessions. The first C-ORS and C-SRS were completed during the first therapy session. The C-ORS and C-SRS that were completed during the last session (planned in the case of completers and unplanned in the case of dropouts), were marked as the last C-ORS and C-SRS. It largely depended on the length of therapy how many C-ORS and C-SRS forms the patient finally completed.

Statistical Analyses

All analyses were performed using the SPSS, version 25.0 (IBM, 2017). First, the reliable change index (RCI) was determined to calculate reliable change between the first and last C-ORS session and C-SRS session using the Jacobson and Truax formula (Jacobson and Truax, 1991) with a 95% reliability interval. Based on all questionnaires (C-ORS N = 2174; C-SRS N = 2313) for the C-ORS a reliability (Cronbach's Alpha) = 0.842 and $SD = 6.19$ was found, the standard error was 3.48. This resulted in a reliable change criterion for the C-ORS of (1.96×3.48) 6.82. In case of the C-SRS the reliability was (Cronbach's Alpha) = 0.916 and $SD = 7.23$ and the standard error 2.96. The reliable change criterion for the C-CRS was (1.96×2.96) 5.81.

Second, percentages of significant changes (using RCI) in the C-ORS and C-SRS between the first and last session of therapy were calculated for both the C-ORS and C-SRS.

Third, the odds ratio was calculated of the chance of a favourable outcome (C-ORS) if post-treatment the therapeutic alliance had grown (C-SRS) compared to the rest of the sample. Therefore the participants with lower scores at post-treatment on the C-SRS and the participants of which the C-SRS scores were unchanged at post-treatment, were combined.

Last, based on the FSTR (C-SRS: $M = 26.45$, $SD = 7.23$) groups were formed, namely a Low FRST group ($M - 1\ SD \leq 19.22$), a Moderate FRST group (between $M - 1\ SD$ and $M + 1\ SD = 19.23$–33.68) and High FRST group ($M + 1\ SD \leq 33.68$) (See **Table 2**).

RESULTS

Descriptives

The 92 subjects attended group psychotherapy between March 2013 and October 2018, with an average number of group members of 5.0. The number of sessions the participants attended ranged from 9 to 44 times ($M = 28.77$, $SD = 9.48$). The number of C-ORS and C-SRS completed per participant ranged for the C-ORS from 6 to 44 ($M = 25.35$, $SD = 8.96$) and for the C-SRS from 6 to 44 ($M = 25.12$, $SD = 8.80$). Over 2,647 attended sessions, the response percentage per patient for the C-ORS ranged from

30 to 100% (M = 88.12%, SD = 13.86) and for the C-SRS from 40 ti 100% (M = 87.35%, SD = 13.18). A significant ($p < 0.001$) but moderate association was found between the C-ORS and C-SRS scores per session (n = 2,265, r = 281).

The Association Between the FSTR and the Outcome

First we compared the first and last session's scores of the C-ORS and the C-SRS. Both the C-ORS (t1: M = 16.00, SD = 6.19; t2: M = 23.01, SD = 9.76; t = 6.54, $p < 0.001$) and C-SRS scores (t1: M = 26.50, SD = 7.23; t2: M = 31.49, SD = 10.23; t = 4.15, $p < 0.001$; r = 0.253) were significant higher at post-treatment than at pre-treatment. **Table 1** shows the number and percentage of participants that deteriorated, stayed unchanged or improved on the Reliable Change Index (RCI) between first- and last session scores C-ORS and C-SRS.

Second, the association between the therapeutic relationship and the outcome was investigated. In general, if the therapeutic alliance stayed unchanged (C-SRS), just over a quarter (28.6%) of the participants had a significantly better outcome (C-ORS). However, if the therapeutic relationship did improve, almost 63% had a significantly better outcome at the end of treatment. In the case that at post-treatment the therapeutic alliance had grown, the chance of a favourable outcome was more than twice as large (OR = 2.152 95% CI 0.931–4.976).

The Patients' Assessment of the FSTR and the Chance of a Favourable Outcome

Of the total of 92 participants, 9 (9.8%) reported a low ($M - 1$ SD) therapeutic alliance in the first session of the treatment, 70 (76.1%) a moderate (between $M - 1$ SD and $M + 1$ SD) therapeutic alliance and 13 (14.1%) a high ($M + 1$ SD) therapeutic alliance. Of the Low FRST group (N = 9), the therapeutic relationship improved in 7 (77.8%) cases, but only 1 (11.1%) had a favourable outcome (p = 0.571). In contrast, the therapeutic alliance did not improve for anyone in the High FRST group (N = 13) and 8 (61.5%) had a favourable outcome. When in the Moderate FRST group (N = 70) the therapeutic alliance did not improve, only 37.1% (n = 13) had a favourable outcome; but when the therapeutic alliance did improve, 62.9% (n = 22) recovered significantly (p = 0.004).

In case a post-treatment therapeutic alliance had improved in this Moderate FRST group, the chance of a significantly better outcome was more than four times as high (OR = 4.231 95% CI 1.550–11.546). In contrast, the chance of a favourable outcome in the Low FRST group when the therapeutic alliance had improved was 1.167 (95% CI 0.862–1.579) (See **Table 2**).

DISCUSSION

The aim of our study was to gain deeper insights on the association between the first-session quality of the therapeutic relationship and treatment outcome among high risk adolescents receiving intensive MBT. We measured the therapeutic relationship with the C-SRS and the outcome with the C-ORS during clinical adolescent's group therapy. As expected, in general a good FSTR gave twice as much chance of a significantly better outcome (OR = 2.2). In case the therapeutic alliance did not improve, just 36.0% of the respondents (N = 18) had a significantly better outcome while if the therapeutic relationship did improve, 54.8% (N = 23) had a significantly better outcome. Especially for those with moderate FSTR, establishing and maintaining a good working relationship during treatment could increase the chances of a good outcome considerably (OR = 4.2). In contrast, adolescents with low FSTR had little chance of positive outcome regardless of any improvement in the therapeutic relationship (OR = 1.2). This could mean that clinical adolescents' assessment of FRST is indicative of the chance of a good outcome. Our study showed that the rather short instrument (C-SRS), which can be easily applied in clinical practice to be completed by adolescent patients themselves, is a valuable instrument for measuring the quality of the therapeutic relationship.

The results of this study provide evidence concerning the significance of the FSTR and of the client-therapist match in high risk adolescents. In the intake process it seems crucial to establish a good quality therapeutic relationship to increase the chance of an average or high treatment outcome. Maybe for high risk adolescents with personality disorders and insecure attachment (Hauber et al., 2018) an intense focus on the therapeutic relationship from the start of treatment is extra helpful in establishing and maintaining alliance (Groth and Hilsenroth, 2019; Hauber et al., 2020). Therapeutic ruptures

TABLE 1 | The number and percentage of participants that deteriorated, stayed unchanged or improved on the Reliable Change Index (RCI) between first- and last session scores on general functioning (C-ORS) and therapeutic alliance (C-SRS).

General functioning	Deteriorated		Unchanged		Improved		Total	
Therapeutic alliance	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Deteriorated	2	2.1	4	4.3	2	2.2	8	8.6
Unchanged	3	3.3	23	25.0	16	17.4	42	45.7
Improved	1	1.1	18	19.6	23	25.0	42	45.7
Total	6	6.5	45	48.9	41	44.6	92	100.0

RCI, Reliable Change Index; C-ORS, Child Outcome Rating Scale; C-SRS, Child-Session Rating Scale.

TABLE 2 | Comparison of number and percentage of not improved and improved participants between first- and last session scores on general functioning (C-ORS) and quality of the FSTR (C-SRS).

General functioning	Not improved		Improved		Total		
	n	**%**	**n**	**%**	**n**	***OR***	***p***
Low FSTR not improved	2	100.0	0	0.0	2		
Low FSTR improved	6	85.7	1	14.3	7	1.167	0.571
Moderate FSTR not improved	25	71.4	10	28.6	35		
Moderate FSTR improved	13	37.1	22	62.9	35	4.231	0.004

FSTR, First-session therapeutic relationship.

can quickly be repaired and drop out of treatment prevented (Hauber et al., 2020).

In the light of psychotherapies' equivalent paradox—'treatments have equivalently positive outcomes despite non-equivalent theories and techniques' (Stiles et al., 2008)—FSTR could help enhance treatment outcomes and the (cost-)effectiveness of psychotherapy for adolescents with personality disorders. As adolescents with low FSTR had little chance of positive outcome regardless of any improvement in the therapeutic relationship, it is worth considering stopping the treatment in consultation with the patient and family. A frank discussion with the patient and their parents about the low probability of a positive outcome provides an opportunity to adjust or stop the treatment, and to look for a more suitable treatment.

CONCLUSION

In this study, the association between the quality of the FSTR from the patients' point of view and treatment outcome was examined in a seldom studied adolescent group with personality pathology. Personality disorders often manifest themselves in mid to late adolescence for the first time (Kessler et al., 2005). Despite this knowledge, research and clinical attention is focussed mainly on adults and then mainly on borderline personality disorder. Against this background, clinical practice is in need of more information on this difficult patient group. Research investigating moderators of outcome among psychotherapy treatments for adolescent personality disorders is needed. Understanding for whom, and under what conditions and in which dosage, treatments exert their greatest effects is essential and enhances development of personalised psychiatry. Furthermore, the role of parents and peers could be an important factor of influence on the outcome of intensive treatment and needs further study.

Limitations of this study must be mentioned. The first limitation is that it is not clear if these results found in a sample of high risk adolescents can be generalised to (group) psychotherapy with other patients with personality pathology and patients with other pathology. The second limitation is that Axis-I disorders were left out due to the practical consideration of not overloading patients with assessment instruments. Nevertheless, the C-SRS can help psychotherapists estimate the change of a positive treatment outcome.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

KH performed the data collection and wrote the manuscript. AB contributed to the design of the research project, performed the statistical analyses in the study, and revised the manuscript. Both authors read and approved the final manuscript.

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Does Reiki Benefit Mental Health Symptoms Above Placebo?

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Background: Reiki is an energy healing technique or biofield therapy in which an attuned therapist places their hands on or near the client's body and sends energy to the client to activate the body's ability to heal itself and restore balance. It was developed in Japan at the end of the 19th century by Mikao Usui of Kyoto. Given the enormous international socioeconomic burden of mental health, inexpensive, safe, and evidenced-based treatments would be welcomed. Reiki is safe, inexpensive, and preliminary research suggests it may assist in treating a wide variety of illnesses. Given that Reiki is a biofield therapy, growing in use, and not yet accepted by the dominant biomedical paradigm, it is important to establish its effectiveness over placebo. This study aimed to examine Reiki's effectiveness over placebo in treating symptoms of mental health and to explore parameters for its effectiveness.

Method: A systematic review of randomized placebo-controlled trials (RPCTs) examining Reiki's effectiveness in treating symptoms of mental health in adults was conducted through a systematic search of PubMed, PsycINFO, MEDLINE, CINAHL, Web of Science, Scopus, Embase, and ProQuest. Fourteen studies met the inclusion criteria, and risk of bias was assessed using Cochrane's Revised ROB 2 assessment tool. This was followed by a grading of recommendations, assessment, development and evaluations (GRADE) assessment.

Results: The evidence to date suggests that Reiki consistently demonstrates a greater therapeutic effect over placebo for some symptoms of mental health. The GRADE level of evidence is high for clinically relevant levels of stress and depression, moderate to high for clinically relevant levels of anxiety, low to moderate for normal levels of stress, and low to moderate for burnout, and low for normal levels of depression and anxiety.

Conclusion: The results suggest that, Reiki may be more effective in treating some areas of mental health, than placebo, particularly if symptoms are clinically relevant. To date, there are a small number of studies in each area, therefore findings are inconclusive and, more RCTs controlling for placebo in Reiki research are needed. Most included studies were also assessed as having a risk of bias of some concern. Incorporating Reiki as a complementary treatment to mainstream psychotherapy for depression, stress, and anxiety may be appropriate.

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Keywords: Reiki, placebo, mental health, anxiety, depression, stress, burnout, systematic review

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INTRODUCTION

Complementary and alternative medicine (CAM) is a heterogeneous group of practices that are not part of orthodox medical care. They may include alternative medical systems such as Chinese medicine, mind-body interventions such as meditation, biologically based treatments such as herbs, body-based approaches such as chiropractic care (NIH, 2005), and biofield therapies which use the body's energy field to promote therapeutic benefit (Guarneri and King, 2015). Reiki is considered a biofield therapy. It was developed in Japan at the end of the 19th century by Mikao Usui of Kyoto (Baldwin, 2020). It is a non-invasive treatment whereby the attuned practitioner gently places their hands on or close to the body of a client in a sequence of positions to promote the body's ability to heal itself and restore balance (Anderson and Wolk-Weiss, 2008).

Worldwide, one billion people suffer from a mental health disorder (The Lancet Global, 2020), and mental illness accounts for half of all illnesses for people up to 45 years of age in wealthy countries (LayaRd, 2017). In 2010, mental health expenditure was estimated to cost the world economy USD$2.5 trillion a year because of poor health and reduced productivity, and this cost is expected to increase to USD$6 trillion by 2030 (The Lancet Global, 2020). Finding inexpensive, evidence-based, safe ways to reduce this burden would be welcomed. Reiki is deemed safe, inexpensive, and non-invasive and preliminary research suggests that it may be effective in treating many illnesses, including symptoms of mental health.

There is also evidence Reiki has therapeutic effects compared with placebo on non-human living systems. Studies on Reiki's effects that best control for placebo are non-human studies where we would expect placebo not to be operating or be less influential. These include RPCT of Reiki's influence on cell cultures, isolated cells, rats and dogs. Despite this expectation in all the following randomised controlled trials (RCTs), the placebo effect was still controlled for with a placebo Reiki group, and all produced significant therapeutic results (Baldwin and Schwartz, 2006; Baldwin et al., 2008; Mothersill et al., 2013; Kent et al., 2020; Pacheco et al., 2021). In these five studies, Reiki was more effective than placebo in the following areas: reducing noise-induced microvascular damage in rats (Baldwin and Schwartz, 2006), improving heart rate homeostasis in rats (Baldwin et al., 2008), increasing survival of directly irradiated cells (Mothersill et al., 2013), increasing photon emission of intervertebral cells in mice and increasing collagen 11 and aggrecan in mice (Kent et al., 2020), and reducing postoperative pain in female dogs undergoing elective minimally invasive ovariohysterectomy (Pacheco et al., 2021). While the studies do not prove that Reiki is beneficial over placebo in humans, they provide evidence that Reiki can be beneficial over placebo in non-human living systems.

Complementary and alternative medicine (CAM) and Reiki are also becoming frequently used and more accepted (Lepine, 2018), with reported rates of CAM use at 69% in Australia (Xue et al., 2007), 76% in Singapore, 76% in Japan, and 75% in South Korea (Wardle et al., 2018). According to the Center for Reiki Research (Lepine, 2018), 60 hospitals and clinics offer Reiki treatments in the United States (USA), and eight other clinics offer it in other countries. Despite the growing use, it is important to keep in mind that Reiki is a biofield therapy (B.T.) belonging to the paradigm of biofield science, which has not been fully established or accepted by the mainstream biomedical paradigm. The biofield is believed to be an organizing energy field of any living system that regulates and helps maintain the biological system (Rubik et al., 2015). This notion is a shift from the mechanical chemistry-based view of the current dominant biomedical paradigm to an information-based view where the biofield is a multi-level organizational concept where information flows within and between various levels of an organism (Rubik et al., 2015). Western biomedicine routinely examines electrical fields from the heart, known as electrocardiograms (ECG), and the brain, known as electroencephalograms (EEG). Biophysics provides evidence that endogenous electromagnetic and other energy fields influence tissue development, tissue repair, and other processes. Energy medicine purports that sending low-level signals to the body can help it heal, including energy healing interventions and bio-electromagnetic device-based therapies (Rubik et al., 2015). However, there are several sociological and paradigmatic oppositions to biofield science as follows (Hufford et al., 2015):

(1) Although research is emerging on causal factors to explain the biofield, such as electromagnetic field properties of electricity, magnetism, sound, and pH, they are not well-understood (Kent et al., 2020) and therefore viewed as unscientific (Hufford et al., 2015).
(2) Some scientists believe that biofield science is incongruent and, therefore, a challenge to the current paradigm.
(3) Subtle energies are often viewed as central to biofield healing. The notion that subtle energies exist is not accepted by conventional science so they are often viewed as psuedoscience.
(4) The idea of a biofield is often associated with a life force or vitalism, that is, the historical notion of a force behind consciousness. This was firmly rejected by modern medicine and still is.

The above concerns point to a need for scientific inquiry into whether Reiki is more effective then placebo, particularly in the much needed area of mental health. This systematic review aims to determine the level of evidence for Reiki's effectiveness over placebo and explore the parameters used when and if it is more effective.

METHOD

Reiki's effectiveness over placebo in treating mental health was assessed by a systematic review (SR) of RCTs in which a placebo-Reiki comparison group was included. In most randomized placebo-controlled trials (RPCTs), of Reiki, an untrained Reiki practitioner with no knowledge of Reiki is taught to mimic the hand positions of the trained Reiki practitioner to control for expectancy effects on participants. The participants are blind to whether they are receiving real or sham Reiki. As much as possible, all other conditions, room, lighting, time, sound, etc.,

are kept the same as in the Reiki condition. To control for client expectancy effects, creating a placebo-Reiki group goes beyond standard RCT protocols and provides more rigorous evidence.

This study only focused on studies that compared hands-on Reiki to a placebo Reiki group or controlled for placebo in some other way. It did not include distant Reiki because it was thought that the causal mechanisms operating might be different for distant Reiki applications. Also, in the hands-on placebo Reiki condition, while participants are not receiving Reiki, they often receive touch unless Reiki is delivered close to but not touching the body. Several studies suggest that the use of therapeutic touch alone has benefits (Gagne and Toye, 1994; Hawranik et al., 2008; So et al., 2008; Ana Cristina et al., 2016). As such, studies of hands-on placebo Reiki involving touch may be examining the benefits of Reiki over therapeutic touch and placebo.

Considerations in Studying Reiki

In examining whether Reiki has a therapeutic effect over placebo, some considerations are as follows to achieve a therapeutic effect:

(1) How long and how many applications of Reiki are needed, and is the dose varied for different conditions?
(2) What kinds of conditions does Reiki provide a therapeutic effect for?
(3) If Reiki is therapeutic, how long do the benefits last?
(4) Do the length of time and number of applications vary according to the level of training and experience of the practitioner?
(5) If effective, do the benefits always occur during treatment, or could they occur after treatment?

Inclusion Criteria for Review

While several reviews of randomized RCTs of Reiki's effectiveness have been conducted (Vitale, 2007; Lee et al., 2008; VanderVaart et al., 2009; Joyce and Herbison, 2015; Zimpel et al., 2020; Morero et al., 2021), only one focused solely on studies controlling for placebo (McManus, 2017); however, it did not conform to the systematic review (SR) methodology. The present study aimed to provide an up-to-date review of RPCTs on the influence of Reiki on mental health symptoms in adults that conformed to the SR methodology and included an assessment of the risk of bias (ROB) and the GRADE criteria. It also included a broader range of inclusion criteria than McManus (2017) as follows:

P: Adults healthy or unhealthy 18 years or older, with or without a formal diagnosis of a mental health condition.

I: Hands-on (touching or near the body) Reiki as a treatment intervention regardless of frequency, duration, or level of practitioner training.

C: A Placebo or Sham comparison group where Reiki is mimicked and/or the receiver did not know whether they received Reiki or not. Other comparison groups may also be included.

O: Standardized, valid, and reliable outcome measures of mental health symptoms and statistical analysis of results.

Published and unpublished studies were included, but only those translated into English.

Despite other SRs of Reiki not meeting the inclusion criteria of a placebo group, there are differences in other Reiki SRs' worth noting. For instance, a Cochrane SR (Zimpel et al., 2020) of "Complementary and alternative therapies for post-cesarean pain" included a review of Reiki plus analgesia vs. analgesia. This only included 2 RCTs (Midilli and Eser, 2015; Midilli and Gunduzoglu, 2016), one of which did not have a placebo group (Midilli and Eser, 2015). The limited number of studies may have been due to four databases being searched rather than the eight searched in this SR.

Another SR by Joyce and Herbison (2015) excluded studies that were included in this SR because they did not meet the criteria for being anxious or depressed (Dressen and Singg, 1998; Shiflett et al., 2002; Mackay et al., 2004; Shore, 2004; Bowden et al., 2010). These studies still used *outcome measures of mental health* (met PICO), so they were included in this SR. Also, when baseline pre-treatment mean scores were compared to accepted clinical cutoffs, some studies that Joyce and Herbison (2015) excluded were in the clinical range (Dressen and Singg, 1998; Shore, 2004), and one study she included was in the clinical range for stress but not anxiety and depression (Bowden et al., 2011). These clinical discrepancies are highlighted in the results of this SR.

Research Questions

1. Does Reiki consistently demonstrate a therapeutic effect above placebo for mental health symptoms?
2. If so, what variables appear to contribute to this therapeutic effect, i.e., duration and frequency of treatment and level of wellness?

Search Method

Randomized controlled placebo trials were researched on PubMed, PsycINFO, MEDLINE, CINAHL, Web of Science, Scopus, Embase, and ProQuest with the keywords "Reiki," "sham," "placebo," "mock," and "comparison treatment." **Supplementary Appendix A** lists the search terms used for each database. Reference lists of identified studies were scanned to search for additional studies. A total of 319 duplicates were removed. One hundred and eighty-nine records were screened, and of these, 150 were excluded and 39 were sought for retrieval. Two reports were not retrieved and 37 were assessed for eligibility. Two studies were in French, 4 used distant Reiki, and 4, on closer inspection, had significant design flaws due to non-randomization (Bessa et al., 2017), missing validated post-test outcome measures (Mauro, 2001), no statistical tests of significance (Salach, 2006), no validated outcome measures (Bourque et al., 2012), and a focus on senders of Reiki rather than recipients (Barnett, 2005). Finally, 12 studies with no outcome measures of mental health were excluded and 14 studies remained. The search was also conducted by an independent assessor. The PRISMA flow chart detailing search findings can be seen in **Supplementary PRISMA Flow Diagram 1**. The PRISMA Checklist can be found in **Supplementary Appendix B**. The PRISMA Abstract Checklist can be found in **Supplementary Appendix C**.

The SR used the recently revised Cochrane Risk of Bias Tool for randomized controlled trials (ROB 2). The suggested

algorithms for judging risk of bias (ROB) were used as a guide to help maintain objectivity (Sterne et al., 2019). The ROB 2 uses a detailed template and an algorithm for judging ROB arising from each of the following areas: randomization, assignment to intervention, adhering to intervention, missing outcome data, measurement in the outcome, and selection of the reported result. ROB from period and carryover effects in crossover trials was applied if applicable. All ROB 2s were independently reviewed, and discrepancies were resolved. Full ROB 2 assessments for each study are available at https://cloudstor.aarnet.edu.au/plus/s/qI4RRkw4Ys8MFKr and effect size calculations at https://cloudstor.aarnet.edu.au/plus/s/uCKeNLEjGLo5jId. A summary of key information is presented in the results section **Table 1** (Summary of Main Findings). Extended information on all studies is presented in **Supplementary Table 1** (Extended summary of findings) of the **Supplementary Material**. Effect sizes were calculated for all RPCTs using an effect size calculator (Wilson, 2017), and the results were randomly checked by calculating Cohen's d from *t*-tests (Thalheimer and Cook, 2002). For four studies, effect sizes could not be calculated because of insufficient published data (Shiflett et al., 2002; Rosada et al., 2015; Erdogan and Cinar, 2016; Çinar et al., 2022).

Attempts were made to contact the authors of all the 14 studies to clarify unclear or missing information and provide a fair review. Author contacts were searched for through Google, LinkedIn, and Research Gate. No contact details were found for the authors of one RPCT (Shiflett et al., 2002). Of the remaining 13 RPCTs, the authors of four studies responded (Thornton, 1991; Vasudev and Shastri, 2016; Baldwin et al., 2017; Çinar et al., 2022).

RESULTS

The search found 26 randomized placebo controlled trials (RPCTs) that examined *hands-on* Reiki's effectiveness over placebo in adults using valid outcome measures translated in English (Thornton, 1991; Dressen and Singg, 1998; Witte and Dundes, 2001; Shiflett et al., 2002; Mackay et al., 2004; Shore, 2004; Gillespie et al., 2007; Assefi et al., 2008; Bowden et al., 2010, 2011; Catlin and Taylor-Ford, 2011; Díaz-Rodríguez et al., 2011a,b; Ventura Carraca, 2012; Baldwin et al., 2013, 2017; Fortes Salles et al., 2014; Novoa and Cain, 2014; Rosada et al., 2015; Alarcao and Fonseca, 2016; Erdogan and Cinar, 2016; Midilli and Gunduzoglu, 2016; Vasudev and Shastri, 2016; Bat, 2021; Yüce and Taşcı, 2021; Çinar et al., 2022). Fourteen of these met PICO for examining the effectiveness of Reiki over placebo in measuring symptoms of mental health (Thornton, 1991; Dressen and Singg, 1998; Shiflett et al., 2002; Shore, 2004; Bowden et al., 2010, 2011; Díaz-Rodríguez et al., 2011a,b; Rosada et al., 2015; Erdogan and Cinar, 2016; Vasudev and Shastri, 2016; Baldwin et al., 2017; Yüce and Taşcı, 2021; Çinar et al., 2022). These RPCTs included outcome measures of depression, anxiety, stress, and burnout. No studies in this SR reported adverse effects of Reiki.

Anxiety and Stress

Eight peer-reviewed and one non-peer-reviewed RPCTs using standardized outcome measures for anxiety and stress met the criteria for inclusion. Six included measures for anxiety (Thornton, 1991; Dressen and Singg, 1998; Bowden et al., 2010, 2011; Baldwin et al., 2017; Çinar et al., 2022), and five included measures for stress (Shore, 2004; Bowden et al., 2010, 2011; Vasudev and Shastri, 2016; Yüce and Taşcı, 2021).

Thornton (1991) conducted an unpublished RPCT on the effect of Reiki on adult healthy female nursing students (Thornton, 1991). In this study, 42 healthy student nurses were randomly assigned to either 1 h of Reiki (n = 22) or 1 h of mock Reiki from a research assistant (n = 20). The Spielberger State-Trait Anxiety Inventory was given pre-post treatment. State and trait anxiety were lower in both placebo and Reiki groups post-treatment; however, there were no between-group differences between Reiki and sham groups for state anxiety (p = 0.864) or trait anxiety (p = 0.35) post-treatment. By direct contact with the author, participants were randomized using a random numbers table. It is unclear if the groups were equal at baseline as differences were not statistically analyzed. All mean baseline scores (ranging from 34 to 36) were under the cutoff of 39 for both state and trait anxiety. These scores are considered clinically insignificant (Julian, 2011) and likely decreased the impact of Reiki in this study. The small sample size may have also reduced power.

Contact with the author revealed that the assessors were not blind and that Reiki was delivered by the author, a Reiki master with 10 years of experience. Mainly the unblind assessors and author delivery of Reiki leave this study with some concerns for ROB. This study does not support the effectiveness of Reiki over placebo in populations with anxiety in the normal range.

A larger study on adults who had been chronically ill for at least 1 year with chronic pain was conducted by Dressen and Singg (1998). One hundred and twenty participants were randomly assigned to one of four groups: (1) Reiki, (2) progressive muscle relaxation, (3) mock Reiki, and (4) the control group that received no treatment but came to read any material of their choice. Sessions lasted 30 min and were conducted two times a week for 5 weeks. Forty-five percent of the participants experienced pain from chronic headaches. Other categories included pain from cancer, coronary heart disease, arthritis, and hypertension. A sizeable significant reduction in pain intensity global (p = 0.0001), depression (p = 0.0001), state anxiety (p = 0.0001), and trait anxiety (p = 0.0001) was found in the Reiki groups post-treatment, and it was stated that Reiki was significantly more effective than placebo in all the areas (between-group p-values not given). Large effect sizes were found for Reiki's effect over placebo for reducing state anxiety (d = 1.36), trait anxiety (d = 1.07), and depression (d = 1.4). Also relevant to mental health, Reiki was stated to be significantly more effective than placebo in improving self-esteem, loss of control, and an unrealistic sense of control as measured with validated outcome measures (p-values not given). The subjects were partly self-selected, and it was unstated whether the assessors were blind to treatment assignment. No prespecified analysis plan was found, and a 3-month follow-up was only assessed for the Reiki group. Despite some concerns regarding ROB, this study supports the effectiveness of Reiki in treating anxiety over placebo in those

TABLE 1 | Summary of main findings.

Study	Results **Between groups *P*-value and effect size *d* = 0.2 (Small) 0.5 (Medium) 0.8 (Large).**	ROB 2	Critique
Clinical anxiety **GRADE: moderate to high**			
Çinar et al. (2022) Fibromyalgia	**Post 4th trt Reiki sig lower than placebo for state anxiety (*p* = 0.005) and trait anxiety (*p* = 0.003).**	Some concerns	-No prespecified analysis plan was found. -1 exclusion criteria may have introduced bias. -Reiki was done by "an experimenter" but unclear if it was an author.
Baldwin et al. (2017) Knee Replacement Surgery	No between group comparisons made due to small sample size of controls. **Within grp Reiki sig *p* = 0.004 and Placebo NS.** ***d* (Reiki over placebo) = 0.93**	Some concerns	-If the Reiki size was better matched, placebo Reiki may not have performed as well. -Blinding was assessed as successful. -No pre-specified analysis plan was found.
Dressen and Singg (1998) Chronically ill and in pain.	**Reiki sig > placebo (no *p*-value)** **State Anx *p* = 0.0001 (pre/post) *d* = 1.36 > placebo.** **Trait Anx *p* = 0.0001 (pre/post) *d* = 1.07 > placebo.**	Some concerns	-Unstated if assessors were blind. -No pre-specified analysis plan was found. -Follow-up Reiki scores were not compared to other groups
Anxiety: normal range **GRADE: low**			
Bowden et al. (2011) Mood and wellbeing in High vs. Low Mood	HADS *anxiety* baselines not given Reiki not sig > Placebo. DASS Anxiety (high mood) baseline borderline normal/low (7) Anxiety DASS High Mood $p = 0.084$ Low Mood $p > 0.05$	Some concerns	-Very small sample decreased power. -Experimenter administered Reiki however well blinded and participant blinding was assessed as successful.
Bowden et al. (2010) Well-being and salivary cortisol in healthy psych undergraduates.	Anxiety subscale DASS $p = 0.295$ $d = 0.17$ (L)	Some concerns	-Author administered Reiki but unlikely influence as sat behind a blindfolded SS with no touch (blinding successful $p < 0.05$) -No pre-specified plan. -Dropouts 14%
Thornton (1991) Female Nurses Unpublished	State Anxiety $p = 0.864$ $d = -0.16$ Trait Anxiety $p = 0.350$ $d = -0.12$	Some concerns	- Unnecessary as others small also. -Assessors were not blind -Baseline scores below the cut-off for clinical anxiety and healthy population. -Experimenter administered Reiki. -Baseline differences not statistically analyzed.
Clinical stress **GRADE: high**			
Bowden et al. (2011) Mood and wellbeing in High vs. Low Anxiety and Depression.	**Sig** **High Stress Reiki > placebo (*p* = 0.008). *d* = 0.87** ***d* = 0.90 at f.up.** Not sig in low mood ($p < 0.05$) *d*	Some concerns	-Baseline scores for wtress higher in Reiki group. -Author administered Reiki but was unlikely to bias outcome as sat behind blindfolded SS with no touch (blinding successful $p < 0.05$) -No pre-specified plan.
Vasudev and Shastri (2016) Self-perceived work-related stress software professionals.	**Hands on Reiki and DR Placebo *p* = 0.028 *d* = 0.63** No diff bet hands on Reiki and DR $p = 0.878$ suggests benefits from hands on R not due to touch or other placebo effects.	Some concerns	-Hands on and distant Reiki was delivered by the experimenter but instruction was given which should have reduced placebo bias. -Hands on Reiki > DR placebo and no difference bet hands on Reiki and DR suggesting Reiki is not influenced by the placebo factors. -31% dropout rate (raw scores in thesis) though reasons mostly random.
Yüce and Taşcı (2021) Stressed Caregivers of cancer patients.	**CSI *p* < 0.001 at post-treatment 6 weeks. *d* = 2.3**	Some concerns	-Investigator administered Reiki and trained the sham group. -17% dropouts and no ITT analysis were reported.
Stress: normal range **Grade: low to moderate.**			
Bowden et al. (2010) Well-being and salivary cortisol in healthy psych undergraduates.	NS ($p = 0.054$) stress subscale over placebo on DASS.	Some concerns	-Higher pre-stress scores in the Reiki group may have assisted Reiki -Author administered Reiki but was unlikely to influence as sat behind a blindfolded SS with no touch (blinding successful $p < 0.05$) -No pre-specified plan and 14% dropouts.

(Continued)

TABLE 1 | (Continued)

Study	Results **Between groups *P*-value and effect size *d* = 0.2 (Small) 0.5 (Medium) 0.8 (Large).**	ROB 2	Critique
Shore (2004) Depression and Self Perceived Stress.	**Perceived Stress Scale (PSS) post-test *p* = 0.029 *d* = 0.88** **1 year follow up *p* = 0.001 *d* = 2.02**	Some concerns	-High drop out from post-treatment to f. up through analysis of original numbers (73 to 46). -Placebo R believed Hands On R was the placebo to reduce expectancy. - PSS-10 may not have captured stress adequately.
Clinical depression **GRADE: high**			
Dressen and Singg (1998) Chronically ill and in pain.	**Reiki sig > placebo (no *p*-value)** ***P* = 0.0001 pre-post. *d* = 1.4 > placebo**	Some concerns	-Unstated if assessors were blind. -Subjects were self-selected in response to an advertisement. -No pre-specified analysis plan was found. -Follow up Reiki scores were not compared to other groups
Erdogan and Cinar (2016) Depression in the Elderly.	**Reiki sig > placebo at all 4 time measurements.** **1st *p* = 0.001 4th *p* = 0.000** **8th *p* = 0.000, 12th *p* = 0.000 (1 mthf.up). Inadequate data to calculate *d*.**	Some concerns	-One of only 2 studies blinding sham practitioners, i.e., Reiki done by the researcher but Placebo Reiki practitioners believed they were doing Reiki to control for practitioner expectancy effects. -NI whether outcome assessors were blind.
Shore (2004) Depression and Self Perceived Stress.	**Reiki > placebo Reiki *p* = 0.042 *d* = 0.74** **1 yr follow up *p* = 0.001 *d* = 1.43**	Some concerns	-High drop out from post-treatment to f. up through analysis on original numbers (73 to 46) -Placebo R led to believe Hands On was the placebo grp to reduce expectancy. -SS self-selected in response to an advertisement as being in need of treatment for self-perceived depression and stress/anxiety.
Shiflett et al. (2002) Functional Recovery Post Stroke Rehab.	NS Depression ($p > 0.05$). Inadequate data to calculate *d*-value.	HIGH	-double-blinded, i.e., blinded practitioners and participants. -blinding practitioners were successful but attunement may have not been successful. -20 historic controls used. -16% missing data and cognitive FIM missing. ITT not done. -No pre-specified analysis plan. -Variation of 6–10 treatments/grp and though not related to group assignment may have still influenced outcomes.
Depression: normal range **GRADE: low**			
Bowden et al. (2010) Well-being and salivary cortisol in healthy psych undergraduates.	NS ($p > 0.05$ no values given).	Some concerns	-Author administered Reiki but was unlikely to influence as sat behind a blindfolded SS with no touch (blinding successful $p < 0.05$) -No pre-specified plan. -Dropouts 14%
Bowden et al. (2011) Mood and wellbeing in High vs. Low Anxiety and Depression.	NS ($p > 0.05$ no values given)	Some concerns	-Experimenter administered Reiki. -Participant blinding was assessed as successful. -Baseline scores for stress were higher in the Reiki group.
Burnout **GRADE: low to moderate**			
Díaz-Rodríguez et al. (2011a) Nurses with Burnout.	**Reiki reduced diastolic BP > placebo *p* = 0.04 *d* = 0.59 and increased SIgA over placebo *p* = 0.04 *d* = −0.75** Systolic BP $p = 0.24$ a-amylase activity $p = 0.71$	Some concerns	NI found on pre-register so maybe some concerns are there. Some research questions the use of biological markers to measure burnout and some supports it.

(Continued)

TABLE 1 | (Continued)

Study	Results **Between groups *P*-value and effect size *d* = 0.2 (Small) 0.5 (Medium) 0.8 (Large).**	ROB 2	Critique
Díaz-Rodríguez et al. (2011b) Health Care Proff with Burnout. –	**ECG recordings for SDNN Reiki > placebo ($p < 0.04$), $d = 0.71$** **Body temp Reiki > Placebo ($p = 0.02$), $d = 0.85$** Salivary Cortisol $p = 0.08$, ECG RMSSD $p = 0.06$ HRV non-sig.	Some concerns	NI found on pre-register so maybe some concerns. -blinding of participants was tested and found to be successful. - Greater significance across other measures may have resulted from longer treatments and multiple sessions as NS was borderline. Some research questions the use of biological markers to measure burnout and some supports it.
Rosada et al. (2015) Burnout Health care professional.	**Reiki > placebo Overall for burnout $p = 0.011$. Reiki also reduced emotional exhaustion, depersonalization, and increased pers accomplishment ($p < 0.05$ no values given)**. **Inadequate data to calculate *d*.**	Some concerns	-Unstated whether outcome assessors were blind. -Published study excludes some non-significant results from the original thesis. -baseline numbers between groups for single people were not given and this is important to some results.

Bold indicates statistically significant results and moderate or larger effect sizes. NI means no information.

with chronic pain when the treatment is provided two times a week for 5 weeks.

Bowden et al. (2010, 2011) conducted two studies that included measures for anxiety, stress, and depression. In the first study, Bowden et al. (2010) examined the effect of Reiki and positive imagery on the wellbeing of and salivary cortisol in 35 healthy psychology undergraduates with mental health scores all in the normal range. The participants were randomly assigned to one of the six groups, and all the groups were asked to engage in a self-hypnosis/relaxation exercise. Three groups ($n = 18$) underwent Reiki 3–30 inches above their head with the experimenter seated behind them. The other three groups were not administered Reiki but were told that they were receiving Reiki ($n = 17$) while the experimenter sat behind them with their hands at their side. Ten 20-min sessions were given to both groups from between 2 and 12.5 weeks. All the groups were blindfolded or wore headphones depending on the task. Although the experimenter conducted Reiki in the study, the additional steps to blind the subjects should have reduced the influence of placebo. Blinding was tested and found to be successful. Pre- and post-assessments were conducted by a co-experimenter blind to the treatment groups. In the first study, despite within-group improvements in anxiety ($p = 0.037$) and stress ($p = 0.001$) but not in depression ($p = 0.102$), there were no significant between-group differences in the results for Reiki over placebo for anxiety ($p = 0.295$), stress ($p = 0.057$), or depression ($p = 0.152$). Treatment delivery ranged from 2 to 12.5 weeks; however, statistical analysis found this to not to have an impact on outcomes. No prespecified analysis plan was found, and "wellbeing" was operationalized with the Depression, Anxiety and Stress Scale (DASS). This is not a measure of wellbeing and likely not a sensitive measure for participants all scoring in the normal range at baseline. There was also a 14% dropout rate with no ITT analysis. Overall, this study presents an ROB of some concern. This study does not support the effectiveness of Reiki over placebo for participants with mental health outcome scores in the normal range.

In a replication of the above study (Bowden et al., 2011), the same authors examined whether Reiki benefited mood and wellbeing, but this time, they controlled for mood. Forty university students, half with high anxiety and/or depression and half with low anxiety and/or depression, were randomly assigned to Reiki or placebo Reiki groups in the same arrangement as the previous study. Despite being grouped separately according to "high" and "low" levels of anxiety/depression, baseline scores for the high mood groups still nearly all fell in the normal range on the DASS. Depression baseline means were "normal," and anxiety means were borderline normal at a cutoff of 7 and "high" group stress scores were in the clinical range (Lovibond and Lovibond, 1995). On the HADS, scores were in the mild to moderate range, but no separate baseline scores were provided for anxiety and depression, so this measure could not be assessed in this review.

Six 1/2 hour treatment sessions were administered between 2 and 8 weeks. Again, the impact of this variation was statistically tested and found to not impact the outcomes. Blinding was also tested and found to be successful. It is unstated whether the assessors were blind, but it was expected given that it is a replication of their previous study, which had blinded assessors (Bowden et al., 2010) and the care taken to blind the participants. There was no ITT analysis; however, there was a low dropout rate of 7%.

Reiki reduced total DASS scores more than placebo for the high mood group only, and although this did not reach significance post-treatment ($p = 0.075$), it was significant at follow-up ($p = 0.045$). Reiki significantly reduced stress compared with placebo in the high mood group post-treatment ($p = 0.008$) but did not reduce anxiety compared with placebo in high mood ($p = 0.084$) or depression (no between-group means given). Effect sizes for Reiki compared with placebo for stress were also large in the high mood group post-treatment ($d = 0.87$) and at follow-up ($d = 0.9$).

There was no prespecified analysis plan found for this study. It is likely that the low sample size of ten per subgroup and low baseline scores reduced the outcomes of significance. Overall, this study presents an ROB of some concerns. These results

provide support for Reiki's influence over placebo at reducing clinical levels of stress but not at reducing anxiety or depression in the normal range.

Baldwin et al. (2017) examined the effects of Reiki on pain, anxiety, and blood pressure in patients undergoing knee replacement surgery. In this study, 46 adults scheduled for single knee replacement surgery were randomly assigned to one of three groups, all incorporating standard hospital care (Baldwin et al., 2017): (1) three or four 30-min Reiki treatments by a Reiki master, (2) three or four 30-min sham Reiki sessions with an untrained person following the same hand positions as the Reiki master from a printed protocol, and (3) three or four sessions of quiet time. The participants and assessors were blind to treatment assignment. Blinding was assessed and found to be successful overall. The first session was 1 h prior to surgery, and subsequent sessions 24, 48, and 72 h after the surgery if not already discharged. Data were deidentified and collected by trained data collectors. Anxiety was measured with the State-Trait Anxiety Inventory, and the means met cutoffs for clinically relevant anxiety at baseline (Julian, 2011).

Only the Reiki group showed significantly reduced state anxiety scores as measured on the State-Trait Anxiety scale at discharge ($p = 0.004$). The placebo group was non-significant; however, the Reiki group could not be directly compared to the placebo group, because the placebo group was too small for valid statistical comparison because of dropouts. The magnitude of effect for Reiki over placebo on anxiety was large ($d = 0.93$). Despite no ITT analysis being performed, post-baseline dropouts were controlled for by statistical analysis. Data from 48-h post-surgery were treated separately by paired *t*-tests, which compared pre-intervention and pre-surgery data, with patients discharged 48 h or more post-surgery.

If the Reiki sample size better matched that of the smaller placebo group, Reiki may not have performed as well as it did. No prespecified analysis plan was found. Overall, this study presents an ROB of some concerns, and the outcomes suggest that Reiki was more effective than placebo in reducing state anxiety in populations with clinically relevant anxiety levels.

A recent study examined the effect of Reiki on stress levels of caregivers of patients with cancer (Yüce and Taşcı, 2021). In this study, 42 caregivers were randomly allocated to 45 min of Reiki ($n = 21$) or sham Reiki ($n = 21$) once a week for 6 weeks. The caregivers met the cutoff scores for high stress on the standardized Caregiver Strain Index (CSI). They and the assessors were blind to treatment allocation. The investigator delivered Reiki and trained four nursing students to identically deliver the sham Reiki, increasing ROB. Though a strict application protocol was followed. All baseline measures were similar between the groups. Reiki performed significantly better than placebo with high statistical significance on all measures except for salivary cortisol. On week 6, the Reiki group had significantly lower stress (CSI) scores than the sham Reiki group ($p < 0.001$) with a very large magnitude of effect ($d = 2.3$). A prespecified plan was reported in clinicaltrials.gov. There was also a 17% dropout rate with no evidence of an ITT analysis. Because of these issues, this study had an ROB of some concerns. However, it provides support for Reiki over placebo in treating high levels of caregiver stress.

Another recent study evaluated the impact of Reiki on pain, wellbeing, and anxiety in Turkish hospital patients treated for pain from fibromyalgia (Çinar et al., 2022). Fifty patients were randomly and blindly assigned to either 30 min of Reiki or sham Reiki one time a week for 4 weeks, with 25 patients in each group. The assessors were blind to the treatment group. Only after the fourth treatment was Reiki found to reduce both state anxiety ($p = 0.005$) and trait anxiety ($p = 0.003$) significantly more than placebo. The data required to calculate effect sizes could not be obtained from the author and therefore could not be included. There were no baseline differences and no dropouts. No prespecified analysis plan was found for this study. Overall, it was assessed as having an ROB of some concerns but provided evidence that Reiki can reduce state and trait anxiety compared with placebo in patients who have fibromyalgia after four 30-min sessions.

Self-Perceived Stress

Two peer-reviewed RPCTs have focused on the effects of Reiki on self-perceived stress. Shore (2004) examined the long-term effects of Reiki on depression and self-perceived stress. Forty-six adults were randomly selected from a pool of respondents to an advertisement for those seeking treatment for symptoms of depression and stress. The participants were randomly assigned to hands-on Reiki, distant Reiki, or distant Reiki placebo and were blind to their treatment group. Reiki was performed by an independent healer. The assessors were blind to group assignment. All the groups (except placebo) were given 1 to 1.5 h of Reiki one time a week for 6 weeks. Those in the distant Reiki condition were in an identical room to those receiving hands-on Reiki and were given the treatment from afar. Those in the placebo distant Reiki condition were also in an identical room and were told that they were given the treatment from afar but were not given any treatment. The author states on page 43 that, "Participants in the hands-on Reiki condition believed they were receiving mock Reiki and participants in the placebo distant Reiki condition believed they were receiving distant Reiki (Shore, 2004)." This was conducted to reduce the effect of placebo further but would have biased the outcome in favor of placebo in how the groups were treated unequally. Despite this, the study still produced results with high significance in favour of Reiki.

Baseline means were clinically relevant in the mild depression range on the BDI. The means for the perceived stress scale were very low at baseline and in the normal range. Post-treatment showed a significant reduction in symptoms between the hands-on Reiki and distant placebo Reiki treatment groups on the Perceived Stress Scale (PSS) at post-test ($p = 0.029$) and at 1-year follow-up ($p = 0.001$). Effect sizes for perceived stress were also large at post-treatment ($d = 0.88$) and very large at follow-up ($d = 1.43$). There was also a significant reduction in depression scores on the Beck Depression Inventory (BDI) at post-treatment ($p = 0.042$) and at 1-year follow-up ($p = 0.001$), with corresponding effect sizes of moderate at post-treatment ($d = 0.74$) to very large at follow-up ($d = 1.43$). Significant outcomes were also found for Reiki over placebo on the Beck Hopelessness Scale (BHS) at post-treatment ($p = 0.019$) and 1-year follow-up ($p = 0.009$). Large effects of magnitude and significance at follow-up should be treated with caution because

of very high dropouts (40%) and no ITT analysis. However, the reasons participants dropped out appeared to be random, reducing bias from attrition. Initially, this study was published as a dissertation.

This study shows an ROB of some concerns mainly because of high follow-up attrition. It provides support for Reiki in reducing normal levels of stress and mild clinical depression over placebo in the short term and possibly with long-term effects.

Vasudev and Shastri (2016) studied 120 software professionals suffering mainly from work-related stress and working at a firm in Bangalore, India. The participants were randomly assigned to hands-on Reiki, distant Reiki, distant placebo Reiki, or no Reiki (control). Reiki was applied in the treatment groups 5 min per day for 21 days. The placebo participants were told that they would receive Reiki, but they did not, to control for expectancy effects, again biasing the outcomes in favor of placebo. All the four groups were assessed pre- and post-21 days of treatment with the 14-item Perceived Stress Scale. Direct contact with the author confirmed that the assessor was blind to group assignment. In the original thesis, additional scales were also used as follows: Coping Checklist (Rao et al.) and WHO (Five) wellbeing index, sociodemographic checklist, and stressor inventory (Vasudev and Shastri, 2016).

In this study, a significant difference between groups occurred for perceived stress, but it did not specify which of the three groups were compared. However, the original thesis identified that a significant difference between hands-on Reiki and distant placebo Reiki (p = 0.028) was found. This had a medium magnitude of effect (d = 0.63). The experimenter administering Reiki used hands-on elements such as touch and body language which could have increased the ROB favoring the hands-on Reiki treatment condition. However, there was no statistical difference between the hands-on Reiki and distant Reiki treatment conditions (p = 0.878), and distant Reiki was also more effective than placebo distant Reiki (p = 0.019). This suggests that placebo factors of experimenter bias and the hands-on placebo elements of touch and body language were not significant.

The thesis identified several other omissions from the published article that favored both experimental and placebo outcomes and were therefore unlikely due to bias. Direct feedback from the author supports this: "The publisher said I had too much content, so I had to cut it short." There was a high dropout rate of 31%. No ITT analysis was confirmed by direct contact with the author. The author stated the main reason for attrition was being unable to maintain regular attendance at the sessions, so it is unclear if this was random. Although Reiki was given with high frequency (21 days), it was only given for 5 min at a time. A greater effect may have been found with a longer treatment period. This study showed an ROB of some concerns mainly because of high attrition rates and no ITT analysis but supports the use of Reiki over placebo for normal levels of stress.

Conclusion on the Effects of Reiki on Anxiety

All of the above six studies measuring the effects of Reiki on anxiety showed an ROB of some concern, but none had methodological issues too great to suggest that the outcomes were significantly compromised. Of the three RPCTs measuring clinically relevant anxiety, two had significantly reduced anxiety in the Reiki group compared with placebo (Dressen and Singg, 1998; Çinar et al., 2022). The other (Baldwin et al., 2017) did not directly compare the Reiki and placebo groups, but only the Reiki group had significantly reduced anxiety. Where effects could be calculated in two studies, large to very large magnitudes of effect for Reiki over placebo were found for treating anxiety. This provides support that Reiki can reduce anxiety compared with placebo in people with clinically relevant levels of anxiety.

The three RPCTs that did not meet clinical cutoffs for anxiety produced non-significant results directly comparing placebo and Reiki for anxiety (Thornton, 1991; Bowden et al., 2010, 2011). This suggests that Reiki is not more effective than placebo in reducing anxiety in the normal range.

Conclusion on Reiki's Impact on Stress

None of the above five studies measuring the effects of Reiki on stress showed a ROB, which would suggest that the outcomes were seriously compromised, that is, all ROBs were of some concern (Shore, 2004; Bowden et al., 2010, 2011; Vasudev and Shastri, 2016; Yüce and Taşcı, 2021). For clinically relevant outcomes, Reiki was found to be highly significant compared with placebo, and with medium to very large effect sizes in three studies (Bowden et al., 2011; Vasudev and Shastri, 2016; Yüce and Taşcı, 2021). Reiki was also suggested to be effective with those experiencing normal levels of stress. Reiki showed significant effects over placebo, with a large magnitude of effect on reducing stress in Shore (2004) et al.'s (2010) study. These results suggest that, compared with placebo, Reiki assists in reducing clinically relevant stress and may reduce normal levels of stress.

Depressed Mood

There have been six RCPTs in which Reiki has been compared to placebo with reducing scores on validated outcome measures of depression (Dressen and Singg, 1998; Shiflett et al., 2002; Shore, 2004; Bowden et al., 2010, 2011; Erdogan and Cinar, 2016).

Reiki significantly reduced the symptoms of depression in chronically ill patients (Dressen and Singg, 1998). This study has previously been reviewed in the section on anxiety. The study's largest significant treatment effect was found for Reiki on treating depression as measured by the Beck Depression Inventory 11 (p = 0.0001 post-treatment). Reiki was also significantly more effective than placebo (no between group p-value was provided), and the magnitude of the effect was large (d = 1.4). Depression baseline means were all clinically relevant and in the mild range for women and moderate range for men. This study was assessed as having an ROB of some concerns and supports the hypothesis that Reiki reduces clinical levels of depression compared with placebo in the short-term.

A study on functional recovery for patients undergoing post-stroke rehabilitation (Shiflett et al., 2002) included outcome measures for the effect of Reiki on depression. Here, 30 patients were randomly allocated to Reiki by a Reiki master (n = 10), a Reiki novice (n = 10), or a sham Reiki (n = 10). An additional twenty historic control patients were used. Six to ten 30-min

sessions were given over 2.5 weeks for each of the Reiki, Reiki novice, and sham Reiki conditions. This was double-blinded in that the Reiki novice and sham Reiki practitioners did not know whether they had been attuned with Reiki. Various analyses suggest that this was likely successful. The outcome measure for depression was The Centre for Epidemiological Studies Depression Scale (CES-D). The CES-D baseline cutoff means for clinical levels of depression were low but mostly met. This study did not support the use of Reiki for clinical levels of depression. However, there were significant methodological problems. The baseline scores revealed statistically significant differences between age and severity of impairment. These were used as covariates to correct for this difference, but this still may have influenced outcomes. The method of Reiki attunement was questionable, as it appeared to have been conducted at a distance (not hands-on) with all the practitioners together in the same room. The arrangement for blinding the Reiki practitioners meant that the novice practitioners used in the study had no experience with a basic level of training having been attuned to level 1. Reiki is believed to flow more strongly with higher levels of attunement and more years of experience, so this is not ideal. There were an uneven number of treatments of 6 to 10 for each condition, although it stated that this was unrelated to group assignment, functional status, mood, or FIM score. The dropout rates were at least 16%, and no ITT analysis was conducted. It is not stated whether the outcome assessors were blind, although we might expect so given that the therapists and participants were blind. The cognitive portion of the FIM was missing, which likely influenced the outcomes for functional recovery and raised issues regarding general data storage. There was also no prespecified analysis plan. Overall, this study's ROB was assessed as high, and the results should be treated with caution. Also, effect sizes could not be calculated because of insufficient data.

Shore (2004) examined the long-term effects of Reiki on depression and self-perceived stress in volunteers. This study was reviewed in the section on stress. BDI scores were above the cutoff for being mildly clinically depressed. Reiki resulted in a significant reduction in depression compared with placebo on the Beck Depression Inventory ($p = 0.042$) and maintained this at 1-year follow up ($p = 0.001$), along with medium effects at post-treatment ($d = 0.74$) to very large effects at follow-up ($d = 1.43$). The ROB for this study was assessed as having some concerns, but it provided evidence that Reiki reduces depression compared with placebo in the short term and possibly in the long term in people who are mildly clinically depressed.

Two RPCTs by Bowden et al. (2010, 2011), where the subjects exhibited normal baseline scores for depression, showed no evidence that Reiki had a therapeutic effect when compared with placebo Reiki (Bowden et al., 2010, 2011). These studies have been reviewed in the sections on anxiety and stress, and both were assessed as having an ROB of some concerns.

In another RPCT, 90 elderly depressed volunteers living in a nursing home in Istanbul (Erdogan and Cinar, 2016) were randomly and blindly allocated to 45- to 60-min sessions one time a week for 8 weeks. The sessions were Reiki, sham Reiki, or a waitlist control. The therapist was "a researcher who (was) a Reiki master (p37)," and it was unclear if this was the author of the study. The sham Reiki group was applied by four nurses who did not have training in Reiki but believed that they were practicing Reiki. This should have helped to control for differences in expectancy effects between the Reiki and placebo Reiki practitioners. In this way, this study controlled for both participant and practitioner biases. There appear to be no dropouts in this study. Reiki was applied in the same room and at the same time as real Reiki. The outcomes were measured with the Geriatric Depression Scale (GDS) after the 1st, 4th, 8th, and 12th weeks (i.e., at 1-month follow-up), and Reiki was found to be significantly more effective at reducing depression than both placebo Reiki and the control across all four-time measurements over the 12 weeks with highly statistically significant outcomes at every measure ($p = 0.001$ post week 1 and $p = 0$ thereafter). Effect sizes could not be calculated because of insufficient data. All the participants scored at least 14 on the GDS at baseline, falling at least in the moderately clinically depressed range (Laudisio et al., 2018). It is not clear how the 45- to 60-min treatment time was distributed between conditions, but this was unlikely to account for such high levels of difference between groups. It is also not stated whether the researcher, who was the outcome assessor, was blind to the treatment assignment. Overall, this study was assessed as having some concerns but provides evidence that Reiki is more effective than placebo in reducing depression in the short term and the long term in moderately depressed elderly populations.

Conclusion on Reiki's Impact on Depression

Of the six Reiki RPCTs measuring depression, only one RPCT had significant methodological issues that may have resulted in invalid outcomes (Shiflett et al., 2002). The remaining five studies all showed an ROB of some concerns. For the two RPCTs in which baseline scores for depression were in the normal range, Reiki had no effects of significance over placebo (Bowden et al., 2010, 2011). In the other three RPCT where baseline scores were clinically relevant, all found that Reiki was more effective than placebo at reducing depression (Dressen and Singg, 1998; Shore, 2004; Erdogan and Cinar, 2016), and where calculations were possible, in studies with clinically relevant baselines, all showed large to very large effect sizes. This provides support that Reiki is effective in reducing clinically relevant symptoms of depression compared with placebo but does not support Reiki's ability to reduce depression in the normal range.

Burnout

Three RCPTs have examined the effects of Reiki on burnout over placebo (Díaz-Rodríguez et al., 2011a,b; Rosada et al., 2015), two of which used biomarkers to measure burnout (Díaz-Rodríguez et al., 2011a,b). In these studies, the author cited literature which states that the stress response stimulates the sympathetic nervous system and blood pressure and that several biological markers are often used to measure stress. While some literature supports the relationship between stress and blood pressure (Gasperin et al., 2009; Ayada et al., 2015) and the relationship between

biomarkers and burnout (Deneva et al., 2019; Bayes et al., 2021), some research does not (Danhof-Pont et al., 2011).

Díaz-Rodríguez et al. (2011a) examined whether Reiki given to nurses with burnout syndrome had beneficial effects on biomarkers for burnout and stress. The biomarkers measured were concentrations of salivary IgA, α-amylase activity, and blood pressure. Eighteen adult nurses diagnosed with burnout syndrome by a psychologist using the Maslach Burnout inventory Manual were randomly assigned to 30 min of Reiki or sham Reiki. The participants and data collectors were blind. Blood pressure was measured with an Omron HEM-737 validated device, with measurements performed in triplicate and the average taken for analysis. There were no dropouts. The Reiki group produced a significant decrease in diastolic blood pressure compared to placebo ($p = 0.04$) with a medium magnitude of effect ($d = 0.59$). Reiki also showed a significant increase in SigA concentration compared to placebo ($p = 0.04$) with a medium magnitude of effect ($d = -0.75$). The magnitude is negative because of an increase in SigA, which suggests an improvement in immune function. Compared with placebo, Reiki had no significant effect on systolic blood pressure ($p = 0.24$) or a-amylase activity ($p = 0.71$). It was concluded that a single 30-min session of Reiki led to immediate improvement in the innate immune function (SigA) and blood pressure regulation, which the placebo effect could not explain. A prespecified analysis plan was not found. This study was assessed to have some concerns. It provides support for Reiki in treating biomarkers of burnout.

In a similar study (Díaz-Rodríguez et al., 2011b), 21 healthcare professionals diagnosed with burnout by a psychologist using criteria from the Maslach Burnout Inventory Manual were randomly assigned to 30 min of Reiki or sham Reiki. Again, biomarkers of burnout and stress were measured using validated instruments and standardized procedures. The biomarkers measured were heart rate variability (HRV), cortisol from salivary flow rate, and body temperature (which used the OMRON Gentle Temp 510). The participants were randomly assigned, and the participants and data collectors were blind. There were no dropouts. Only 19% of the participants identified their treatment group correctly, so blinding was successful. All the sessions occurred in the morning between 9 am and 12 pm, and the subjects abstained from food, alcohol, caffeine, and exercise 2 h prior to assessments. Interventions were given after 20 min of rest. ECG recordings for SDNN were significantly higher than placebo ($p < 0.04.$) with a moderate effect ($d = 0.71$). Body temperature was significantly higher than placebo after Reiki ($p = 0.02$) with a large magnitude of effect ($d = 0.85$). The authors stated that the higher body temperature was significantly correlated with the LF domain after Reiki ($p = 0.02$), suggesting a therapeutic effect on the parasympathetic nervous system. When compared with placebo, Reiki had no significant effect on salivary cortisol ($p = 0.08$) and ECG RMSSD ($p = 0.06$). The authors concluded that Reiki positively influenced the parasympathetic nervous system when applied to the healthcare professionals with burnout syndrome. Once again, a prespecified analysis plan was not found. This study was assessed to having an ROB of some concerns. It supports the use of Reiki for treating biomarkers of burnout.

Reiki was also found to reduce burnout among community mental health clinicians (Rosada et al., 2015). Forty-five mental health clinicians were randomly and blindly allocated to 30 min of Reiki one time a week for 6 weeks or 30 min of sham Reiki one time a week for 6 weeks in a randomized controlled crossover design. Burnout was measured with the Maslach Burnout Inventory. The participants were self-selected volunteers working at mental health agencies. There was no information on whether the assessors were blind to the treatment assignment, and the dropout rate was 4%. Reiki was more effective than placebo Reiki overall in decreasing burnout ($p = 0.011$). When compared with placebo, Reiki also significantly reduced burnout, as evidenced by decreased emotional exhaustion, decreased depersonalization, and increased personal accomplishment on the scale (p-values not provided). Effect sizes could not be calculated because of insufficient data. The 6-week washout period in this crossover design appears to have prevented a carryover effect because when the Reiki treatment was provided in the first 6 weeks, it was more effective than when it was provided in the second 6 weeks. The original more detailed thesis describes two additional assessments: the Social Readjustment Rating Scale (SRRS) and the Perceived Self Efficacy Scale. These both produced insignificant results. Furthermore, although overall Reiki was significantly more effective than sham Reiki on the Maslach Burnout Inventory (MBI) ($p = 0.011$), it was only significant on the individual scales of the MBI and on the primary symptom of the MYMOP for single people (p not provided). While being single may be relevant to burnout, the proportion of single people was not reported in baseline characteristics, which are important to these outcomes. This selective reporting and the absence of information about the blinding of assessors leave this study with an ROB of some concerns.

Conclusion on Reiki's Impact on Burnout

Of the three RPCTs conducted on the influence of Reiki over placebo to reduce burnout, none had significant methodological issues, which would suggest the outcomes to be invalid. All the three RPCTs found significant effects for Reiki over placebo in treating burnout in healthcare professionals with mostly moderate effect sizes for those that could be calculated. The three studies provide evidence that Reiki reduces burnout over placebo in healthcare professionals in the short term.

GRADE RANKING

In accordance with GRADE guidelines, a GRADE ranking was applied to each mental health area under study (Brozek et al., 2021; Schünemann, 2022; Siemieniuk, 2022). It is often reported that Reiki energy flows according to the degree of imbalance a person is experiencing and when it is needed (Webster, 2016; Powers, 2018; Frazier, 2020) and stops flowing when the balance is restored. Given this, it was expected that the more clinically unwell the population under study, the more therapeutic impact the Reiki would have. A number of studies in this SR used healthy populations with mental health scores in the normal range, in other words, scores that were clinically irrelevant. It was expected

that Reiki would have a minimal effect over placebo in these populations, just as one might expect almost any treatment to produce a limited effect on a healthy normal individual with nothing to treat. This appeared to be the case. Most studies did not screen for a diagnosis of mental health, particularly, as many used healthy participants.

To encourage consistency in the populations of studies under review, standardized mental health outcome measurements were grouped into populations with baseline means reaching cutoffs for clinical levels of mental health (low range or higher) and studies with baseline means falling in the normal range. Burnout was not grouped this way because, in two studies, the population met a diagnosis of burnout, and in the other study, it was not assessed. In this study, health professionals were self-selected for burnout, and it was not stated whether cutoff scores for burnout were met (Rosada et al., 2015). Means were also not provided.

GRADE is assessed according to the following criteria: ROB, inconsistency, indirectness, imprecision, and publication bias. The studies are then checked for factors that may upgrade the GRADE assessment (Schünemann, 2022; Siemieniuk, 2022). According to GRADE guidelines an RCT, and more so one that controls for placebo, begins at a GRADE ranking of *High*. In the ROB criteria, only one study showed high ROB (Shiflett et al., 2002), and this showed non-significant results for those with clinically relevant scores of low depression. All the other studies showed an ROB of some concerns, but none had methodological issues serious enough to suggest that the results were invalid. It is important to note that an ROB of some concerns does not necessarily affect GRADE outcomes, as the ranking is not a result of averaging the ROB across studies but carefully considering the contribution of each study, and they recommend this to be done conservatively (Schünemann et al., 2013). "One should be conservative in the judgment of rating down. That is, one should be confident that there is substantial risk of bias across most of the body of available evidence before one rates down for risk of bias (5.2.1)."

With respect to the criteria of inconsistency, this was assessed as follows: populations were drawn from university hospitals (4 studies), undergraduate students (3 studies), self-selected or GP referred (3), one acute care hospital, one community mental health agency, one rehabilitation institute, and one nursing home. Six studies were conducted in the United States, three in Turkey, two in the United Kingdom, two in Spain, and one in India. One study used 58% men, three gave no percentages, another three used 100% women, and the remainder used over 50% women.

Despite this variation in settings, country, and gender, no studies used populations hospitalized for a mental health condition. All the studies only used Reiki as the treatment under study although in varying dosages and with practitioners who had varying levels of training and experience. A number of studies applied Reiki to populations that were healthy or unhealthy but with normal (clinically irrelevant) levels of anxiety, stress, or depression. As mentioned, this was thought to influence outcomes, so studies were grouped according to normal vs. clinically relevant scores. In this way, consistency was improved, and all showed expected trends. On the whole, despite some variations, it was determined that there was enough consistency not to decrease the level of GRADE ranking.

All the studies met the criteria for *indirectness*; that is, all clearly met PICO inclusion criteria and measured what they were meant to measure. For the criteria of *imprecision*, the small sample sizes across most of the studies would have increased imprecision, decreasing the GRADE down by one level to a grade of *Moderate*. For *publication bias*, while the small sample sizes across most of the studies would have increased publication bias, the systematic search across multiple databases would have eliminated or reduced this bias, so the GRADE assessment was not decreased. This leaves all areas at a GRADE level of moderate because of the criteria of imprecision. However, GRADE can also increase one level when there are large effects or when there are dose-response relationships (Schünemann, 2022; Siemieniuk, 2022), and this will now be assessed.

Anxiety GRADE

The three RPCTs with populations meeting clinical cutoffs for anxiety produced SOME highly significant results for Reiki's effectiveness over placebo ($p = 0.003$, $p = 0.004$, and $p < 0.05$), or as has been noted by Baldwin et al. (2017) for Reiki post-treatment ($p = 0.0001$) and not placebo post-treatment. Where they could be calculated, the effect sizes for Reiki, compared with placebo, in two studies ranged from large to very large ($d = 0.93$, 1.36, and 1.07). However, because Baldwin et al. (2017) treatment and placebo groups were not directly compared, GRADE was only increased to a level of moderate to high.

The three studies with normal anxiety scores all produced non-significant results for Reiki's influence compared with placebo. Here, compared with placebo, the overall GRADE ranking for Reiki in reducing normal anxiety was low.

Stress GRADE

In the three RPCTs using populations with clinically relevant stress scores, the findings were all highly significant for Reiki compared with placebo ($p = 0.028$, 0.008, and 0.001). They also all produced large or very large effect sizes ($d = 0.97$, 0.9, and 2.3) except for Vasudev and Shastri (2016), which produced a moderate effect ($d = 0.63$). Overall, compared with placebo, this would increase the GRADE to a level of high for Reiki's influence on reducing clinically relevant levels of stress.

For the two RPCTs on stress with outcomes in the normal range, one (Shore, 2004) found significant results for Reiki over placebo post-treatment ($p = 0.029$) and at 1-year follow-up ($p = 0.001$). As previously noted, this follow-up score should be treated with caution because of high dropouts. Shore's (2004) study also found large effect sizes post-treatment ($d = 0.88$) and very large effect sizes at follow-up ($d = 2.02$). While the participants did not meet the cutoffs for clinical stress in this study, they met the cutoffs for depression and reported being anxious and stressed. It may be that the PSS-10 did not capture their stress levels adequately or that Reiki, compared with placebo, is also effective at reducing normal levels of stress. These outcomes suggest a low to moderate level of evidence that Reiki is more effective than placebo in reducing stress in the normal range.

Depression GRADE

For the area of depression, in three of four studies using clinically relevant scores, all produced statistically significant results for Reiki over placebo. The RPCT that did not produce significant outcomes had a high ROB, and as such, the outcomes were likely compromised. For the other three RPCTs with significant outcomes, effect sizes could be calculated in two studies (Dressen and Singg, 1998; Shore, 2004), and both showed some very large (d = 1.43 and 1.4) as well as moderate effects (d = 0.74). The other study (Erdogan and Cinar, 2016) provided insufficient data for the effects to be calculated but showed very high levels of significance across all the time points including follow-up (p = 0.001 to p = 0). Because of the large effects and consistent significant findings for Reiki, the GRADE level was increased by one. It was concluded that, compared with placebo, there was a high level of evidence for the influence of Reiki on reducing clinically relevant levels of depression.

The two other depression studies with clinically irrelevant scores produced no significant effects for Reiki when compared with placebo. As such, the GRADE assessment for Reiki reducing normal-range depression when compared with placebo is low.

Burnout GRADE

Reiki showed significant results when compared with placebo for all the burnout studies. However, they were not highly significant, which may have been because two studies were based on only a single 30-min session of Reiki (Díaz-Rodríguez et al., 2011a,b). It would be interesting to see if the significance increased with a more extended session of Reiki and/or multiple applications and whether the effects of Reiki lasted at follow-up, which were not assessed. There were insufficient data to calculate effect sizes for Rosada et al. (2015) study, and the effect sizes for Díaz-Rodríguez et al. (2011a,b) two studies were mostly moderate (d = 0.59, 0.75, and 0.71) to large (d = 0.85). These effect sizes were not sufficient to increase the GRADE ranking. Also, as noted earlier, there is some contention as to whether biomarkers adequately operationalize burnout. For this reason, the level of evidence for burnout was downgraded overall to low to moderate. A summary of findings for the reviewed RPCTs along with levels of significance, effect sizes, and ROB 2 and GRADE assessments are presented in **Table 1**.

DISCUSSION

To answer to the first research question, to date, the evidence suggests that, compared with placebo, Reiki consistently demonstrates a therapeutic effect on some symptoms of mental health. When Reiki is applied to people with clinically relevant levels of mental health, the GRADE level of evidence is moderate to high for anxiety and high for stress and depression in reducing symptoms over placebo. For people with stress levels in the normal range, the GRADE level of evidence was low to moderate in reducing stress when compared with placebo. When Reiki was applied to people with anxiety and depression in the normal range, the GRADE level of evidence was low for reducing anxiety or depression when compared with over placebo. When Reiki was applied to people with burnout, the GRADE level of evidence was low to moderate in reducing burnout.

Overall, the number of studies in each area is small, and further research is required to confirm the conclusions. A detailed discussion on how well the placebo effect was controlled for by the studies in this review will now be explored. This is followed by a discussion on the second research question; what parameters other than the level of wellness might influence the effectiveness of Reiki over placebo?

Controlling for Placebo

The placebo effect is powerful and has the ability to alter our biology and enhance our mood (Hamilton, 2021). According to Benson and Friedman (1996), three factors contribute to the placebo effect:

Criterion 1. Placebo can increase positive expectations of the client and influence their beliefs and/or biology to produce the real effect under study (Benson and Friedman, 1996; Hamilton, 2021).

Criterion 2. Placebo can affect the expectations of the practitioner, which in turn influences the expectations of the client to produce the real effect under study (Benson and Friedman, 1996).

Criterion 3. The strength of the relationship between the practitioner and the client can influence client expectations in such a way as to produce the effect under study (Benson and Friedman, 1996).

How well each of these factors was controlled in the studies under review will now be discussed.

Criterion 1: Participant expectations.

All RPCTs in this systematic review met Criterion 1, in that they controlled for participants' expectations. In three RPCTs, the blinding of participants was also tested and found to be successful (Bowden et al., 2010, 2011; Baldwin et al., 2017).

Criterion 2: Therapist expectations.

Two RPCTs additionally controlled for therapist expectations (Shiflett et al., 2002; Erdogan and Cinar, 2016). To achieve this, the practitioner must believe that they are administering the treatment of choice but really provide a treatment that cannot produce an effect. In Erdogan and Cinar's (2016) study on elderly depressed patients, the sham practitioners were four nurses who did not have training in Reiki but were made to believe they were practicing Reiki. Details about how the blinding was achieved were not provided. The study produced highly significant long-term effects of Reiki when compared with placebo on treating depression in the elderly. Shiflett et al.'s (2002) study on the effect of Reiki when compared with placebo on functional recovery and depression in stroke victims also blinded a group of sham Reiki practitioners and found no significant effects of Reiki compared with placebo. They blinded the novice practitioners by telling them that they may or may not be attuned to Reiki and then only attuned half of the group of novice practitioners while pretending to attune the other half. This blinding was assessed as successful, but the success of attunement was questionable because it was done at a distance. As discussed, the study had other significant methodological issues resulting in high ROB.

Criterion 3: Strength of the relationship.

The strength and quality of the relationship can also influence outcomes, and this is commonly reported to be an important therapeutic influence in psychotherapy sessions (Flückiger et al., 2018). In the Reiki sessions under study, several factors would have reduced this kind of placebo influence. In all the RPCTs, the therapists and the clients were not allowed to speak or speaking was kept to a minimum. Therefore, verbal cues would have been minimal or non-existent. In some of the RPCTs, sensory cues were further minimized. In Bowden et al.'s (2010, 2011) studies, there were no sensory cues, i.e., the client was blindfolded while the therapist stood behind them and did not touch them or speak. Both studies by Díaz-Rodríguez et al. (2011a,b) on Reiki's effect on burnout did not allow any touch. Dressen and Singg (1998) study only allowed touch for the head positions but not the body. Vasudev and Shastri's (2016) study found hands-on Reiki to be significantly more effective than distant placebo Reiki ($p = 0.028$). However, the hands-on Reiki was not significantly different from the distant Reiki ($p = 0.878$), which used no sensory cues at all. This suggests a placebo effect from relationship factors should not have influenced outcomes. Relationship expectations influencing the clients would also have been removed or reduced in the two discussed RPCTs controlling for Criterion 2 (Shiflett et al., 2002; Erdogan and Cinar, 2016). These controlled for therapist expectations, which are central to the relationship.

In sum, all the RPCTs controlled for Criterion 3 to some extent, and eight RPCTs controlled for it to a larger extent (Dressen and Singg, 1998; Shiflett et al., 2002; Bowden et al., 2010, 2011; Díaz-Rodríguez et al., 2011a,b; Erdogan and Cinar, 2016; Vasudev and Shastri, 2016). Of these eight, six showed significant therapeutic outcomes for Reiki over placebo. Erdogan and Cinar's (2016) study controlled for Criteria 1, 2, and 3 and found highly significant effects for Reiki over placebo, although it still had an ROB of some concerns and did not describe the blinding procedure applied to the therapists.

Hamilton (2021) argues that Reiki's effects are essentially placebo by-products of criteria B and C, that is, the expectations of the practitioners and the strength of the relationship. He argues that the recipient becomes aware of the emotional states of the real Reiki therapist through their facial expressions and body language and that these are more convincing than the sham Reiki therapist. He also argues that mirror neurons in the brain, which make us mimic the therapist's emotional states, facilitate this emotional transference, which is enough to produce a statistically significant impact of Reiki from a real therapist over sham Reiki (Hamilton, 2021). This argument is not convincing given the above discussion. As mentioned, in four RPCTs, the participants were blindfolded and/or not touched by the therapists to minimize or eliminate sensory cues. In two other studies, practitioner expectations were controlled for, one of which produced highly significant results.

Hamilton (2021) also argues that the therapist's emotional state affects their bioelectric current and magnetic field, which has been shown to have the ability to influence another's bioelectric and magnetic fields. If this is correct, even without visual or tactile cues, a real Reiki's practitioner's positive intention may be what is influencing the client over sham Reiki practitioners who have no genuine healing intention toward the client. This possibility is worth considering. However, Erdogan and Cinar's (2016) RPCT provides evidence to the contrary. In their study, the sham Reiki therapists were made to believe that they were practicing real Reiki, which, according to Hamilton (2021), would have therapeutically enhanced their bioelectric field and magnetic current, thereby influencing the clients' bioelectric field and magnetic current as much as the real Reiki practitioners did. However, the real Reiki practitioners still produced a therapeutic effect that was highly statistically significant over the sham practitioners despite having the same therapeutic expectations. More well-controlled double-blind experiments are needed to further verify this result. Such studies will also help isolate underlying mechanisms of influence for Reiki. As mentioned at the start of this article, studies that best control for all the placebo Criteria A, B, and C are studies on Reiki's influence on non-human living systems: cell cultures, isolated cells, rats, and dogs, and all found highly significant results compared with placebo (Baldwin and Schwartz, 2006; Baldwin et al., 2008; Mothersill et al., 2013; Kent et al., 2020; Pacheco et al., 2021).

Under What Parameters Is Reiki Effective Over Placebo?

Clinically Relevant Baseline Scores

As discussed, the findings suggest that Reiki is more effective than placebo when the baseline scores are clinically relevant even if low. There may be other variables impacting energy healing (Griffin and Erdreich, 1991; Oschman, 2015), such as the size of a client's biofield or the environment in which it is practiced; however, this SR highlights the importance of clinically relevant baselines.

Reiki Dosage

The RPCT perhaps showing the most benefit for Reiki in reducing depression was by Erdogan and Cinar (2016), in which Reiki was administered for a longer period of 45 to 60 min one time a week for 8 weeks. However, Shore (2004) also administered Reiki for long periods of 60–90 min one time a week for 6 weeks but achieved moderate significance at post-test ($p = 0.042$). The three RPCTs that produced non-significant results for depression also applied Reiki 6 to 10 times, although for only 20 to 30 min per application (Shiflett et al., 2002; Bowden et al., 2010, 2011). Overall, these RPCTs suggest that 60 min of Reiki for 6 to 10 weeks may be sufficient to produce a significant therapeutic effect for at least mild clinical depression over placebo with potentially long-lasting effects.

For anxiety, the three RPCTs with significant findings all administered 30 min of Reiki on three or more occasions (Dressen and Singg, 1998; Baldwin et al., 2017; Çinar et al., 2022), suggesting that at least four applications of at least 30 min of Reiki one time a week may reduce anxiety compared with placebo.

For stress, Yüce and Taşcı (2021) (2021) administered 45 min of Reiki one time a week for 6 weeks, producing highly significant results in reducing stress when compared with placebo ($p = 0.001$). Bowden et al. (2011) used six applications of 30 min of Reiki again, resulting in highly significant results for stress when compared with placebo ($p = 0.008$). Vasudev and Shastri (2016), however, used very short applications of 5 min of Reiki

per day but for 21 consecutive days, producing significant results ($p = 0.028$) although not as high as the other studies using longer treatment periods. Interestingly, Shore (2004), whose participants had normal baseline scores for stress, also produced significant results ($p = 0.029$). Shore (2004) used 60–90 min of Reiki for over 6 weeks, and it may have been the longer treatment period that produced significant results even in participants with normal levels of stress. Overall, compared with placebo, at least six sessions of at least 30 to 45 min of Reiki may reduce stress with potentially long-term effects.

For health professionals diagnosed with burnout, two studies found that a single 30-min session of Reiki can significantly reduce biomarkers related to burnout in the short term (Díaz-Rodríguez et al., 2011a,b). Another study by Rosada et al. (2015) found that 30 min of Reiki one time a week for 6 weeks also significantly reduced burnout when compared with placebo. These studies suggest that one 30-min session of Reiki may benefit the biomarkers of those experiencing burnout in the short term.

Type and Level of Training and Experience

Many Reiki practitioners consider that the level of training and years of experience increase the flow of Reiki energy. Some consider the type of Reiki training and how they were trained as also important and advocate the original Usui method through face-to-face training as preferred.

Of the 14 RPCTs, five used Reiki practitioners trained with the original Usui method and of these, two studies stated that they used a practitioner trained solely in the Usui method (Díaz-Rodríguez et al., 2011a; Yüce and Taşcı, 2021). The other three RPCTs stated that they used practitioners trained in the Usui method and one or more in other healing methods (Shiflett et al., 2002; Bowden et al., 2010, 2011). The remaining nine studies only state that the practitioners used Reiki. Given the variation, it is difficult to discern the impact of this variable.

Level of attunement and years of experience are also considered important. Of the 14 RPCTs assessed, six stated they used Reiki masters only (Thornton, 1991; Bowden et al., 2010, 2011; Díaz-Rodríguez et al., 2011a,b; Erdogan and Cinar, 2016). Another three used Reiki masters in addition to either level 2 practitioners (Shore, 2004; Rosada et al., 2015) or level 1 and 2 practitioners (Shiflett et al., 2002). One study used only a level 2 practitioner (Yüce and Taşcı, 2021) and produced highly significant results, suggesting level 2 training may be sufficient for highly significant outcomes. Six studies stated their practitioners' years of experience (Thornton, 1991; Shore, 2004; Bowden et al., 2010, 2011; Díaz-Rodríguez et al., 2011a,b), ranging from at least 1 year (Shore, 2004) to 15 years (Díaz-Rodríguez et al., 2011a,b). From these outcomes, we might conclude that an experienced level 2 practitioner or a Reiki master with at least 4 years of experience could be used for research purposes.

Challenges and Limitations of the Evidence

All the areas under review had few studies, so the findings are not conclusive. Several confounding variables other than the level of wellness may also influence outcomes, such as dose, level and type of training, years of practitioner experience, and whether the practitioner was trained in other methods of energy healing and had been trained in ways which may not be effective such as being attuned at a distance. Some of the studies also did not blind the assessors or make it clear whether the outcome assessors were blinded, potentially biasing the outcomes.

Conclusions

In the area of mental health, so far, there is some evidence that Reiki is consistently more effective than placebo in reducing clinical symptoms of depression, anxiety, stress, and burnout. This effect is observed by decreased symptoms, as measured by validated outcome measures, or validated instruments in each of the areas under study.

So far the research suggests that the duration and frequency of Reiki required to obtain a therapeutic effect over placebo is as follows:

Depression (at least clinically mild): 60 min of Reiki once a week for 6 to 10 weeks with potentially long-term effects lasting from 1 month to 1 year post-treatment.

Anxiety (at least clinically mild): 30 min of Reiki one time a week for a minimum of 4 weeks.

Stress (at least clinically mild): 30 to 45 min of Reiki one time a week for 6 weeks. No long-term effects have been studied.

Stress (normal range): One study showed (Shore, 2004) that 60 to 90 min of Reiki one time a week for over 6 weeks may also reduce normal levels of stress. Effects may be maintained at 1-year follow-up.

Burnout: a single 30-min application of Reiki may reduce some biomarkers of burnout. One study found (Rosada et al., 2015) that six 30-min sessions of Reiki one time a week for 6 weeks may reduce the psychological symptoms of burnout.

For clinical levels of anxiety, stress, and especially depression, a longer duration of treatment and higher number of applications broadly produced more significant outcomes and larger effects. However, low number of studies and other confounders make dose-response relationships unclear. The level of wellness could not be ascertained in one burnout study (Rosada et al., 2015), so dose-response relationships could not be assessed for burnout. All the studies compared the effects of Reiki immediately before and after treatment, suggesting the effects were occurring during the treatment, and sometimes these effects were still strong if measured at follow-up, suggesting that they were maintained or may have continued.

Recommendations

Future studies controlling for placebo are needed to confirm and consolidate the above findings and should consider the following:

(1) Clinically relevant baseline scores should be used or controlled for and validated outcome measures should be used.
(2) The number or applications of and duration of treatment should be controlled for to establish clearer dosage effects. This can be guided by the above findings.

(3) Long-term effects through follow-up measures are needed to assess the impact of higher doses and lasting impacts.
(4) Outcome measures should be used at several time points to assess the cumulative effects of treatment.
(5) Practitioners should have at least 4 years of practice experience at level two or three to promote therapeutic effects.
(6) To promote consistency, only practitioners trained solely in the original Usui method who have been attuned with hands-on Reiki should be employed.
(7) Studies should always blind the data collectors and assessors.
(8) Blinding of practitioners is ideal and may be conducted by sham attunement vs. real attunement (hands-on). Practitioners should be attuned to level 2 to maximize the effects and the method of blinding outlined in detail.
(9) Where practitioners are not blinded, all sensory and interactive stimuli should be minimized by not allowing any form of communication between the practitioner and the receiver, blindfolding the receiver, and conducting Reiki without touching the body.
(10) Placebo Reiki should not be done by a Reiki practitioner, as Reiki energy may flow without conscious intention.

Controlling for placebo is an important part of investigation in the emerging field of biofield science, and biofield therapies could open up consumers to less expensive, safe, and much-needed treatments in a variety of areas. The findings from this SR provide some evidence for Reiki's effectiveness over placebo in treating a variety of mental health symptoms, particularly when the symptoms are clinically relevant. Specific parameters for optimal therapeutic effects are unclear; however, the findings so far may be used as a guide. Incorporating Reiki as a complementary treatment to mainstream psychotherapy for depression, stress, and anxiety may be appropriate.

DATA AVAILABILITY STATEMENT

The datasets presented in this study of full ROB 2 assessments for each study are available at https://cloudstor.aarnet.edu.au/plus/s/qI4RRkw4Ys8MFKr and effect size calculations at https://cloudstor.aarnet.edu.au/plus/s/uCKeNLEjGLo5jId.

AUTHOR CONTRIBUTIONS

SZ wrote this manuscript as part of her Ph.D. in Complementary Medicine and Reiki at Bond University. PS is her Ph.D. supervisor and second author of this manuscript. Both authors contributed to the article and approved the submitted version.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.897312/full#supplementary-material

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Is the combination of behavioral activation and attention training technique effective to reduce depressive symptomatology? A multiple case study

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Background: This study tested whether the combination of BATD and Attention Training Technique (ATT) is effective to reduce depressive symptomatology and investigate the mechanisms of action underlying the effectiveness of treatment with a multiple N-of-1 trials.

Methods: Nine adults with depressive symptoms were randomly included in three different combinations of BATD and ATT, concurrent in Condition 1 and sequential in Conditions 2 and 3 (ATT followed by BATD and BATD followed by ATT, respectively). The sequential components allow investigating the specific changes that occur during the two distinct treatment phases. Multiple self-report and pre–post-assessments were conducted on generic mental health measures (depressive symptoms, life functioning, mood, and well-being) and intervention-specific measures (behavioral activation, behavioral avoidance, self-focused attention, cognitive control and rumination), with two-week and three-month follow-up assessments. We also measured treatment adherence with treatment attendance, homework compliance and a clinical interview.

Results: Participants' attendance, homework compliance and satisfaction were acceptable in the three conditions, with higher adherence in Condition 1 and Condition 3. Eight participants out of nine reported a reduction in depressive symptomatology and five an improvement in well-being. Most of their progress was maintained 2weeks after the intervention but not 3months later. Conditions 1 and 2 seemed to be associated with a higher response to generic mental health measures in comparison with Condition 3. The three conditions were not associated with consistent changes in intervention-specific measures, except for rumination with five participants out of nine reporting an improvement in rumination immediately after the intervention and eight participants 2weeks after the intervention. The concurrent format was associated with a better improvement in rumination immediately after the intervention. No specific changes of self-focused attention and rumination characterized ATT, and no specific changes of behavioral activation, behavioral avoidance and rumination characterized BATD.

Conclusion: Our three interventions were judged acceptable and showed positive short-term benefit for generic mental health measures and rumination maintained 2weeks later, but not 3months later. Results suggest that five sessions of concurrent treatment could be a better option than sequential formats. However, our data did not support the specificity of ATT and BATD treatments.

Clinical Trial Registration: This trial was previously registered with the ClinicalTrials.gov NCT04595539 registration number and the title "Does Attention Training Technique Enhance the Effectiveness of Behavioral Activation Treatment for Depression: A Multiple Baseline Study."

KEYWORDS

multiple baseline, depression, behavioral activation, attention training technique, single-case design

Introduction

Depression is one of the most prevalent mental disorders and one of the main causes of disability worldwide (Kessler and Bromet, 2013). Depression is associated with enormous costs at both the individual (e.g., maintaining a household, managing finances, sustaining interpersonal relationships) and societal levels (e.g., health service uptake, productivity losses and lesser efficiency at work) (World Health Organization, 2017). Behavioral Activation Treatment for Depression (BATD) is a psychological treatment that is easy for patients to understand and for practitioners to implement (Richards et al., 2017). It is associated with robust empirical data indicating that it reduces depressive symptoms (Ekers et al., 2014; Cuijpers et al., 2020) and improves well-being (Mazzucchelli et al., 2010) in subclinical and clinical depression. The main goal of BATD is to re-engage people in their lives by increasing the number of positively reinforcing experiences which, in turn, reduce depression (Lejuez et al., 2001, 2011). Previous empirical studies have shown that BATD is supposed to improve behavioral activation (Collado et al., 2014; Dimidjian et al., 2017), and to reduce behavioral avoidance (Chen et al., 2013) and rumination (McIndoo et al., 2016). Moreover, neuronal activation changes in brain regions associated with cognitive control abilities have been found following BATD, suggesting that BATD could impact cognitive control (Dichter et al., 2010).

While BATD is associated with promising therapeutic findings, the magnitude of the effect size on depressive symptoms in comparison with control conditions ranges from low to medium which suggests that there is room for improvement in response to BATD (Cuijpers et al., 2020; Uphoff et al., 2020). One way to improve psychological treatments is to identify the mechanisms of action underlying the effectiveness of treatment in interaction with inter-individual differences (Kazdin, 2007; Cuijpers et al., 2019).

Among the processes targeted by BATD, rumination plays a central role (Manos et al., 2010). However, only few studies have investigated the effect of behavioral activation (BA) on rumination. According to the impaired disengagement hypothesis model of rumination (Koster et al., 2011, 2017), Lemoult and Gotlib model of depression (LeMoult and Gotlib, 2019) and the HEXAGON model or rumination (Watkins and Roberts, 2020), rumination is influenced by multiple factors, including a low level of attention control. Attention control influences rumination by providing the cognitive resources needed to disengage from it. Consequently, it is possible that BA insufficiently affects rumination and the use of a psychological intervention targeting cognitive control resources might be a promising avenue to increase BATD's effectiveness.

Because attention control resources are not fully under volitional control, these resources need experiential practice to improve, rather than the verbal processes usually employed in psychotherapy (Watkins and Roberts, 2020). The Attentional Training Technique (ATT) is a procedure that aims to strengthen cognitive functions. In this procedure, participants are instructed to focus on auditory stimuli in order to direct their attention away from repetitive negative thoughts including rumination (Wells, 2009). The aim of ATT is to reduce self-focused attention, increase flexible attentional control over information processing, and promote metacognitive awareness to reduce depressive mood (Fergus et al., 2014; Fergus and Wheless, 2018). ATT is a low-attention-demanding task in which cognitive control is needed to inhibit internal intrusive thoughts and focus on the task (Wells, 2009). Reviews have reported that ATT is associated with large effects on anxiety and depression symptoms (Fergus and Bardeen, 2016; Knowles and Wells, 2018). In a single-case series including patients with depression, ATT has also been shown to clinically reduce rumination and self-focused attention (Papageorgiou and Wells, 2000). A reduction in self-focused attention has also been found in non-clinical population (Fergus et al., 2014). These effects on cognitive resources and rumination suggest that ATT is a promising avenue to increase the effectiveness of BATD.

A previous study investigated the combination of cognitive training (including adaptive Paced Auditory Serial-Addition

Task-PASAT and ATT) with four sessions of BATD in a clinically depressed sample (Moshier and Otto, 2017). The authors did not find that the adjunction of this training enhanced BATD outcomes, as similar improvements in rumination and depressive symptoms were observed both with and without this training (Moshier and Otto, 2017). However, in that study, only four sessions of cognitive training were administered, which is well below the approximately 10 training sessions recommended in previous research (Koster et al., 2017). Furthermore, the study investigated only one combination of treatments (BATD and cognitive training concurrently), which did not allow the researchers to explore conditions (e.g., cognitive training followed by BATD or vice versa) that might lead to optimization of the efficacy of both cognitive training and BATD. Moreover, participant adherence to the intervention was not assessed, although it is well known to influence treatment response (Cuijpers et al., 2019). Finally, the randomized trial design used did not allow the examination of intra-individual differences throughout the intervention or inter-individual differences in response to treatment. The present study aims to overcome these limitations and investigate whether ATT could enhance the effectiveness of BATD.

This study is a multiple-case study that tested whether combining BATD and ATT is useful to improve generic mental health measures (depressive symptoms, life functioning, mood, and well-being) at post-test and at the two-week and three-month follow-ups. The study also aimed to document which combination of treatments (e.g., a combination of ATT and BATD, ATT followed by BATD, or BATD followed by ATT), if any, produced the best outcome. Moreover, this study aimed to investigate the mechanisms of action underlying the effectiveness of treatment (behavioral activation, behavioral avoidance, and rumination for BATD; self-focused attention, cognitive control, and rumination for ATT).

To do so, we used a multiple-baseline mixed-method case series with multiple baselines across participants, settings and behaviors. This design allows one to capture intra-individual differences with multiple daily evaluations of generic mental health measures and intervention-specific measures, as well as inter-individual differences, which is important in the study of depression – a disorder characterized by considerable heterogeneity regarding the nature of the disturbed psychological processes (Philippot et al., 2018) and symptoms (Fried and Nesse, 2015). This design allowed us to study the variables of interest in relation to the sequential or simultaneous introduction of components of an intervention to explore their individual and combined effects (Krasny-Pacini and Evans, 2018). The sequential components allow investigating the specific changes that occur during the two distinct treatment phases and thus see if the targets of the interventions are indeed modified. In the following sections, the comparisons will be made based on measures taken during a one or two-week baseline. In Condition 1, in which ATT and BATD are concurrent, we expected to observe changes in all targets during the combined intervention. In Conditions 2 and 3 we also expected to observe changes in all targets during the combined intervention. More precisely, in Condition 2, in which ATT is followed by BATD, we expected to observe first a modification of ATT targets (i.e., a reduction in self-focused attention and rumination) and a later enhancement of BATD target processes (i.e., an increase in behavioral activation, and a reduction in behavioral avoidance and rumination). In Condition 3, in which BATD is followed by ATT, we expected the reverse pattern of changes, that is, an increase in behavioral activation, and a reduction in behavioral avoidance and rumination with the introduction of BATD, followed by a later reduction in self-focused attention and rumination with the introduction of ATT.

Materials and methods

Design

The multiple-baseline mixed-method case series is a Single-Case Experimental Design (SCED) characterized by repeated assessment of multiple measures of interest. SCED uses multiple measurements to capture intra-individual differences before, during and after the intervention to control for natural fluctuations in the assessed behaviors (Kazdin, 2010). Our study followed an A-B-B′ design that was determined *a priori*. The length of the baseline phase, (A) differed between participants (one or two-week baseline). The length of the intervention phase, (B) differed between participants, depending on the condition in which they were randomly included (5 weeks for ATT + BATD; and 7 weeks for ATT-BATD and BATD-ATT). Phase B′ was a two-week follow-up phase. Throughout all phases, participants completed daily measures in a booklet. A high standard SCED design should include a minimum of three replications of the intervention to demonstrate its effect (Kratochwill et al., 2013; Krasny-Pacini and Evans, 2018). Consequently, this study needed a minimum of nine participants (three per condition).

We also collected standardized measures four times during the study protocol (i.e., at pre-treatment, immediately after treatment, at the two-week follow-up and at the three-month follow-up). The timing of these four assessments was determined *a priori* and designed to provide an overall context to help us interpret the daily measure outcomes. The four standardized pre- and post-assessments were conducted by the second author, an external clinician psychologist blind to patient condition and objectives of the study, to minimize the risk of bias due to different roles (therapeutic and evaluative).

Participants

Selection criteria

Regarding inclusion criteria, participants had to be aged between 18 and 65 years, have a good knowledge of French, and have at least a medium level of depressive symptoms (i.e., a score of at least 12 on the Beck Depression Inventory – II). The cut-off

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TABLE 1 Participants' demographic and clinical characteristics.

Participant	Condition	Age	Gender	Relationship status (number of children)	Origin	Education level	Previous therapy	Employment	Anxiety disorders	MDD	BDI-II scores	Number of past EDM
S01	*1*	*23*	*F*	Single	Belgian	LCHE	C	S			13	One
S05		*28*	*F*	In relation.	Belgian	SCHE	LI-CBT	S	Agoraphobia Social phob.	MDD L-SI	26	Several
S08		*44*	*F*	In relation. (3)	Belgian	SCHE	None	E			25	
S02	*2*	*51*	*F*	In relation. (1)	Belgian	College	LI-CBT	E		MDD	18	Several
S06		*33*	*F*	In relation. (2)	Belgian	SCHE	C + MBCT LI-CBT	E		MDD L-SI	25	Several
S09		*27*	*M*	Single	Vietnamese	SCHE	C	S		MDD	33	Several
S04	*3*	*25*	*F*	Single	Belgian	SCHE	C	E		MDD L-SI	22	Several
S07		*23*	*F*	Single	Belgian	LCHE	C	U		MDD L-SI	13	
S10		*25*	*F*	In relation.	Belgian	HE- LT	None	E		MDD	11	

F, Female; M, Male; In relation., In relationship; SCHE, Short-Course Higher Education; LCHE, Long-Course Higher Education; Previous Therapy: C, Counselling; MBCT, Mindfulness-Based Cognitive Therapy; LI-CBT, Low-Intensity Cognitive Behavioral Therapy; U, Unemployed; E, Employed; S, Student; Social phob., Social Phobia; MDD, Major Depressive Disorder; L-SI, Light Suicidal Ideation; BDI-II scores, Beck Depression Inventory–Second Edition scores.

applied was based on the one provided by the French validation where a score of at least 12 is considered as depression (Beck et al., 1996; Centre de Psychologie appliquée, 1996). Participants meeting the following criteria were excluded from the procedure: a history of psychotic, bipolar or, neurological disorder; an alcohol/substance dependence other than tobacco in the past 6 months; a concurrent additional psychotherapy; acute suicidal ideation; or a significant change in medication within 1 month prior to baseline assessment. We also excluded participants with severe organic illness (e.g., cancer) as the intervention is not designed to target these specific issues. Finally, we excluded participants who reported modifications in medication intake that could influence our findings throughout the research study.

Participant's demographic and clinical characteristics

Participants are self-referrals from the general population with depressive symptoms. None of the participants followed a concurrent additional psychotherapy. Participants' ages ranged between 23 and 51 years; there were eight women and one man. Four participants were single and five were in relationships; three of them had children living at home. Eight participants were Belgian and one was Vietnamese. Five participants had full-time paid jobs, three were students and one was unemployed. Four participants reported a low level of depressive symptoms, four reported a medium level of depressive symptoms and one reported a high level of depressive symptoms. Seven participants reported a current major depressive episode and four of them reported low suicidal ideation. Six participants had experienced several past depressive episodes. Of the nine participants, one also suffered from agoraphobia and social phobia. None of the participants was regularly taking anti-depressants or anxiolytic medication. Table 1 presents the participants' demographic and clinical characteristics.

Procedure

We posted paper advertisements at the university and digital advertisements in the authors' social networks to recruit participants. Then, we used a two-phase recruitment protocol. First, the first author conducted a phone interview with interested candidates to provide practical information and screen for eligibility. If a candidate met the inclusion criteria, the first author reassessed his/her eligibility during a pre-clinical interview in order to investigate the person's level of depressive symptoms, medical history, and complaints.

Following confirmation of eligibility, we randomized participants to one of three format conditions. The length of the baseline phase was 2 weeks for the first 5 participants and 1 week for the last 4.[1] After the baseline phase, participants were invited

1 This assignment was respected except for S08 who was in quarantine during the first appointment and for whom the appointment was postponed to the following week.

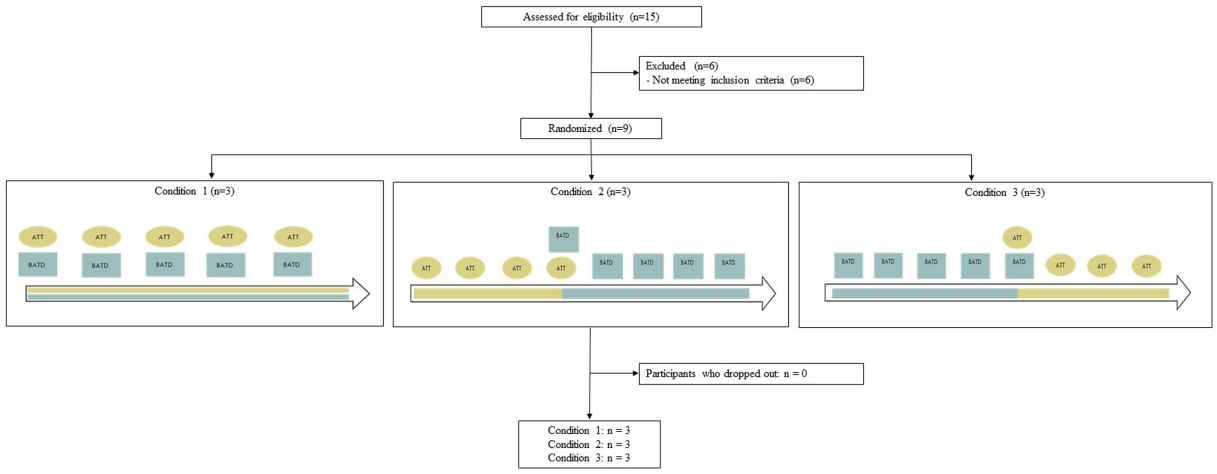

FIGURE 1
Enrollment chart.

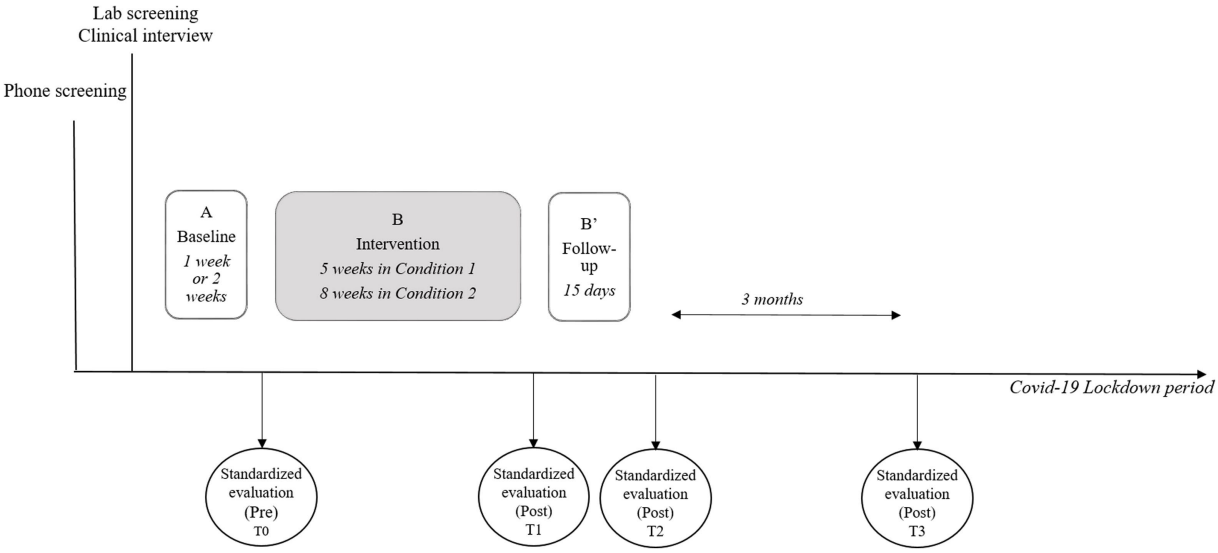

FIGURE 2
General procedure.

to come back to the clinic, where they completed a pre-assessment (T0) with an external evaluator and then started one of the three intervention format conditions (Phase B). After the intervention, participants completed a post-assessment evaluation (T1). Multiple measures continued for 2 weeks post-treatment (Phase B′). After this two-week period, participants completed a second post-assessment evaluation (T2) and a third assessment 3 months after the end of the intervention (T3). Figure 1 represents the general procedure.

Three conditions were included: a first combining ATT and BATD simultaneously, a second where ATT was followed by BATD, and a third where BATD was followed by ATT. Condition 1 was spread over 5 weeks with 52 h laboratory sessions (1 h of ATT and 1 h of BATD). Additional ATT sessions had to be carried out at home between the laboratory sessions. Condition 2 was spread over 8 weeks, with eight laboratory sessions: 7 1 h sessions and 12 h session (which included 1 h of ATT followed by 1 h of BATD). Six ATT sessions were prescribed at home. Condition 3 was spread over 8 weeks, with eight laboratory sessions: 7 1 h sessions and 12 h session (which included 1 h of BATD, followed by 1 h of ATT). Six ATT sessions were prescribed at home. Schemas depicting the three format conditions are presented in the enrollment chart (see Figure 2).

Based on the advertisements, the first author phoned the first 15 interested people. Two candidates were excluded because of a

concurrent additional psychotherapy, one because of a significant change in medication within 1 month prior to the baseline, and one because of a recent trauma. Thus, 11 participants met the inclusion criteria and went on to the pre-clinical interview. During the pre-clinical interview two participants were excluded because of a low level of depressive symptoms. The final participants were nine individuals who met the inclusion criteria. Figure 2 represents enrollment charts.

The study was conducted in Belgium during the second wave of the COVID-19 pandemic (i.e., from October 2020 to February 2021). Patients and therapist met in a consultation room of the CPLU – a private clinic located at Université de Liège – or *via* videoconference appointment when face-to-face meetings were not allowed due to the pandemic. The inclusion of participants was non-concurrent (participants started the protocol between October 13, 2020, and October 21, 2020). This trial was previously registered on clinicaltrials.gov.[2] All participants gave their written informed consent. The order of the questionnaires remained the same for each participant. The Ethics Committee of Université de Liège[3] approved the study, which was conducted according to the Declaration of Helsinki.

Measures

We selected the measures in line with treatment rationales, the results of empirical studies and the personal case formulation of each participant.

Treatment adherence and satisfaction

As a measure of treatment adherence, we first recorded the session attendance and homework assignments. We conducted a descriptive (non-rated) clinical interview focusing on the patient's satisfaction with the organization, with the content, and with the therapists.

Multiple measurements

Generic mental health measures and intervention-specific measures were included in the multiple measurements. Common (all participants had the same) and personal (specific to participants) measures were collected daily in a booklet in which items were accompanied by a Visual Analog Scale (VAS) from 0 to 10. Regarding measures that were common to all participants, they were asked to estimate their level of behavioral activation, behavioral avoidance, self-focused attention, rumination, and general mood during the day. Common measures were selected based on standardized scales and presented to the participants during the clinical interview to ensure that the construct assessed by the item was clear and validated by the participant (items are presented in the Supplementary Table S1). All common measures were validated by 15 experts (psychology researchers, and clinical psychologists at Liege University) who were asked to rate the validity of the measures (e.g., content validity).

Personal measures, on the other hand, were two personal depressive symptoms and two personal areas of functioning impairments. We used an idiographic approach to measure depressive symptoms and functioning impairment given the heterogeneity of depressive symptoms and associated disturbances that characterizes depression. Symptoms were selected by participants from a list of items containing symptoms of depression, and functioning impairments were selected by participants from a list of six areas of life functioning (i.e., households, work/school, social, professional, hobbies, and relationships). All measures were selected with the therapist during the clinical interview. For each item, a higher score (i.e., placing the cursor closer to the right side of the VAS) indicated higher frequency/intensity of the phenomenon.

Pre–post-measurements

Before the intervention, we used a sociodemographic questionnaire to register participants' characteristics and a French version of The Mini-International Neuropsychiatric Interview (MINI) to assess current mental disorders (Lecrubier et al., 1997). The modules on anorexia, bulimia, and antisocial personality disorder were not used, as they are of limited interest for this study.[4]

For generic mental health measures, we used the Beck Depression Inventory – Second Edition (BDI-II) to assess the severity of depressive symptoms (Beck et al., 1996; Centre de Psychologie appliquée, 1996). In the French version, a score between 12 and 19 is considered as mild depressive symptomatology, a score between 20 and 27 is considered as moderate depressive symptomatology and a score above 28 is considered as severe depressive symptomatology (Centre de Psychologie appliquée, 1996). We also used the Work/School Impairment and Social Impairment subscales of the Behavioral Activation for Depression Scale (BADS) to assess work and social functioning disturbances (Kanter et al., 2007; Krings et al., 2021). We used the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) to assess well-being (Tennant et al., 2007; Trousselard et al., 2016). Higher scores indicate higher depressive symptoms, work and social impairment, and well-being, respectively.

For intervention's-specific measures, we used the Activation and Behavioral Avoidance subscales of the BADS to assess behavioral activation and behavioral avoidance (Kanter et al., 2007; Krings et al., 2021). We also used the Abstract Evaluative

2 Registration number: NCT04595539; title: "Does Attention Training Technique Enhance the Efficacy of Behavioral Activation Treatment for Depression: A Multiple Baseline Study."

3 Approval number: 1920-119 (29/08/2020).

4 The evaluator was intensively trained by the first and the last authors to administer the Mini-International Neuropsychiatric Interview (Lecrubier et al., 1997). The training included role-play sessions (at least 22h sessions) and several supervised practice sessions before the start of the experiment.

mode of Repetitive Thinking subscale (AERT) of the Repetitive Thinking Mode Questionnaire (RTMQ) to assess rumination, characterized by thoughts at an abstract, over-general level that address the causes and consequences of one's mood or condition.[5] In addition, we used the Internally oriented Attention Subscale (IAS) and the Externally oriented Attention Subscale (EAS) of the Attentional Style Questionnaire (ASQ) to assess self-report attentional control resources (Van Calster et al., 2018). These subscales measure an individual's capacity to maintain attention on task-related stimuli and not be distracted by internal or external interfering stimuli. Finally, a computerized version of the Paced Auditory Serial-Addition Task (PASAT) was used as a measure of participants' updating abilities reflecting working memory ability (Gronwall, 1977). In this task, 60 numbers (from 1 to 9) were presented successively. Participants were asked to add each number to the preceding one, which prompted them to update their working memory. The task was divided into four trials that differed in the speed with which the numbers were presented. For each variable, higher scores indicated higher behavioral activation, behavioral avoidance, rumination, attentional resources more easily captured by internal and external stimuli, and cognitive control resources, respectively.

We used the validated French version of all those scales. Number of items, range, fidelity index, mean and standard deviation in general population sample of all those scales are reported in Table 2.

Interventions

The protocol used was adapted from the 10-session program based on the *Brief Behavioral Activation Treatment for Depression – Revised Treatment Manual* developed by Lejuez et al. (2001). The intervention was shortened from the minimum of 10 sessions originally proposed by Lejuez et al. (2001). This shortened version was proposed because more recent studies have found that the number of sessions is not a significant moderator of treatment effect (Simmonds-Buckley et al., 2019) and that sudden gains often occur before the fourth session (Blairy et al., 2020). The five-session BATD included the development of a shared formulation, psychoeducation, self-monitoring of daily activities, identifying "depressed behaviors," developing alternative goal-oriented behaviors, scheduling goal-directed activities, and problem-solving concerning difficulties implementing scheduled activities. The treatment manual is available from the first author on request.

Wells's Attention Training Technique is a task designed to train selective attention to specific information by teaching individuals to attend to multiple external auditory sources (Papageorgiou and Wells, 2000). Each ATT exercise progressed through stages that trained three different functions. First, there was a six-minute selective attention phase in which participants had to focus their attention on one sound at a time (for 15 s) following the therapist's instructions. Second, in a six-minute flexibility phase, participants had to disengage their attention from one sound and focus on another sound every 10 s, following the therapist's instructions, with a speed that increased as the exercises progressed. The third phase was a three-minute divided attention phase in which participants had to count and listen to all sounds simultaneously. One ATT training session took approximately 15 min. We used six different audio-recorded exercises during the therapy, each composed of seven sounds.

As frequently recommended in ATT, the first laboratory ATT session included psychoeducation and a discussion of rumination (e.g., controllability, usefulness) to understand the rationale of treatment. Furthermore, each ATT exercises were also accompanied with a self-report evaluation of self-focus attention before and after the auditory exercises. Ten sessions were prescribed, including five in the laboratory and five at home in Condition 1, and four sessions in the laboratory and six at home in Conditions 2 and 3. At home, we instructed participants to sit in a quiet room and to perform the audio-recorded exercises provided by the therapist (without additional exercises).

The first author (AK), who conducted the interventions, is a clinical psychologist/psychotherapist specializing in cognitive-behavioral therapy under the weekly supervision of the last author, who is an experienced clinical psychologist, psychotherapist and supervisor. To provide ATT, the therapist was supervised by an expert in this technique (M.-N. Levaux).[6]

Statistical analysis plan

For multiple measurements, we first followed the visual analysis guidelines (Kazdin, 2010) and computed the mean as an index of central tendency, the standard deviation as an index of variability, and the least squares regression as an index of trend. Additionally, to reflect the effect size, we computed the Tau for non-overlap with baseline trend control indices (Tau-U) (Bulté and Onghena, 2013). Tau-U indices measure the difference between phases of treatment by controlling for the baseline trend (Parker et al., 2011). Tau-U was computed online on the website http://www.singlecaseresearch.org (Vannest et al., 2016). In addition, we computed a Cohen *d* score to reflect the effect size of change between mean phases. Cohen *d* scores between 0.20 and 0.50 are considered low, scores between 0.50 and 0.80 are considered medium, and scores of 0.80 or higher are considered as large (Cohen, 1977).

For pre–post-measures, we computed a change score assessing the proportion of individuals showing reliable change (RC) at each post-treatment assessment time, relative to pre-treatment levels. RC allowed us to rule out the possibility that

5 Philippot, P., Verschuren, A., and Douilliez, C. (2020). Trans-diagnostic processes in depression and anxiety: assessing differentiated cognitive modes in repetitive thinking. Manuscript submitted for publication.

6 M.-N. Levaux, PhD in Psychology, email: mnlevaux@uliege.be.

TABLE 2 Fidelity index, mean and standard deviation of standardized subscales.

Measures

	Behavioral Activation	Behavioral Avoidance	Attentional control	Attentional control	Attentional control	Rumination	Depression	Work/School impairment	Social impairment	Well-being
Scale	BADS	BADS	ASQ	ASQ	PASAT	RTMQ	BDI-II	BADS	BADS	WEMWBS
Subscale (number of items)	Behavioral Activation subscale (7 items)	Behavioral Avoidance subscale (5 items)	Internally oriented Attention Subscale (IAS) (7 items)	Externally oriented Attention Subscale (EAS) (5 items)	- (60 trials)	Abstract Evaluative mode of Repetitive Thinking subscale (AERT) (6 items)	- (21 items)	Work/School Impairment subscale (5 items)	Social Impairment subscale (5 items)	- (14 items)
Range (min-max)	0–42	0–30	7–42	5–30	0–60	6–24	0–63	0–30	0–30	14–70
Fidelity index	$\omega = 0.83$	$\omega = 0.85$	$\alpha = 0.79$	$\alpha = 0.76$	split half reliability =0.89	$\alpha = 0.78$, ICC = 0.92	$\alpha = 0.86$	$\omega = 0.84$	$\omega = 0.83$	α = from 0.85 to 0.89 (M*)
General population										
Mean	22.75	7.39	26.42	17.85	50.83	13.52	10.02	10,74	4,36	51.68 (M*)
Standard deviation	8.75	6.92	5.99	4.86	9.02	4.85	7.36	7.25	5.72	7.03 (M*)
n	409	409	111	111	520	138	520	409	409	394
Sources	Krings et al. (2021)		Van Calster et al. (2018)		Krings et al. (2022)	See Footnote 5	Krings et al. (2022)	Krings et al. (2021)		Trousselard et al. (2016)

BADS, Behavioral Activation for Depression Scale; SBI, Savoring Belief Inventory; ASQ, Attentional Style Questionnaire; PASAT, Paced Auditory Serial-Addition Task; RTMQ, Repetitive Thinking Mode Questionnaire; BDI-II, Beck Depression Inventory–Second Edition; WEMWBS, Warwick-Edinburgh Mental Well-Being Scale; ω, Omega; α, Cronbach's α. M* = Mean computed from student and worker scores.

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TABLE 3 Sessions attendance and homework compliance.

		Condition 1			Condition 2			Condition 3		
		S01	S05	S08	S02	S06	S09	S04	S07	S10
Laboratory treatment sessions		0/5	5/5	4/5	0/8	7/8	8/8	5/8	5/8	7/8
Video treatment sessions		5/5	0/5	1/5	8/8	1/8	0/8	3/8	3/8	1/8
Laboratory pre–post-assessments		3/4	2/4	4/4	2/4	1/4	1/4	0/4	2/4	2/4
Video pre–post-assessments		1/4	2/4	0/4	2/4	3/4	3/4	4/4	2/4	2/4
Rescheduled sessions		0	0	2[1]	2[2]	0	1[3]	1[4]	0	0
Activity monitoring (%)		> 70	> 70	> 70	< 30	< 30	< 50	< 50	> 70	> 70
Activity completion (%)		> 50	> 70	> 70	< 30	> 70	< 50	< 50	> 70	> 70
Number of ATT exercises completed at home		4/5	4/5	7/5	1/6	3/6	5/6	2/6	6/6	4/6
Number of ATT exercises completed in the Laboratory		5/5	4/5*	5/5	3/4*	4/4	3/4*	4/4	4/4	4/4
Daily measures completed (%)	Baseline	85.71	66.67	50	93.75	20	75	64.29	87.5	87.5
	Intervention	58.62	71.43	71.43	57.45	48	66.67	53.06	100	95.83
	Follow-up	NA	99.33	100	66.67	44.44	42.11	NA	100	95

Laboratory sessions = Laboratory sessions at Université de Liège; NA = missing data.
*no ATT exercise because the participant arrived late.
[1]Quarantining.
[2]Felt tired and overburdened.
[3]Felt sick.
[4]Felt sick because of COVID-19.

a difference between two scores for a given individual was due to a measurement error rather than to the intervention (Jacobson and Truax, 1991). We focused on both improvement and deterioration to identify benefits and harm.

Following recommendations on research transparency and replicability, de-identified data can be downloaded on the Open Science Framework link: https://osf.io/zcpvf/.

Results

Treatment adherence analysis

Session attendance and homework compliance

Session attendance and homework compliance are presented in Table 3. All participants completed all sessions but the therapist had to reschedule six sessions because of cancellation, which was usually related to the COVID-19 pandemic. Two participants (S01 and S02) took all the therapy sessions *via* videoconference.[7] The homework completion rate seems to be higher in Conditions 1 and 3 in comparison with Condition 2.

7 This adjustment was due to COVID-19 lockdown. Indeed, at the time, health care recommendations indicated that we could continue with face-to-face, but remote format was also recommended. So we left the choice to our participants concerning the intervention format.

Clinical interview

All participants were satisfied with the material conditions, but three complained about the poor quality of some audio-recorded exercises. Regarding the format of Condition 1, two of the three participants reported that 2 h was a bit long and very tiring. In Conditions 2 and 3, some participants reported that the one-hour session was too short. Participants were generally satisfied with the frequency of sessions. Overall, the participants appreciated the possibility of switching to a remote format because of the COVID-19 pandemic. Eight participants gave positive feedback about the treatment, identifying clear behavioral gains despite only partial or no symptomatic relief; S09, however, did not report positive feedback, behavioral gains or symptomatic relief. The relevance of the BATD intervention for everyday life was emphasized unanimously, whereas ATT was judged to have less transferability to everyday life, leading to a reduction in motivation to perform the exercises. Some barriers to engagement were reported by the participants, including the lockdown reducing their activities and social contacts. All participants reported being satisfied with the relationship with the therapist and with the therapist's skills.

Multiple measurement analysis

The means, standard deviations, Tau-U non-overlap indices, and Cohen's d scores across phases are reported in Tables 4, 5. Graphs representing multiple measurement and

TABLE 4 Means, standard deviations, Tau-U and Cohen's *d* scores for generic mental health measures for all participants across phases.

	Condition 1			Condition 2			Condition 3		
	S01	**S05**	**S08**	**S02**	**S06**	**S09**	**S04**	**S07**	**S10**
Depressive symptoms 1	***Loss of pleasure***	***Punishment feelings***	***Irritability***	***Loss of pleasure***	***Irritability***	***Loss of interest***	***Loss of pleasure***	***Loss of pleasure***	***Irritability***
Mean A (SD)	33.51 (13.97)	63.55 (19.69)	42.39 (28.80)	63.87 (18.89)	64.52 (1.08)	59.68 (19.12)	50.30 (37.34)	86.64 (12.74)	31.03 (17.35)
Mean B (SD)	48.01 (17.28)	20.38 (22.33)	22.04 (26.67)	47.33 (19.27)	43.17 (19.47)	57.18 (14.44)	17.52 (18.29)	63.33 (19.41)	26.72 (19.40)
Mean B′ (SD)	NA	2.38 (6.43)	17.43 (21.51)	59.46 (25.10)	24.19 (16.14)	44.53 (21.80)	NA	55.00 (19.82)	23.83 (18.56)
A-B Cohen's d	1.04	−2.19	−0.71	−0.88	−19.85	−0.13	−0.88	−1.83	−0.25
A-B Tau-U	0.49*+	−0.83***	−0.52*	−0.51***	−0.60	0.04	−0.51*	−0.63*	−0.22
B-B′ Cohen's d	NA	−0.81	−0.17	0.63	−0.97	−0.88	NA	−0.43	−0.15
B-B′ Tau-U	NA	−0.36 (c)	−0.17	0.30	−0.57*	−0.36	NA	−0.23	−0.09
Depressive symptoms 2	***Sadness***	***Sadness***	***Sadness***	***Loss of interest***	***Guilty feelings***	***Sadness***	***Sadness***	***Sadness***	***Loss of pleasure***
Mean A (SD)	22.85 (21.68)	63.87 (19.85)	40.41 (28.93)	27.17 (13.15)	68.10 (9.02)	51.43 (14.38)	49.62 (44.29)	29.49 (19.29)	52.53 (14.28)
Mean B (SD)	16.00 (19.02)	25.54 (25.78)	22.49 (26.30)	27.63 (15.14)	41.34 (16.49)	47.29 (17.99)	30.07 (24.58)	6.94 (11.63)	45.98 (13.45)
Mean B′ (SD)	NA	6.35 (12.10)	29.95 (33.18)	26.17 (17.51)	38.84 (29.93)	39.10 (27.29)	NA	3.98 (9.01)	48.48 (21.62)
A-B Cohen's d	−0.32	−1.93	−0.62	0.04	−2.96	−0.29	−0.44	−1.17	−0.46
A-B Tau-U	−0.15	−0.74***	−0.51*	0.01	−0.90*	−0.12	−0.22	−0.74***	−0.23
B-B′ Cohen's d	NA	−0.74	0.28	−0.10	−1.37	−0.46	NA	−0.26	0.19
B-B′ Tau-U	NA	−0.56*	0.03	−0.15	−0.06	−0.26	NA	−0.17	−0.03
Funct. impair. 1	***School impair.***	***Social impair.***	***Social impair.***	***Social impair.***	***Household impair.***	***School impair.***	***Household impair.***	***Leisure impair.***	***Social impair.***
Mean A (SD)	11.65 (11.48)	68.28 (22.01)	34.14 (14.42)	25.02 (9.27)	58.06 (9.37)	61.65 (19.22)	92.47 (9.44)	21.97 (22.73)	17.82 (19.54)
Mean B (SD)	10.44 (15.18)	21.51 (24.35)	15.32 (21.84)	26.00 (11.49)	34.74 (14.21)	60.53 (15.12)	70.90 (31.97)	8.21 (15.11)	18.75 (16.06)
Mean B′ (SD)	NA	0.00 (0.00)	22.58 (23.80)	32.69 (11.80)	15.19 (18.36)	56.26 (22.00)	NA	1.14 (3.61)	12.65 (13.63)
A-B Cohen's d	−0.11	−2.13	−1.31	0.11	−2.48	−0.06	−2.29	−0.61	0.05
A-B Tau-U	0.00	−0.81***	−0.81***	0.00	−0.76*	0.04	−0.55*	−0.41	0.13
B-B′ Cohen's d	NA	−0.88	0.33	0.58	−1.37	−0.28	NA	−0.47	−0.38
B-B′ Tau-U	NA	−0.65*	0.19	0.29	−0.53*	−0.09	NA	−0.25	−0.33*
Funct. impair. 2	***Leisure impair.***	***Relationship impair.***	***Familial impair.***	***Leisure impair.***	***Relationship impair.***	***Leisure impair.***	***Relationship impair.***	***Relationship impair.***	***Leisure impair.***
Mean A (SD)	7.62 (12.55)	86.02 (8.75)	39.46 (31.58)	28.96 (9.74)	55.20 (15.30)	64.70 (15.47)	74.19 (32.51)	37.17 (25.87)	29.03 (22.64)
Mean B (SD)	17.96 (25.34)	21.99 (26.44)	14.16 (22.18)	23.36 (8.52)	34.27 (15.55)	54.56 (19.11)	23.45 (23.06)	12.15 (18.08)	20.97 (15.93)
Mean B′ (SD)	NA	0.00 (0.00)	17.43 (18.63)	32.69 (9.29)	24.87 (19.11)	41.35 (2.07)	NA	2.96 (8.16)	20.77 (15.75)
A-B Cohen's d	0.82	−7.32	−0.80	−0.57	−1.36	−0.66	−1.56	−0.97	−0.36
A-B Tau-U	0.38	−0.96***	−0.67*	−0.33	−0.75*	−0.29	−0.84***	−0.57*	−0.15
B-B′ Cohen's d	NA	−0.83	0.33	1.10+	−0.60	−0.69	NA	−0.51	−0.01
B-B′ Tau-U	NA	−0.60*	0.19	0.52*+	−0.40	−0.37	NA	−0.30	−0.05

(Continued)

TABLE 4 Continued

	Condition 1			Condition 2			Condition 3		
	S01	S05	S08	S02	S06	S09	S04	S07	S10
Mood									
Mean A (SD)	69.53	63.44	44.52	42.80	52.69	42.47	51.08	47.77	60.39
	(13.11)	(21.47)	(27.47)	(13.3)	(5.69)	(16.40)	(35.30)	(18.89)	(8.90)
Mean B (SD)	57.37	68.12	75.54	50.66	47.78	40.04	78.89	57.63	56.57
	(12.34)	(11.01)	(12.42)	(15.81)	(9.98)	(15.28)	(18.46)	(8.19)	(12.91)
Mean B′ (SD)	NA	78.57	58.45	65.93	47.04	50.12	NA	61.65	59.70
		(9.21)	(28.96)	(17.48)	(12.35)	(23.57)		(11.01)	(12.71)
A-B Cohen's d	−0.93	0.22	1.13	0.59	0.86	−0.15	0.79	0.52	−0.43
A-B Tau-U	−0.44*+	−0.05	0.70*	0.36*	−0.21	−0.12	0.48	0.24	−0.22
B-B′ Cohen's d	NA	0.95	−1.38	0.97	−0.07	0.66	NA	0.49	0.24
B-B′ Tau-U	NA	0.61*	−0.33	0.51*	−0.03	0.35	NA	0.17	0.06

Funct. impair., Functioning impairment; d, Cohen's d score; Tau, Tau for non-overlap with baseline trend control; +, significant deterioration, NA, missing data; (c), corrected for baseline trend; *$p < 0.05$; ***$p < 0.001$.

associated trends are reported in Figures 3–5 for generic mental health measures and in Supplementary Material Section S2 for intervention's-specific measures.

Visual and statistical analyses suggest that, relative to baseline, six out of nine participants made significant improvements in at least one personal depressive symptom; five improved at least one personal life functioning aspect; and two demonstrated a positive change in their general mood over the course of treatment (S02 and S08). However, generic mental health measures appear unchanged for S01 (Condition 1) and S10 (Condition 3) and appear to be worsening for S09 (Condition 2). By considering the two-week follow-up period, additional significant improvements are reported in both symptoms, both functioning aspects and mood for S05 (Condition 1); in mood for S02 (Condition 2); and in one symptom for S06 (Condition 2). The three Conditions seemed to have similar results on generic mental health measures.

For intervention's-specific measures, visual and statistical analyses suggest that, relative to baseline, two out of nine participants experienced significant increases in behavioral activation (S02 and S04); two significant reductions in behavioral avoidance (S05 and S08); one a reduction in self-focused attention (S05); and four reductions in rumination. However, S01 and S05 (Condition 1) reported a deterioration of behavioral activation; S07 (Condition 3) an increase in behavioral avoidance; and S08 and S02 (Condition 1 and 2, respectively) an increase in self-focused attention. Again, intervention-specific measures appear unchanged for S01 (Condition 1) and S10 (Condition 3) and appear to be worsening for S09 (Condition 2). By considering the two-week follow-up period, one additional significant increase in behavioral activation was reported (S05); three significant reductions of behavioral avoidance (S08, S06 and S07); one reduction in self-focused attention (S06); and two reductions of rumination (S05 and S07). The three Conditions seemed to have similar results on intervention's-specific measures.

Component analyses of each treatment

To control for the specificity of treatments, we analyzed ATT and BATD separately in sequential conditions. The means, standard deviations, Tau-U non-overlap indices, and Cohen's *d* scores for intervention's-specific measures across treatment components in Conditions 2 and 3 are reported in the Supplementary materials (Section 3 and Section 5). Graphs representing multiple measurement and associated trends are reported in Section 4 and Section 6.

As expected in Condition 2, S06 first reported a reduction in rumination during the ATT. However, S02 reported an unexpected increase in self-focused attention, rumination, behavioral activation and behavioral avoidance during the ATT relative to baseline. With the introduction of BATD, S02 and S06 reported a reduction in rumination but S06 also reported a significant reduction in self-focused attention. S09 reported no significant change during both phases. As expected in Condition 3, S04 reported a significant increase in behavioral activation, and S07 reported a reduction in rumination during BATD. However, S07 also reported an unexpected increase in behavioral avoidance. The ATT did not provide any additional improvements over the BATD. S10 reported no significant change during both phases.

To compare the effectiveness of BATD in the three different formats, we compared the generic mental health measures results associated with A-B phases in Condition 1, and A-BATD phases in Conditions 2 and 3. The effectiveness of BATD did not seem to differ according to condition.

Analyses of pre–post-measurements

We used standardized questionnaires to measure generic mental health measures (depression, work impairment, social impairment, and well-being) and intervention-specific measures

TABLE 5 Means, standard deviations, Tau-U and Cohen's *d* scores for intervention's-specific measures for all participants across phases.

	Condition 1			Condition 2			Condition 3		
	S01	**S05**	**S08**	**S02**	**S06**	**S09**	**S04**	**S07**	**S10**
Behavioral Activation									
Mean A (SD)	78.49	70.43	56.11	37.85	54.12	28.85	68.70	36.56	31.80
	(12.94)	(16.34)	(23.15)	(14.88)	(9.39)	(17.99)	(32.15)	(25.77)	(17.73)
Mean B (SD)	70.52	48.60	70.21	50.98	53.09	37.02	89.35	34.86	43.10
	(8.11)	(15.17)	(15.66)	(16.57)	(11.19)	(13.51)	(10.95)	(25.63)	(15.15)
Mean B′ (SD)	NA	69.05	72.43	58.57	45.43	38.72	NA	45.56	45.25
		(7.77)	(21.82)	(16.96)	(3.89)	(14.14)		(22.98)	(16.83)
A-B d	−0.62	−1.34	0.61	0.88	−0.11	0.45	0.64	−0.07	0.64
A-B Tau-U	−0.50*+	−0.73***+	0.44	0.40*	−0.09	0.26	0.48*	−0.06	0.35
B-B′ d	NA	1.35	0.4	0.46	−0.68	0.13	NA	0.42	0.14
B-B′ Tau-U	NA	0.98***(c)	0.17	0.25	−0.53*+	0.06	NA	0.23	0.08
Behavioral Avoidance									
Mean A (SD)	19.09	63.23	36.05	29.96	34.41	43.37	24.61	3.38	35.64
	(15.02)	(7.43)	(29.28)	(8.64)	(2.15)	(25.62)	(30.77)	(5.43)	(18.08)
Mean B (SD)	13.98	51.51	15.50	41.25	26.97	56.68	13.23	20.81	25.95
	(5.24)	(13.89)	(14.25)	(17.54)	(14.78)	(12.30)	(13.74)	(25.88)	(17.88)
Mean B′ (SD)	NA	58.73	5.76	39.21	3.23	51.23	NA	0.70	16.07
		(9.17)	(3.74)	(19.95)	(4.06)	(10.78)		(0.90)	(11.14)
A-B d	−0.34	−1.58	−0.70	1.31	−3.46	0.52	−0.37	3.21	−0.54
A-B Tau-U	−0.11	−0.54*	−0.58*	0.23 (c)	−0.36	0.31	−0.07	0.56+(c)*	−0.33
B-B′ d	NA	0.52	−0.68	−0.12	−1.61	−0.44	NA	−0.78	−0.55
B-B′ Tau-U	NA	0.30	−0.61***	0.18	−0.97***	−0.32	NA	−0.54***	−0.37
Self-focused attention									
Mean A (SD)	39.61	61.29	15.80	29.61	46.95	38.53	71.21	64.06	30.88
	(19.27)	(10.49)	(6.66)	(13.12)	(9.70)	(13.96)	(19.83)	(22.07)	(10.66)
Mean B (SD)	52.06	45.48	46.06	45.07	37.71	40.08	76.97	69.97	38.43
	(10.63)	(17.52)	(24.50)	(18.79)	(17.73)	(15.40)	(25.74)	(11.75)	(17.13)
Mean B′ (SD)	NA	48.41	62.06	35.61	13.44	36.62	NA	69.03	30.35
		(10.32)	(27.58)	(18.91)	(9.89)	(21.73)		(8.67)	(19.01)
A-B Cohen's d	0.65	−1.51	4.54	1.18	−0.95	0.11	0.29	0.27	0.71
A-B Tau-U	0.41	−0.58*	0.81*+	0.49*+	−0.32	−0.04	0.28	0.20	0.29
B-B′ Cohen's d	NA	0.17	0.65	−0.50	−1.37	−0.22	NA	−0.08	−0.47
B-B′ Tau-U	NA	0.12	0.35	−0.32	−0.82***	−0.28	NA	−0.04	−0.25
Rumination									
Mean A (SD)	19.35	62.04	46.41	32.54	70.97	38.71	44.92	35.33	15.82
	(15.63)	(25.15)	(22.62)	(12.52)	(6.72)	(14.81)	(40.74)	(30.61)	(12.03)
Mean B (SD)	21.88	30.11	19.13	39.93	36.01	48.20	42.94	7.91	28.75
	(17.86)	(21.12)	(13.71)	(18.31)	(18.67)	(14.32)	(25.93)	(10.85)	(20.39)
Mean B′ (SD)	NA	11.90	34.72	37.68	21.37	35.09	NA	2.01	28.46
		(14.10)	(37.00)	(15.96)	(19.97)	(25.66)		(5.20)	(19.16)
A-B Cohen's d	0.16	−1.27	−1.21	0.59	−5.21	0.64	−0.05	−0.90	1.07
A-B Tau-U	0.12	−0.69*	−0.74*	0.23	−0.91*	0.33	0.06	−0.79***	0.44
B-B′ Cohen's d	NA	−0.86	1.14	−0.15	−0.78	−0.92	NA	−0.54	−0.01
B-B′ Tau-U	NA	−0.55*	0.02	0.25	−0.46	−0.42	NA	−0.38*	−0.03

d = Cohen's d score; Tau = Tau for non-overlap with baseline trend control; + = significant deterioration, NA = missing data; (c) = corrected for baseline trend;
*$p < 0.05$; ***$p < 0.001$.

(behavioral activation, behavioral avoidance, rumination, behavioral measures of attentional control and self-reported measures of attentional control).

Participants' total scores on the standardized measures administered at each phase and the number of participants with reliable changes are reported in Table 6.

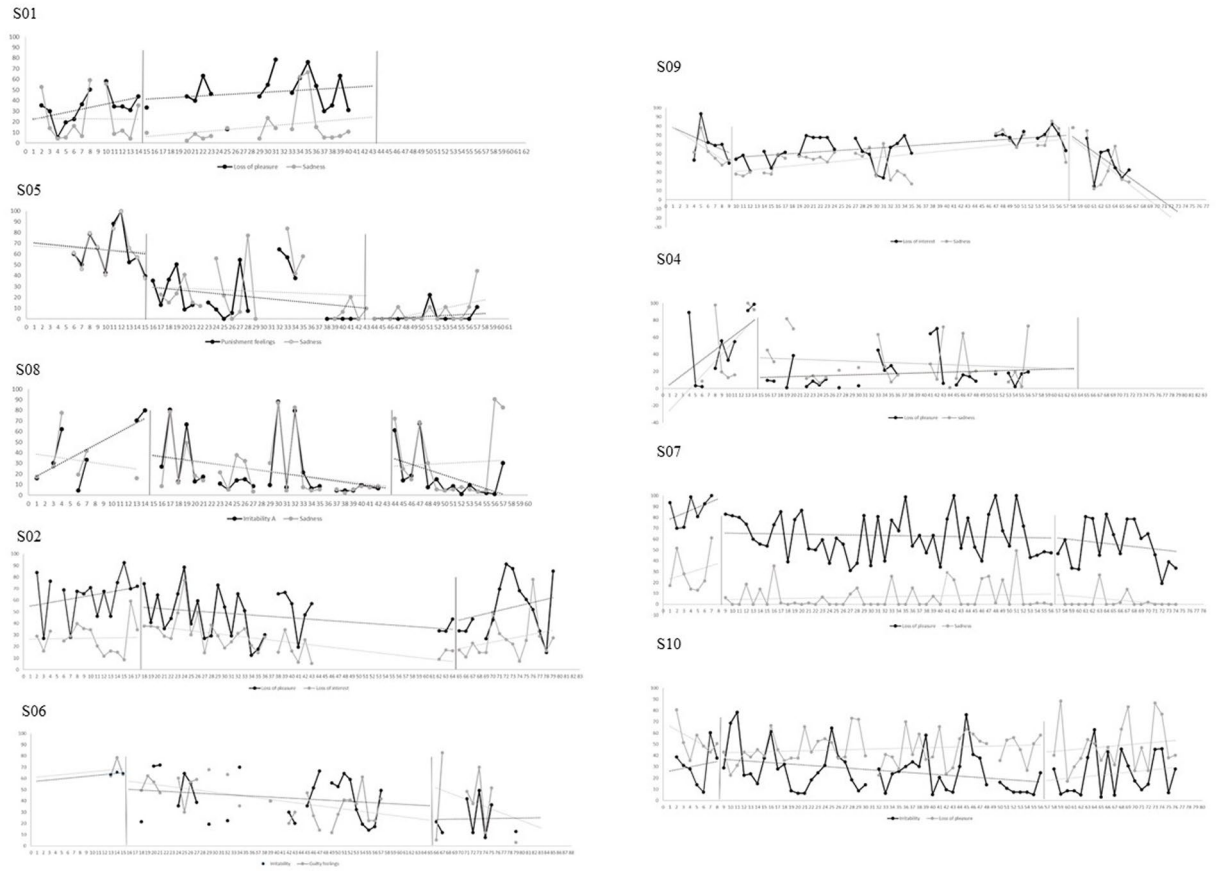

FIGURE 3
Raw data and trend for participants' depressive symptoms ratings.

For generic mental health measures, pre–post-measurements suggest that six participants reported a reliable decrease in depressive symptoms. Two weeks after the intervention, two additional participants reported a reliable decrease in depressive symptoms, for a total of three in Conditions 1 and 2 and two in Condition 3. One participant reported a reliable decrease in work impairment (S06 in Condition 2); three reported a reliable decrease in social impairment (one in each condition); and five participants reported a reliable increase in well-being. Two weeks after the intervention, one additional participant reported a reliable increase in well-being (S04), for a total of two improvements in Condition 1 and 2 and one in Condition 3. S09 (Condition 1), S04 and S10 (Condition 3) did not report any reliable change immediately after the intervention. Every significant change in generic mental health measures reported immediately after the intervention was present 2 weeks later except for one score of well-being (S07). However, only a minority of changes were still present 3 months later. Conditions 1 and 2 seemed to have better results than Condition 3 on generic mental health measures.

For intervention's-specific measures, pre–post-measurements suggest that four participants reported a reliable decrease in rumination (three in Conditions 1 and one in Condition 2). Two weeks after the intervention, four additional participants reported a reliable decrease in rumination (one in Condition 2 and three in Condition 3). Two participants reported a reliable increase in behavioral activation (S02 and S06 in Condition 2); three a reliable decrease in behavioral avoidance (S01 and S05 in Condition 1 and S04 in Condition 2); one reported a reliable increase in attentional control (S02 in Condition 2) and one a decrease in internal attentional style (S08 in Condition 1). The three changes of behavioral activation, two changes of behavioral avoidance (S01 and S04), and attentional control and internal attentional style changes were maintained 2 weeks later. Only rumination for S05 and behavioral avoidance for S04 were still present 3 months later.

Conditions 1 and 2 seemed to have better results than Condition 3 on generic mental health measures. Furthermore, Condition 1 seems to be associated with a higher rumination response rate immediately after the intervention.

Inter-individual differences in response to treatment

Of the nine participants, only one did not respond at all to the treatment (S10), one participant respond 2 weeks later (S04) and one participant respond 3 months later (S09). These three

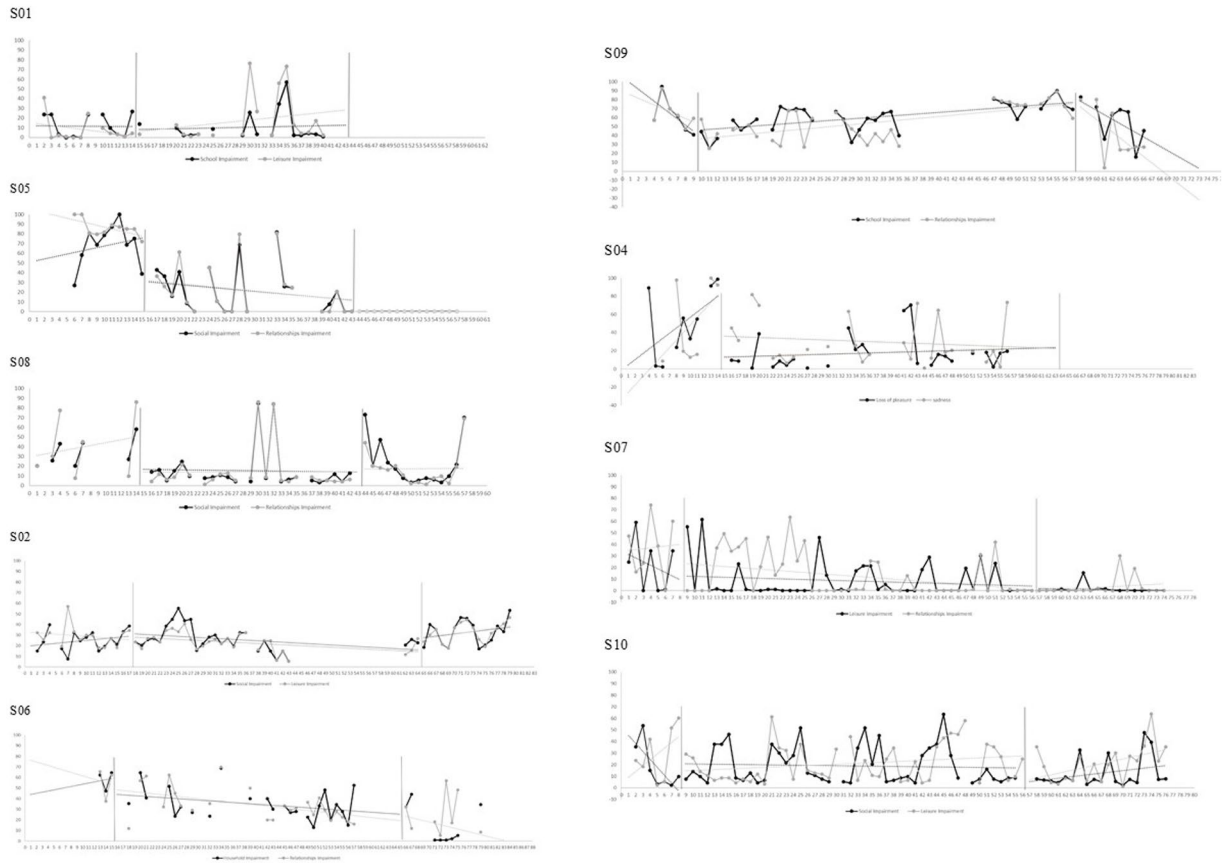

FIGURE 4
Raw data and trend for participants' functioning impairment ratings.

participants did not seem to share any common demographic or clinical characteristics. S04 and S09's failure to do homework might explain their non-response to treatment immediately after the intervention. However, S10 reported a high level of homework compliance. S10 reported relatively low levels of symptoms, impairments and disturbance in psychological processes before the intervention. Based on qualitative inspection, individual factors such as age, gender, clinical status before treatment, history of depression, sociodemographic status, education level, pre-treatment level of attentional control, self-focused attention, rumination, behavioral activation, behavioral avoidance did not seem to be related to the response rates.

Discussion

The first objective of this study was to investigate whether BATD combine to ATT can be efficient in order to reduce depressive symptoms and improve well-being and life functioning in the short (2 weeks) and longer term (3 months), as measured by generic mental health measures (depressive symptoms, well-being and life functioning) and intervention's-specific measures (behavioral activation, behavioral avoidance, self-focused attention, attentional control and rumination). The second objective was to investigate which combination of treatment produced the best outcomes (ATT and BATD concurrently, ATT followed by BATD, or BATD followed by ATT).

This study was associated with no dropouts, acceptable level of treatment attendance and homework compliance and satisfaction with the intervention. Treatment attendance and homework compliance were higher in Conditions 1 and 3, where the treatment started with BATD, which is consistent with previous empirical data reporting high levels of adherence and acceptability for participants involved in BATD (McIndoo et al., 2016; Simmonds-Buckley et al., 2019). The ATT adherence was also acceptable, which is encouraging because cognitive training adherence had sometimes been identified as a challenge in previous studies (Vervaeke et al., 2018).

For generic mental health measures, visual and statistical analyses showed that, relative to baseline, six out of nine participants made significant improvements in at least one personal depressive symptom, five improved at least one personal life functioning aspect, and two demonstrated a positive change in their general mood over the course of

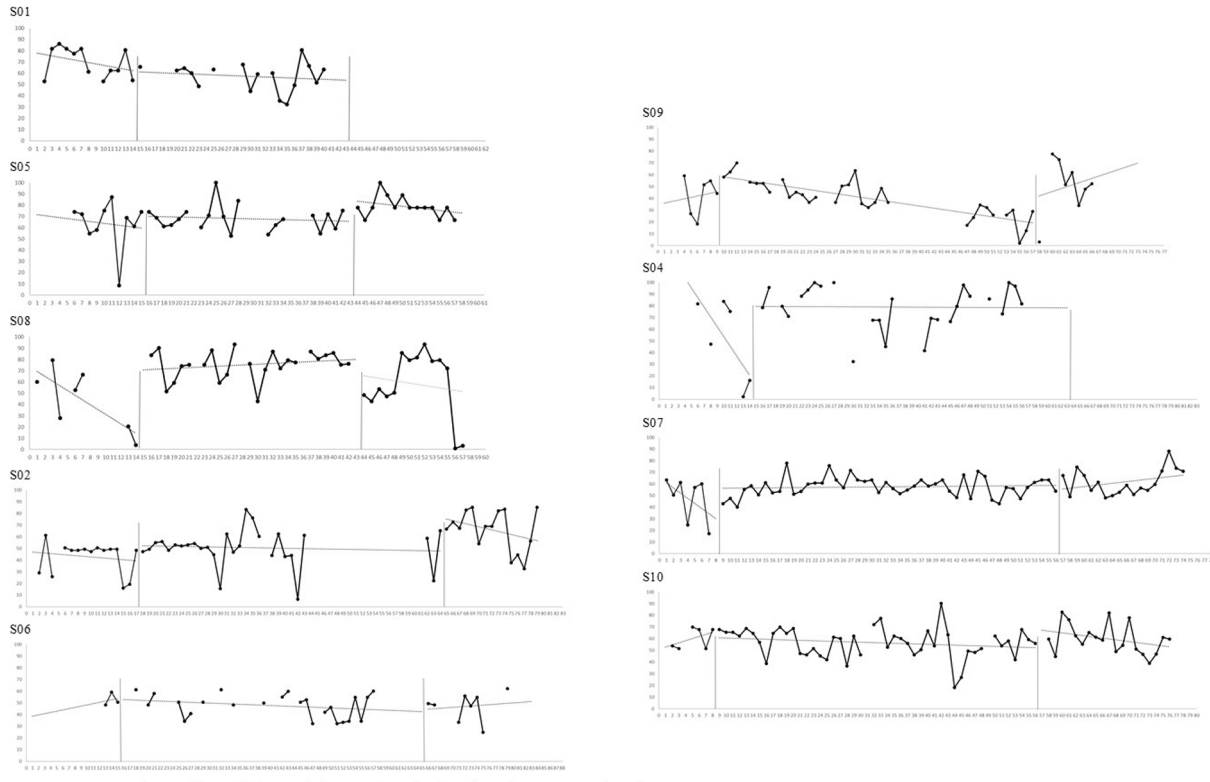

FIGURE 5
Raw data and trend for participants' functioning impairment mood rating.

treatment. Three participants did not respond to the treatment during the intervention (S01, S09 and S10). Regarding pre–post-measurements, six out of nine participants responded to treatment for depression symptoms; one responded to treatment for work impairment; three responded to treatment for social impairment; and five responded for well-being. Two weeks after the intervention, two additional participants responded to treatment for depressive symptoms and one for well-being. Every significant change in generic mental health measures reported after the intervention was present 2 weeks later except for one score of well-being. However, only a minority of changes were still present 3 months later. Conditions 1 and 2 seemed to have better results than Condition 3 on generic mental health measures.

The exploration of inter-individual differences suggest that homework completion did not seem to be related to the response to treatment. Furthermore, S10 who did not respond to treatment reported relatively low levels of symptoms, impairments and disturbance in psychological processes before the intervention. A floor effect might then explain the lack of improvement in these measures. Gender, clinical status before treatment, history of depression, sociodemographic status, education level, pre-treatment level of attentional control, self-focused attention, rumination, behavioral activation, behavioral avoidance did not seem to be related to the response rates that is consistent with recent findings reported in the BATD literature (Ekers et al., 2014; Cuijpers, 2017; Simmonds-Buckley et al., 2019).

For intervention's-specific measures, visual and statistical analyses showed that, relative to baseline, four of the nine participants experienced improvements in rumination, three in behavioral activation, two in behavioral avoidance, and two in self-focused attention. According to pre–post-measurements, four of the nine participants were considered treatment responders for rumination; two responded to treatment for behavioral activation; three for behavioral avoidance, and one for attentional control and internal attentional style, but none for external attentional style. Three participants also reported a reduction in rumination 2 weeks after the end of the intervention. Of the nine participants, only S09 did not report any positive change in rumination. It is interesting that responses sometimes differed in the multiple measurements and pre–post-evaluations. The nature of the evaluations might explain this divergence, with a higher level of content validity for multi-item scales than for one item. The two measures might assess different facets of the construct. According to the multiple measurements, almost every significant change in rumination reported during the intervention was present during the follow-up period 2 weeks later. However, only a minority of changes were still present 3 months later. None of the conditions seemed to produce better outcomes than the others, with the exception of Condition 1 where rumination was

TABLE 6 Participants' total scores on standardized measures administered at each phase and number of participants with reliable changes.

		Condition 1				Condition 2				Condition 3				Total	
Measures		**S01**	**S05**	**S08**	**RC I n**	**S02**	**S06**	**S09**	**RC I n**	**S04**	**S07**	**S10**	**RC I n**	**RC I n**	**RC D n**
BDI-II	Pre	13	26	25	–	18	25	33	–	22	13	11	–	–	–
RCI (7.63)	Post	2*	8*	11*	3/3	6*	2*	35	2/3	15	5*	7	1/3	6/9	0/9
	2 weeks	2*	8*	11*	3/3	8*	1*	22*	3/3	11*	4*	6	2/3	8/9	0/9
	3 months	7	31	11*	1/3	10*	26	7*	2/3	12*	5*	6	2/3	5/9	0/9
BADS-Work	Pre	2	11	0	–	4	19	24	–	17	6	15	–	–	–
imp.	Post	2	10	2	0/3	4	9*	23	1/3	9	3	9	0/3	1/9	0/9
RCI (8.04)	2 weeks	0	3	2	0/3	3	5*	22	1/3	12	16+	14	0/3	1/9	1/9
	3 months	10	19	2	0/3	7	20	19	0/3	11	6	13	0/3	0/9	0/9
BADS- Social	Pre	2	29	8	–	8	19	10	–	4	22	3	–	–	–
imp.	Post	4	1*	14	1/3	3	8*	5	1/3	4	4*	3	1/3	3/9	0/9
RCI (6.53)	2 weeks	4	5*	23+	1/3	9	5*	4	1/3	4	9*	1	1/3	3/9	1/9
	3 months	1	4*	10	1/3	5	22	3*	1/3	6	8*	0	1/3	3/9	0/9
WEMWBS	Pre	40	36	42	–	39	38	36	–	40	43	41	–	–	–
RCI (7.02)	Post	48*	49*	42	2/3	48*	52*	36	2/3	44	52*	42	1/3	5/9	0/9
	2 weeks	51*	49*	39	2/3	48*	53*	37	2/3	50*	45	41	1/3	5/9	0/9
	3 months	37	28+	47	0/3	40	34	47*	1/3	48*	50	39	1/3	2/9	1/9
AERT	Pre	17	20	18	–	15	19	16	–	15	16	12	–	–	–
RCI (3.84)	Post	13*	14*	14*	3/3	17	14*	19	1/3	16	13	13	0/3	4/9	0/9
	2 weeks	15	15*	16	1/3	8*	17	20+	1/3	11*	12*	7*	3/3	5/9	1/9
	3 months	15	17	15	0/3	12	18	21+	0/3	14	6*	11	1/3	1/9	1/9
BADS-Behav.	Pre	28	28	22	–	13	14	14	–	27	26	13	–	–	–
Activation	Post	33	26	17	0/3	27*	33*	20	2/3	34	29	13	0/3	2/9	0/9
RCI (10.00)	2 weeks	37	28	20	0/3	23*	31*	15	2/3	38*	18	8	1/3	3/9	0/9
	3 months	18+	11+	12+	0/3	15	14	24*	1/3	38*	29	11	1/3	2/9	3/9
BADS-	Pre	10	14	9	–	6	12	12	–	18	8	12	–	–	–
Behav.	Post	1*	6*	16	2/3	0	6	17	0/3	8*	6	10	1/3	3/9	0/9
Avoidance	2 weeks	1*	7	8	1/3	1	8	16	0/3	7*	1	2*	2/3	3/9	0/9
RCI (7.42)	3 months	4	4*	3	1/3	3	21+	12	0/3	7*	6	7	1/3	2/9	1/9
PASAT	Pre	42	50	54	–	42	53	55	–	56	53	40	–	–	–
RCI (8.25)	Post	46	47	55	0/3	60*	59	57	1/3	56	59	48	0/3	1/9	0/9
	2 weeks	48	43	58	0/3	59*	59	56	1/3	58	60	54*	1/3	2/9	0/9
	3 months	50	53	55	0/3	59*	58	55	1/3	58	59	44	0/3	1/9	0/9

(Continued)

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TABLE 6 Continued

Measures		Condition 1				Condition 2				Condition 3				Total	
		S01	S05	S08	RC I n	S02	S06	S09	RC I n	S04	S07	S10	RC I n	RC I n	RC D n
ASQ- IAS	Pre	26	23	25	–	27	34	35	–	32	20	29	–	–	–
RCI (7.60)	Post	23	25	14*	1/3	26	30	34	0/3	29	15	35	0/3	1/9	0/9
	2 weeks	26	23	12*	1/3	25	28	33	0/3	28	15	27	0/3	1/9	0/9
	3 months	30	26	19	0/3	27	32	39	0/3	30	17	25	0/3	0/9	0/9
ASQ-EAS	Pre	11	27	22	–	12	18	17	–	26	22	22	–	–	–
RCI (6.56)	Post	17	26	20	0/3	17	13	17	0/3	25	16	19	0/3	0/9	0/9
	2 weeks	17	24	18	0/3	14	17	13	0/3	19*	20	18	1/3	1/9	0/9
	3 months	18+	24	21	0/3	20+	19	18	0/3	24	22	18	0/3	0/9	2/9

BDI-II, Beck Depression Inventory – Second Edition; BADS-Work imp., Behavioral Activation for Depression Scale-Work/School Impairment subscale; BADS-Social imp., Behavioral Activation for Depression Scale-Social impairment subscale; WEMWBS, Warwick-Edinburgh Mental Well-Being Scale; AERT, Abstract Evaluative mode of Repetitive Thinking subscale; FU, follow-up assessment; * = reliable improvement (relative to pre-assessment); + = reliable deterioration (relative to pre-assessment); RCI, Reliable Change Improvement; RCD, Reliable Change Deterioration. BADS-Behav. Activation, Behavioral Activation for Depression Scale- Behavioral Activation subscale; BADS-Behav. Avoidance, Behavioral Activation for Depression Scale-Behavioral Avoidance subscale; PASAT, Paced Auditory Serial-Addition Task; ASQ-IAS, Attentional Style Questionnaire-Internally oriented Attention Subscale; ASQ-EAS, Attentional Style Questionnaire-Externally oriented Attention Subscale.

associated with a better response to treatment immediately after the intervention. If the measures in the follow-up phase had been considered, all conditions would have been associated with similar response rates. Together, these results suggest that all three formats may improve rumination for most participants, but the concurrent format may have a greater effect immediately after the intervention than the two sequential formats. The more compact nature of the first format may have elicited more cognitive resources during the sessions, which may have boosted the effect of the intervention in comparison with the other conditions. Furthermore, the positive reinforcements and hedonic experiences could have increased motivation, leading to enhanced attentional resources, as suggested by previous studies showing a relationship between motivation and cognitive performance (for a review, see Botvinick and Braver, 2015).

Our results suggest that Conditions 1 and 3 seem to be better than Condition 2 in terms of adherence and that Condition 1 seems to be better than the others regarding rumination response rates immediately after the intervention. Overall, our findings suggest that five sessions of concurrent treatment could be a better option than sequential formats in order to reduce rumination immediately after the intervention, even though all three formats improved rumination for a majority of participants.

Our results do not support theoretical models related to BATD or ATT whereby BATD is said to target behavioral activation, and behavioral avoidance while ATT targets attentional control and self-focused attention. The component analysis of each treatment revealed that BATD was not associated with a consistent change in behavioral activation or behavioral avoidance across participants. Similarly, ATT was not associated with a consistent change of self-focused attention or attentional control across participants. Together, these findings do not support the specificity of these two treatments.

In this study, neither behavioral activation nor behavioral avoidance seemed to act as a clear mechanism of change although rumination could act as a mechanism of change for some participants (e.g., S01.S05, S08 S06 S04). However, other participants reported a reduction in depressive symptoms without a reduction in rumination (S09), reported a reduction in rumination that not precede temporally the reduction in depressive symptoms (S02 and S07) or reported a reduction in rumination without a significant change of depressive symptoms (S10).

Moreover, the inspection of response rates for generic mental health measures and intervention-specific measures in different BATD phases suggest that the effectiveness of BATD seems to be similar in each format and that none of the formats enhances its effectiveness. Even though unexpected, our findings are consistent with past studies that reported that cognitive training added to BATD or another usual treatment did not seem to potentiate the change in depressive symptoms or rumination in depressed samples (Moshier and Otto, 2017; Ferrari et al., 2021).

The study was conducted during the lockdown due to the second wave of COVID-19. The spread of the COVID-19 pandemic had a serious impact on people's mental health; with a much higher

mean prevalence of depression than before (31.4% or 33.7% in Europe) (Salari et al., 2020; Wu et al., 2021). The pandemic was associated with higher levels of depressive symptoms, stress, mood swings, irritability, and insomnia (Brooks et al., 2020). This context has decreased access to pleasant activities and social interactions that may have reduced access to important sources of positive reinforcement. This limitation may have reduced BATD's influences on behavioral activation. Moreover, our intervention may have protected the participants against a deterioration in their mental health and well-being during the lockdown period. Indeed, it is possible that our results would have been different in a more favorable context than the health crisis and the lockdown.

Some limitations of this study should be considered. First, the self-report measurement of outcomes might be subject to retrospective recall biases (Rinner et al., 2019) that could have distorted the subjective perception of our variables. Furthermore, participants were not randomly assigned to one baseline duration and the baseline was not controlled for stability. Future studies may benefit from using a random assignment of participants to baseline duration and eventually a response-guided design to ensure a stable baseline (Joo et al., 2018). Moreover, 10 sessions of ATT may not have activated prefrontal regions to the extent necessary to affect mood and symptoms. The optimal dosage of ATT remains unknown (Fergus and Bardeen, 2016). Another limitation is that this study included only a pre–post-measurement of attentional control resources, given the difficulty of measuring this factor daily. However, this process may have acted as a mechanism of change even if pre–post-measurements did not report consistent attention control changes. Moreover, we followed the recommendation of a minimum of three participants per condition to demonstrate its effect but additional participants would have enhanced the validity of our finding. The number of participants also limited the exploration of individual factors that may influence the effectiveness of the intervention. Future studies may benefit from identifying moderators of the effect of the intervention at the individual level. Additionally, as suggested in the literature, the simple fact of being involved in a process of self-monitoring may have enhanced participants' engagement in the therapeutic process that could influence symptoms and outcome improvement (van Os et al., 2017). In the same line, the present findings could have been influenced by the effect of time. Indeed, previous studies have reported that patients' total depression scores tent to naturally decline over time after their first evaluation (Fried et al., 2016). Finally, as participants are self-referred people from the general population, and that only one male participated, future studies may benefit from exploring the generalizability of our findings with the inclusion of more clinical patients referred for treatment, more men, and participants with comorbid diagnoses, who are under-represented in our sample.

This study tested whether combining BATD with ATT is an efficient treatment up to 3 months later, documenting which combination of treatment produced the best outcome and investigating the mechanisms of action underlying the effectiveness of treatment. The design used allowed us to assess the specificity of treatment components and the potential mechanisms of change. Future studies should investigate how to enhance the long-term therapeutic effects (e.g., adding booster sessions) and continue to explore the mechanisms of change in relation to inter-individual differences with mediation analysis. Indeed, proof of the causal role of specific factors on outcomes is lacking, and there is insufficient evidence that these specific factors are core elements of how psychotherapy works and for whom. A promising research strategy to overcome these limitations would be the use of ambulatory assessment or ecological momentary assessment (Gloster et al., 2017), which make it possible to assess variations in behaviors within much smaller time frames and with less retrospective recall bias.

Conclusion

Overall, our results demonstrate a feasible, acceptable combined BATD and ATT intervention with significant positive clinical short-term benefits in terms of depression symptoms, functioning, well-being, and rumination for a majority of adults with depressive symptoms with only one participant who did not respond to the treatment. Benefits were maintained 2 weeks after the intervention, but not 3 months later. Our data also suggest that five sessions of concurrent treatment could be a better option than sequential formats for treatment adherence, response to generic mental health measure and rumination immediately after the intervention. Furthermore, BATD did not appear to have a specific effect on behavioral activation, behavioral avoidance and rumination while ATT did not seem to have a specific effect on self-focused attention and rumination.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by The Ethics Committee of Université de Liège. The patients/participants provided their written informed consent to participate in this study.

Author Contributions

AK: conceptualization, methodology, investigation, formal analysis, writing—original draft, visualization, and review and editing. MG: conceptualization, methodology, formal analysis, and writing—review and editing. EL: investigation. SB: conceptualization, methodology, supervision, project administration, and

writing–review and editing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.914094/full#supplementary-material

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Investigation of causes of ceiling effects on working alliance measures

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The presence of ceiling effects on measures of working alliance is important because they (a) may moderate the observed size of the alliance-outcome correlation and (b) have implications for how quickly the alliance is formed and when. Despite this, little is known about ceiling effects on alliance measures, particularly about potential causes. This study attempted to replicate findings of ceiling effects using a 7-item version of the Working Alliance Inventory (WAI) (Horvath and Greenberg, 1989) accessed in an archival database of 616 parolees enrolled in a drug abuse treatment study. Item response patterns on alliance and related measures were examined to explore potential methodological and theoretical factors that could produce ceiling effects. Analyses revealed ceiling effects on alliance measures assessing relationships with counselors and parole officers as well as floor effects (indicating highly positive appraisals) in measures of outcome expectations with counselors and parole officers. No ceiling effects were found with measures of drug use problems or negative affect. Item responses on the alliance and outcome expectations measures evidenced high consistency where many respondents endorsed the same choice on the 5-point response format across all items on the scale. Ceiling effects offer a potential marker of the working alliance at the scale level, while consistent response choice may provide a specific behavioral marker at the item level. Discussion focuses on theoretical implications and directions for future research in psychotherapy.

KEYWORDS

psychotherapy, working alliance, measurement, replication, ceiling effects, item response

Introduction

Counseling and psychotherapy researchers have found two important results related to the working alliance between client and therapist. First, researchers using meta-analysis have established an overall effect size of approximately 0.30 between scores on working alliance and outcome measures (Horvath and Symonds, 1991; Martin et al., 2000; Horvath and Bedi, 2002; Del Re et al., 2012; Flückiger et al., 2012, 2018). A reasonable interpretation of these consistent findings is that a correlational and possible causal relation exists between alliance and psychotherapy outcome. Second, client-completed alliance measures frequently evidence a ceiling effect early in therapy, suggesting that many clients quickly develop a strong affiliation with their therapist

(Tryon et al., 2007; Hall et al., 2012; Reese et al., 2013; Babatunde et al., 2017; Paap et al., 2019; Meier and Feeley, 2021). Ceiling effects refer to a set of scores clustering toward the top of the range for an item, subscale, or total scale score.

Because traditional test development procedures attempt to identify and eliminate items whose score distributions are skewed, ceiling effects are relatively uncommon in psychological tests. The use of Likert response formats with more than 2 response options typically leads to item scores with higher reliability estimates, item-total correlations, and factor loadings (Maul, 2017) as well as fewer ceiling or floor effects. Developers of alliance measures, including the frequently employed Working Alliance Inventory (WAI; Horvath and Greenberg, 1989), followed traditional test construction procedures designed to maximize variability in item response and subsequent aggregated scale scores (Meier and Feeley, 2021). Given the procedures employed in creating alliance measures, it remains unclear why ceiling effects are commonly observed on client-rated alliance measures.

Some researchers favor measurement problems as the chief explanation for ceiling effects on alliance scales (Paap et al., 2019; Baldwin and Goldberg, 2021). Describing the effects of restricted range on alliance-outcome correlations, Baldwin and Goldberg (2021, p. 28) wrote that "we believe that alliance measures may not be sufficiently sensitive to discriminate variability in the alliance." Paap et al. (2019) also favored a technical explanation, suggesting that ceiling effects result from a failure to construct a comprehensive response format for test items as well as client characteristics such as socially desirable responding.

On the other hand, ceiling effects on client-rated alliance measures may be a consequence of theoretical factors related to the development of the therapeutic relationship (Meier and Feeley, 2021). Using data from two previously published meta-analyses, Meier and Feeley produced 92 estimates of ceiling effects based on 37 studies with 6,439 participants. They found moderate to large ceiling effects across multiple measures of client-rated alliance (e.g., the WAI and SRS) as well as time of administration. While the working alliance has typically been defined in terms of theoretical content such as tasks, goals, and bond (Bordin, 1976, 1994), Meier and Feeley concluded that for many clients, alliance development is not gradual or incremental, but occurs abruptly, non-linearly, and early in therapy. Meier and Feeley suggested that a key element is a threshold structure where clients shift to an experience of the therapeutic relationship as *established*.

Given that many clients may wish to offer positive feedback to their therapist on alliance measures, social desirability, where individuals provide desired responses in relation to the assessment purpose, is an individual differences variable of interest. Research conducted by Reese et al. (2013) and Sturgiss et al. (2019), however, failed to find significant correlations between measures of social desirability and alliance. In contrast, Osborne and Blanchard (2011) studied the effect of random responding on outcome measures used to evaluate an educational intervention. They created a simple random responding scale with items that should be answered in a particular direction by 0 or 100% of the respondents. Deviations from the expected response allowed identification of random responders, who presumably lacked motivation to provide valid responses. Osborne and Blanchard found that random responders evidenced (a) lower scores on study tests and (b) failed to improve on scores intended to assess change from pre- to post-test after an educational intervention intended to improve student learning and retention. Non-random responders had higher scores and did show growth on pre-post scores.

This study sought to replicate ceiling effect findings on alliance measures using a diverse sample and methodological conditions. To extend previous findings with ceiling effects, an archival dataset was sought for this study with a sample different from that typically employed in alliance-outcome studies; Meier and Feeley (2021) noted that one of the limitations of their review was that study samples consisted primarily of female, younger, and Caucasian clients. In addition, the archival data will be explored for patterns of item responses that might reflect one or more individual differences variables that could potentially explain ceiling effects on alliance scores (Osborne and Blanchard, 2011; Reese et al., 2013; Sturgiss et al., 2019).

Methodology

Procedure

An archival database with working alliance data was located at the University of Michigan Inter-University Consortium for Political and Social Research.[1] The dataset was collected for a large-scale drug abuse treatment study called Step 'N Out where participants were randomly assigned to a behavioral management treatment group or a control group (Friedmann, 2011). Data collection occurred from 2002 to 2006 in parole offices in six United States cities; a 2015 version of the dataset was available at the website and employed in this study. Participants were 18 years of age or older, English speaking, evidenced drug dependence related to the most recent incarceration, and had moderate to high risk for recidivism or relapse.

Participants

The full database of Step'N Out participants at baseline included 616 individuals whose mean age was 33.70 (SD = 9.04, range 18–61). The sample consisted of 83% males and 17%

1 http://www.icpsr.umich.edu

TABLE 1 Descriptive statistics, coefficient alpha, and pearson correlations.

Scale	*n*	*M* (*SD*)	Range	Alpha	2	3	4	5	6	7	8
1. WA-CO	316	27.12 (5.96)	5–35	0.95	0.60**	0.08	−0.05	−0.63**	−0.50**	0.16**	−0.02
2. WA-PO	316	26.89 (6.20)	5–35	0.95		0.10	−0.05	−0.53**	−0.72**	0.19**	0.01
3. DUPS	464	45.10 (11.86)	13–65	0.93			0.25**	−0.15**	−0.10	0.35**	0.07
4. NAS	472	21.50 (5.99)	40	0.81				0.01	0.04	−0.06	−0.08
5. CO-ACTS	359	10.46 (3.72)	5–25	0.92					0.63	−0.13*	−0.02
6. PO-ACTS	369	10.42 (4.18)	5–25	0.88						−0.12*	−0.09
7. Age	642	33.62 (8.95)	18–61								0.14**
8. Grade	643	11.14 (1.88)	5–18								

**$p < 0.01$.
*$p < 0.05$.
WA-CO is the working alliance scale, counselor version; WA-PO, working alliance scale, parole officer version; DUPS, drug use problems scale; NAS, negative affect scale; CO-ACTS, counselor–activities scale; PO-ACTS, parole officer–activities scale. DUPS and NAS data were collected at baseline; WA-CO, WA-PO, CO-ACTS, and PO-ACTs were administered at 3-month followup. Respondents who failed to complete all items on a particular measure were not included in the analyses.

females; 55% were Black, 33% Caucasian, 10% Other, and 2% Native American individuals. Completed school grade ranged from 5 to 18, with most individuals attending some level of high school [i.e., grades 10 (19%), 11 (20%), or 12 (34%)]. Sample size varied by measure and time of administration (see **Table 1**). These participants were of interest because (a) compared to traditional psychotherapy clients, mandated clients may be less likely to develop a working alliance and engage in counseling (cf. Henskens et al., 2018; Sturm et al., 2019), and (b) they represent a more diverse sample than those previously studied in alliance research (cf. Meier and Feeley, 2021).

Measures

The Step'N Out study was conducted *via* three assessment waves (baseline, 3 months, 9 months). Multiple unpublished and several published scales and items, utilizing self-report and interview questions, were employed to collect data about working alliance, parole activities and violations, sociodemographic background, family and peer relations, health and psychological status, drug use, criminal behavior, drug use history, and HIV/AIDS risk behaviors (Friedmann et al., 2008). In addition to the working alliance measures (administered at the 3 month wave), items were chosen for this study that had been administered at baseline and 3 months, contained psychosocial content similar to and different from the alliance measures, and employed 5-point Likert response formats that could be assembled into scales with acceptable estimates of internal consistency. These criteria led to creation of four scales assessing self-reported perceptions of drug-related problems, negative affect, and expectations regarding activities respondents performed with counselors and parole officers.

Working alliance inventory–short form

The 7-item, 5-point self-report Likert scale WAI (Horvath and Greenberg, 1989) was employed to obtain two alliance scores relevant to respondents' counselor and parole officer. These versions are referred to as WAI-CO and WAI-PO; "counselor" was the focus of items on the WAI-CO and "parole officer" on the WAI-PO. Sample items include "My work with my counselor is important to me" and "My work with my parole officer is important to me." Both versions of the WAI scales were administered 2–3 months post-baseline; high scores indicate a stronger alliance. As shown in **Table 1**, coefficient alpha equaled 0.95 for both the WAI-CO and WAI-PO. Walters (2016) reported that scores averaged between both WAI measures predicted respondents' subsequent drug use, arrests, and days in jail in the next wave of data collection (9 months post-baseline). Higher WAI scores were associated with lower drug, arrest, and jail outcomes.

Parole officer–expectations scale working alliance scale, parole officer

Collected at 3-month followup, this self-report 5-point Likert scale focused on outcome expectations, that is, knowledge and behaviors the respondent developed with a parole officer to succeed at parole. Originally 6 items, one item was dropped for this study because of a low item-total correlation (0.02). Sample items include "My parole officer explained exactly what I have to do to succeed on parole" and "My parole officer and I made a contract about the things I should and should not do while on parole." Higher scores on the EXP-PO indicate a lower level of activities. The 5-item scale had a coefficient alpha of 0.88.

Counselor–expectations scale working alliance scale, counselor

Parallel to the EXP-PO, this scale was collected at 3-month followup and focused on outcome expectations developed with the treatment counselor. A self-report 5-point Likert scale, one item was dropped from the original 6-item scale because of a low item-total correlation (0.00). Sample items include "My treatment counselor explained exactly what I have to do to succeed in treatment" and "My treatment counselor and I

made a contract about the things I should and should not do during treatment." Higher scores on the EXP-CO indicate a lower level of activities. The coefficient alpha for the 5-item scale equaled 0.92.

Drug use problems scale

This self-report 5-point Likert scale was created by identifying item content related to self-perceived problems about drug use embedded in the Step'N Out Intake data at baseline. Data for 14 items were collected, but one item was dropped as a result of low item-total correlation (0.14). Sample items include "Your drug use is a problem for you" and "You need help in dealing with your drug use." Higher scores indicate more concern about problems associated with drug use. Coefficient alpha equaled 0.93 for the 13-item measure.

Negative affect scale

Collected at baseline along with the DUPS items, this self-report 5-point Likert scale was composed of items with negative affect content. Sample items include "You have a hot temper" and "You feel sad or depressed." Higher scores indicate stronger negative affect. Coefficient alpha equaled 0.81 for the 8-item measure.

Results

Table 1 displays descriptive statistics, scale score range, coefficient alpha, and intercorrelations among all measures. Coefficient alpha for all scales exceeds 0.80, indicating acceptable internal consistency. Convergent validity for the alliance and expectations measures, respectively, is supported by the 0.60 correlation between WA-CO and WA-PO scores and the 0.63 correlation between EXP-CO and EXP-PO scores. Correlations between the alliance and expectations ratings for parole officers ($r = -72$) and for counselors ($r = -0.63$), however, exceed the correlation between alliance ratings of parole officers and counselors ($r = 0.60$) or expectations ratings of parole officers and counselors ($r = 0.63$). This suggests that the scale target (i.e., parole officer or counselor) influences scores more than alliance or expectations content *per se*.

Correlations in Table 1 indicate that increasing age (but not grade) is positively associated with alliance and expectations ratings for counselors and parole officers. The DUPS has the highest correlation with age, such that older respondents report more concerns with drug problems. NAS scores evidence no statistically significant correlations except with DUPS, indicating that more intense negative affect is associated with an assessment of greater drug problems. SAS's General Linear Models procedure, useful with unequal sample sizes, was employed to compare gender and race (i.e., Black and Caucasian participants, the largest racial groups), the independent variables, on the six scale scores, the dependent variables. Participants with missing data were not included in the statistical analyses. For gender, no statistically significant results were found. Regarding race, statistically significant results were found for DUPS [$F_{(1,415)} = 31.81$, $p < 0.001$] and NAS [$F_{(1,419)} = 5.35$, $p < 0.03$], but not for WAI-CO, WAI-PO, EXP-CO, or EXP-PO. Scores for Caucasian respondents were higher for DUPS and NA.

Ceiling effects

In a normal distribution, the mean is positioned approximately 3 SDs from the top or bottom of the set of test scores (Meier and Feeley, 2021). If the sum of the mean and one to two SDs equals or exceeds the maximum test score, a ceiling effect is present, indicating that a substantial number of scores cluster near the top of the scale. Ceiling effects in this study were calculated by comparing the location of the scale mean to the highest possible score on the scale in SD units (Meier and Feeley, 2021). For both WA-CO and WA-PO, the highest possible score equaled 35 (7 items with a 5-point response format). The ceiling was 65 for the 13-item DU scale and 40 for the 8-item NAS. For both the EXP-CO and EXP-PO, the floor was 5, indicating positive appraisals.

Both WA-CO and WA-PO scores evidence ceiling effects (indicating positive appraisals) since their means (27.12 and 26.89, respectively) are 1.32 and 1.31 SD units from the highest possible scale score. The EXP-CO and EXP-PO both evidence floor effects (also indicating positive appraisals), as the EXP-CO mean (10.46) lays 1.47 SD units above the scale floor, while the EXP-PO mean (10.42) is 1.30 SD units above the scale floor. The DUPS mean was approximately 2 SDs below the ceiling and the NAS mean was 3 SDs below its highest score.

Frequency effects

Examination of total scores for both WA scales reveals nodes of high endorsement located at multiples of 7 (i.e., 7, 14, 21, 28, 35). Figure 1 displays the percentage of responses per item for both WA-CO and WA-PO scales. The highest percentages of endorsement occurred for total scores equaling 28 (25 and 22% for WA-CO and WA-PO, respectively) and 35 (13% for both scales). This finding indicates that endorsement of the same response option across all items happens more frequently for response options 4 and 5 than for response options 1, 2, and 3. Thus, ceiling effects on the WA scales were substantially influenced by endorsement of options 4 and 5 on those 2 items.

Figure 2 displays scores on the DUPS that evidence a slight ceiling effect. In contrast, Figure 3 indicates that the distribution of scores for the NAS approaches a normal distribution, with a slight skew toward the floor of the scale. Of particular note, neither the DUPS nor the NAS displays the nodes apparent

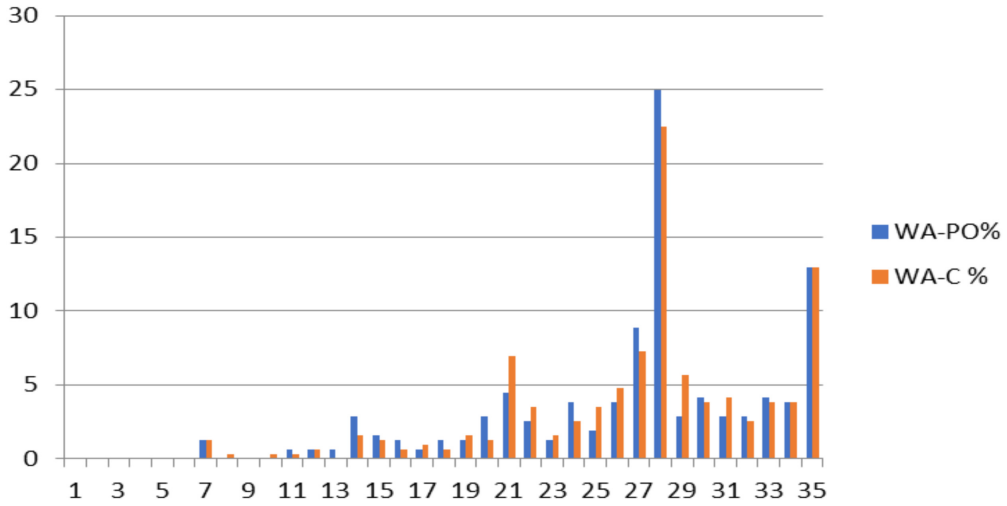

FIGURE 1
Percentage of endorsement for total scores for WA-CO and WA-PO. Nodes at 28 and 35 for total scores indicate a high proportion of respondents chose response options "4" or "5" for WA-CO and WA-PO. WA-PO refers to the parole officer version of the WAI, while WA-C refers to the counselor version.

with both WA scales. This finding indicates that the consistent responding on WA scales did not appear on the DUPS or NAS. Figure 4 displays frequency data for total scores for the EXP-CO and EXP-PO scales. Highest percentages of endorsement occurred for total scores of 5 and 10; total percentage of endorsement equaled 49% for EXP-CO and 41% for EXP-PO. Because these scales were reversed scored, these nodes indicate very positive expectations for counselors and parole officers. Thus, scores on alliance and expectations measures evidence nodes of frequent responding that scores on drug use perceptions and negative affect do not.

Consistency effects

For the WA measures, the frequency data indicated that many respondents endorsed only a single response across all items. To examine this tendency toward response consistency, individuals whose total scores resulted from endorsement of only a single option on the item response format were coded as "1." All other total scores were coded as "0." For WA-CO, 44% of all scores ($n = 140$) had a consistency score of 1; 56% ($n = 176$) had a score of 0. For WA-PO, consistent responses were found for 47% of respondents ($n = 147$) and varied responses for 53% ($n = 169$).

Table 2 displays data examining response consistency between WA scales. While 30% of respondents provided a consistent response across both WA scales, another 30% were consistent responders on only one of the WA scales. Forty percent varied their responses on both scales. Table 3 examines consistency of responses between DUPS and NAS scores. In contrast to the WA scales, only 10% of DUPS respondents ($n = 48$) and 17% of NAS respondents ($n = 80$) had a consistency score of 1. Only 2% provided consistent responses across both scales, while 23% of all responders had consistent responses to only one of these scales. In Table 4, 36% of respondents had a consistency score of 1 for both EXP-PO and EXP-CO. Thirty one percent of respondents had consistency scores of 1 for either the EXP-PO or the EXP-CO.

Discussion

This study replicated previous research that found evidence for ceiling effects on measures of working alliance where scores clustered near the top (positive) of the scale. Mean scores of the alliance with both counselors and parole officers were close to 1 SD unit near the top of the respective scales. In contrast, a normal distribution was apparent for scores on a measure of drug use problems, while scores on a negative affect scale suggested a slight floor effect. This positive clustering of scores on alliance measures resulted from ratings made by mandated, not self-referred, clients. This replication is strengthened by the finding of a floor effect on a reversed score expectations measure, indicating that positive evaluations of counselors and parole officers were not simply a result of the valence of item wording and an acquiescence bias.

Investigation of individual differences in item responding found evidence for response consistency where respondents endorsed the same response from the 5-point response format across all items on the scale. On the WA-CO and WA-PO, for example, 44 and 46% of all respondents, respectively, endorsed the same response across the 7-item scales. If this consistent responding resulted from respondents' lack of motivation, this

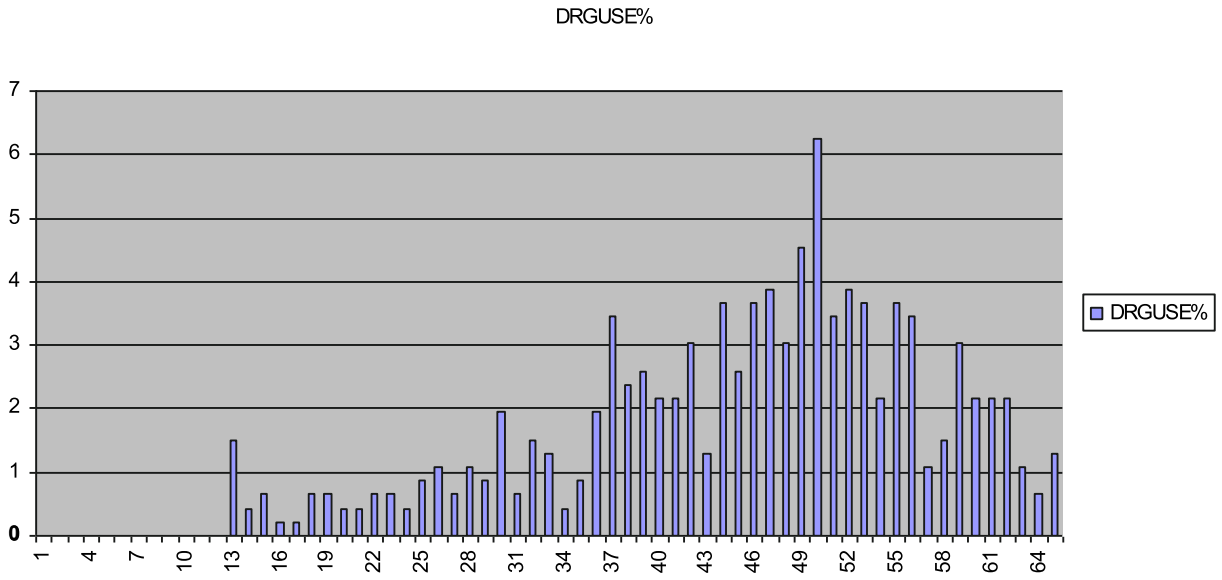

FIGURE 2
Percentage of endorsement for total scores for DUPS. Total scores for DUPS approach a normal distribution. DUPS is the drug use problems scale.

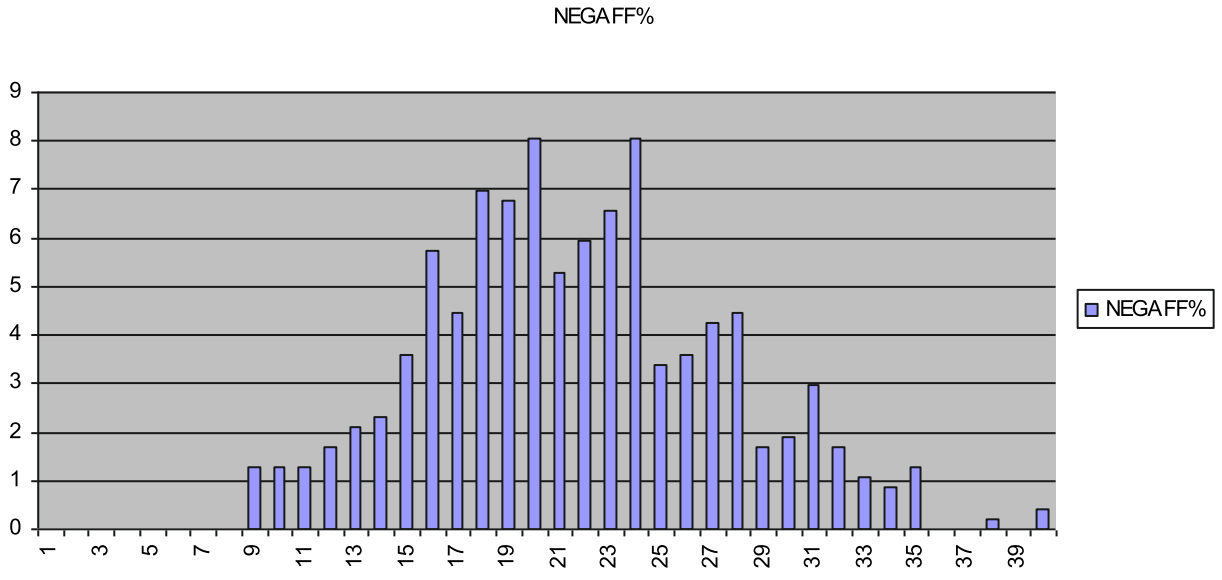

FIGURE 3
Percentage of endorsement for total scores for NAS. Total scores for NAS approach a normal distribution. NAS is the negative affect scale.

item response behavior should have been spread equally across response options 1, 2, 3, 4, and 5. The nodes of consistent responding, however, occurred more frequently on response options toward the positive end of the scale for WA-CO, WA-PO, EXP-CO, and EXP-PO. That is, consistent responding occurred in such a manner that provided high appraisals, reflected in total scores, for counselors and parole officers.

Individuals who responded consistently to items across scales comprised 30% of WA-CO/WA-PO scores, 2% of DUPS/NAS scores, and 36% of EXP-CO and EXP-PO scores. Thus, consistent responding appeared more frequently on scales rating counselors and parole officers, but less so on the drug use and negative affect scales. This finding suggests that consistent responding is not a result of an individual differences variable,

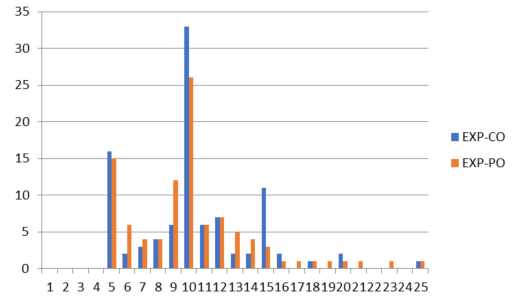

FIGURE 4
Percentage of endorsement for total scores for EXP-CO and EXP-PO. Nodes at 5 and 10 for total scores indicate a high proportion of respondents chose response options "1" or "2" for EXP-CO and EXP-PO. EXP-CO is the counselor–expectations scale, while EXP-PO refers to the parole officer–expectations scale.

TABLE 2 Response consistency between WA-CO and WA-PO total scores.

		WA-PO		
		1 (Consistent)	0 (Varied)	Total
WA-CO	1 (Consistent)	30% (96)	14% (44)	44% (169)
	0 (Varied)	16% (51)	40% (125)	56% (147)
	Total	46% (147)	54% (169)	100% (316)

WA-CO refers to the working alliance-counselor scale, while WA-PO is the working alliance-parole officer scale. Numbers in parentheses are sample sizes per cell.

TABLE 3 Response consistency between DUPS and NAS total scores.

		DUPS		
		1 (Consistent)	0 (Varied)	Total
NAS	1 (Consistent)	2% (11)	15% (69)	17% (80)
	0 (Varied)	8% (36)	75% (347)	83% (383)
	Total	10% (47)	90% (416)	100% (463)

DUPS refers to the drug use problems scale, while NAS is the negative affect scale. Numbers in parentheses are sample sizes per cell.

but depends upon the specific scale. Additionally, correlations between alliance and expectations ratings for parole officers and counselors exceeded the correlation between alliance ratings for parole officers and counselors, indicating that the scale *target* (i.e., parole officer or counselor) influenced scores more than alliance or expectations *content*.

While this study's results argue against respondents as unmotivated or random responders, social desirability remains a possible, but less likely explanation. Some respondents may have had doubts about the confidentiality of their responses, for example, believing that their scores may influence the parole process. If social desirability is an individual differences variable reflected by consistent responding, it should have been present across all scales. Consistent responding was

TABLE 4 Response consistency between EXP-CO and EXP-PO total scores.

		EXP-PO		
		1 (Consistent)	0 (Varied)	Total
EXP-CO	1 (Consistent)	36% (123)	25% (84)	61% (207)
	0 (Varied)	6% (21)	33% (112)	39% (133)
	Total	42% (144)	58% (196)	100% (340)

EXP-CO refers to the expectations-counselor scale, while EXP-PO is the expectations-parole officer scale. Numbers in parentheses are sample sizes per cell.

absent, however, for DUPS and NAS. Study findings are more compatible with a theoretical explanation that the alliance is primarily a holistic experience for many clients. Bordin's (1976, 1994) model of the working alliance implies that clients consider tasks, goals, and bond when assessing an alliance with a particular therapist. The holistic hypothesis, in contrast, suggests that alliance development can be rapid, implicit, and affect-based; clients cross a subjective threshold to experience the alliance as *established*. Similarly, Flückiger et al. (2018, p. 2) defined the alliance as "the holistic collaborative aspects of the therapist-client relationship." They reported that the factor structure of WAI, California Psychotherapy Alliance Scale (CALPAS; Marmar et al., 1986), and Helping Alliance Questionnaire (HAQ; Alexander and Luborsky, 1987) share a common component of a "confident collaborative relationship" (2018, p. 3).

While this study provided further evidence of ceiling effects on working alliance and similar measures, future research should attempt to replicate consistent responses on alliance measures. Ceiling effects offer a potential marker of the holistic connection at the scale level, while consistent responding may provide a marker at the item level. Researchers may wish to conduct qualitative studies to investigate how individuals who provide consistent responses to alliance items perceive the alliance as well as how they interpret particular alliance items. In any event, distinguishing between social desirability and holistic hypotheses for high scores on alliance measures may be difficult in that these two constructs may produce similar effects. Finally, the use of archival data prevents hypothesis confirmation bias and effects from investigator expectancies, but also presents alternative explanations relative to choice of measures, varied timing of measurement administration, and participant selection and motivation. Four of the six measures in this study were homemade, for example, and timing of the administration of these measures may also have influenced observed results.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: University of Michigan

Inter-University Consortium for Political and Social Research (http://www.icpsr.umich.edu).

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The biological dimensions of transcendent states: A randomized controlled trial

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This study evaluated the biological dimension of meditation and self-transcendent states. A convenience sample of 513 participants was drawn from attendees at a 4-day guided meditation workshop. Half were randomly assigned to an active placebo control intervention. All were assessed on a variety of measures, both psychological [anxiety, pain, posttraumatic stress disorder (PTSD), positive emotions, and transcendent states], and physiological (physical functioning). Additional biological assessments including salivary immunoglobulin-A (SIgA), cortisol, and Quantitative Electroencephalography (qEEG) were obtained from subset of the Experimental group (N = 117). No significant difference in psychological symptoms or positive emotions was observed between Experimental and placebo groups at baseline. At post-test, significant improvements were noted in the Experimental group, including a 49.5% median increase in SIgA (p = 0.01), though cortisol remained unchanged. qEEG z-score analysis identified sustained stress reduction, including delta frequency band amplitude increases, high beta decreases, and faster acquisition of sustained alpha states (all $p < 0.001$). Psychological symptoms also improved on all measures. At 6-month follow-up (N = 140), PTSD and somatic symptoms significantly improved from baseline, and post-test versus 6-month follow-up results indicated significant increases in happiness and spiritual and physical oneness, along with decreases in depressive symptoms. These findings suggest that autonomic self-regulation and transcendent states may be measured in both biological and psychological dimensions and are associated with pervasive health benefits.

KEYWORDS

brain waves, cortisol, immunity, anxiety, depression, group therapy, meditation, transcendent states

Introduction

Meditation has been studied extensively for decades and has been found to provide a range of benefits, including stress reduction, mood improvement, and increased health (Baer, 2003). While there are many different schools and forms of meditation such as mindfulness meditation, Zen sitting, mantra repetition, chanting, guided meditation, transcendental meditation, tai chi, clear awareness (Vipassana), lovingkindness (Metta), Hatha yoga, and walking meditation, their commonality is mental training with a goal of wellbeing. This wellbeing takes forms such as stress reduction, improved cognitive function, and the transcendence of ordinary consciousness (Ospina et al., 2007).

Psychological stress downregulates the parasympathetic nervous system which affects several activities directed by the brain, such as respiration, digestion, circulation, and cell metabolism (Kaushik et al., 2020). Stress upregulates the hypothalamus which in turn stimulates the adrenal glands to release cortisol (Seo and Lee, 2010). This further negatively affects the neuro-hormonal levels in the limbic system which over time lead to a cascade of physiological changes in the body such as memory impairments, cognitive deficits, and mood disorders (Yaribeygi et al., 2017). Further, impaired regulation of the amygdala by the pre-frontal cortex is associated with chronic stress (Kaushik et al., 2020). These imbalances also lead to decreased serotonin, which is linked to mood disorders, anxiety, and heightened pain perception (Morena et al., 2016).

Meditation is often associated with improvements in emotional regulation (Robins et al., 2012). This may take the form of enhancement of positive mood (Jain et al., 2007; Tang et al., 2007) and diminished frequency and intensity of dysphoria (Galantino et al., 2005; Chambers et al., 2008; Ding et al., 2014). Meditative practices are associated with improvements in mental health conditions such as anxiety and depression as well as physical symptoms like pain (Shapiro, 2009; Bohlmeijer et al., 2010). Reviews classify guided imagery as a form of mindfulness in that both are forms of selective attention (Chen et al., 2012; Lakhan and Schofield, 2013).

Starting with the earliest investigations of neurofeedback in the 1960s, it has been apparent that an element of meditation involves physiological regulation (Fehmi and Robbins, 2008). Fehmi and Robbins (2008) found that guided imagery could produce the high-amplitude alpha brain waves characteristic of deep meditative states. Emergent disciplines such as functional magnetic resonance imaging (fMRI), electroencephalograph (EEG), salivary endocrine assays (saliva swabs), psychoneuroimmunology, and epigenetics are allowing detailed and systemic maps of the physiological changes associated with meditation to be generated (Church, 2013, 2018).

EEG studies have consistently found that slower alpha frequencies are linked to creativity and relaxation (Klimesch et al., 1998), while beta waves indicate a brain actively involved in cognition and problem solving (Sawant and Jalali, 2010). The characterization of brain waves has advanced to the point where both adaptive and maladaptive patterns can be identified (Kaushik et al., 2020) and a recent study found an association between serum cortisol levels and alpha wave activation (Kamei, 2000). Alpha brainwave activity has further been correlated with decreased pain and discomfort (Palva and Palva, 2011). Individuals practicing transcendental meditation demonstrate increased frontal theta and alpha activity along with decreased levels of anxiety and stress (Chiesa and Serretti, 2010).

After participation in Mindfulness-Based Stress Reduction (MBSR) programs, cortisol is decreased (Matousek et al., 2009) while increased galvanic skin conductance indicates lowered sympathetic nervous system tone (Lush et al., 2009). After the acquisition of mindfulness skills, decreased stress responses are found (Creswell and Lindsay, 2014), as well as quicker recovery to baseline cortisol levels (Brown et al., 2012). After a brief meditation retreat using guided imagery, improvements in both cortisol and SigA were noted (Groesbeck et al., 2018).

As a result of neuroplasticity, the brains of meditators exhibit positive changes over time. The brain regions responsible for emotional regulation, memory, attention, and self-awareness all increase in volume (Fox et al., 2014), while the amygdala – the structure in the midbrain that regulates fear – shrinks (Hölzel et al., 2010). The short-term improvements in stress and mood that result from meditative practices thus eventually become neural pathways as the brain changes it's signaling priorities and neurogenesis results. In this way, the transient positive states evoked by meditation become traits coordinated by a synchrony of endocrinal, genetic, and neurological activity. However, most studies recruit under 100 participants, lack a control group, measure psychological rather than biological change and lack long-term follow-up; all limitations that indicate gaps in our current understanding of the practice (Creswell and Lindsay, 2014).

The present study was designed to address these shortcomings. It examined changes in psychological and physiological markers among participants in a 4-day guided meditation workshop. The sample size was large, and a 6-month follow up of the experimental group was undertaken. We hypothesized that guided meditation would be associated with improved physiological and psychological functioning, and that these improvements would persist over time. We further hypothesized that these physiological changes could be quantified using biomarkers such as brain waves, cortisol and SIgA, and that we would find an association between improved psychological functioning and changes in physiological indicators.

Materials and methods

Participants and procedures

Participants in the study were a convenience sample of 513 individuals out of a total 680 individuals attending a 4-day meditation training. The training, called the Advanced Workshop, was taught by Joseph Dispenza DC. Participants were randomized into two groups (Placebo N = 214, Experimental N = 299) using an online randomized number generator (randomizer.org); although all 680 attendees at the Advanced Workshop were originally included in the study and randomized into the two groups, 167 attendees failed to provide either or both pre- and post- psychological assessments and were therefore not included in the study analyses. The study design was evaluated for human subject protection by the Ethics Committee of National Institute for Integrative Healthcare (US) and found to present minimal risk to human subjects (Approval #NIIHUS20170109). All participants provided informed consent to participate in the study. Pre-post data analysis was conducted blind to group assignment.

Each day of the Advanced Workshop typically comprised four sessions, each beginning with a lecture on a topic such as the role of belief in the placebo effect, or the role of hormones in stress (Dispenza, 2014) and ending with an extended guided meditation lasting for approximately 1 h. Pre- and post- tests were completed by all participants. The Placebo (PL) group completed the pre-test assessment 1 week before they attended the workshop. After pre-test, they were emailed a link to a website containing poems by 13-century Persian poet and mystic Rumi and instructed to read and contemplate them daily for the period of 1 week. The rationale for this control was that this contemplative practice might be reasonably expected to set up an expectancy effect in the minds of PL group participants. At the end of the week, they completed an online post-test and then attended the workshop. In contrast, the Experimental group completed their pre-test online immediately before the workshop, and their post-test on the final day of the workshop. At 6-month follow-up, psychological assessments were conducted online.

A subset of the Experimental group (N = 117) was also tested using salivary assays and EEG; this number was limited by the availability of equipment and time available for testing. Salivary immunoglobulin A (SigA) and cortisol were assessed using saliva swabs (Sabre Labs, Capistrano, CA, United States). To eliminate variances due to circadian fluctuations, samples were collected at the same time pre- and post-test (2 p.m.). Following collection, samples were frozen to prevent degradation, and shipped to the lab on dry ice the following day. EEG was measured using the internationally standard 10/20 19 electrode system, and then processed as qEEG data. qEEG can compare brain wave power, relative power, symmetry, coherence between brain regions, phase cross spectrum correlation, burst metrics, and peak frequency. EEG tests were undertaken before the first day of the workshop, and on the afternoon after the final day. **Figure 1** outlines a CONSORT Flow Diagram of the methodology.

A repeated research question in EEG studies is whether to use the results from absolute power or relative power. Absolute power refers to the amount of power in a frequency band relative to the total spectrum. Relative power is the percentage of power contained in a frequency band relative to the total spectrum of all frequency bands. Relative power measures which percentage of the overall EEG profile each frequency represents and reflects the proportion of activity in a frequency at a particular location rather than the amplitude of the signal itself as in absolute power. Activity in each frequency band is compared to a normative database to determine the presence of suspected abnormalities. Examining a spectral analysis using relative power, when one frequency band has an increase in its percentage of the total spectrum, the other bands share the remaining areas of the spectrum. This can cause distortion and decrease activity in those frequencies that is not seen in absolute power. This can lead to uncertainty as to whether that band really increased, or only appeared to do so due to the distortion of the other frequencies.

Many studies use relative power because it does not confuse EEG signal with noise, and it is consistent in readings across different software programs. Relative power is insensitive to individual differences that affect EEG. When using absolute power, anatomical differences in individuals such as skull thickness can cause skewed data readings; relative power does not skew data in this way. This has led to relative power being the EEG metric of choice especially for studies involving multiple individuals (Kaiser, 2006).

Relative power records clinically significant change and has the advantage of being able to filter individual results against a normative database. It adjusts for demographics such as gender, dominant hand, and ethnicity. Because absolute power cannot consistently produce the same results across different software packages, and cannot be normed to a database, relative power is used in most research studies. For these reasons, relative power was utilized in the analyses.

Measures

General psychological and physiological health were assessed using the Patient Health Questionnaire (PHQ) (Kroenke et al., 2002). Questions were drawn from the PHQ9 and PHQ15 forms of the assessment, with the exclusion of the final two questions on the PHQ15 which relate to female obstetrics-gynecology (OB/GYN) function. The Anxiety subscale of the PHQ was analyzed separately. Transcendent

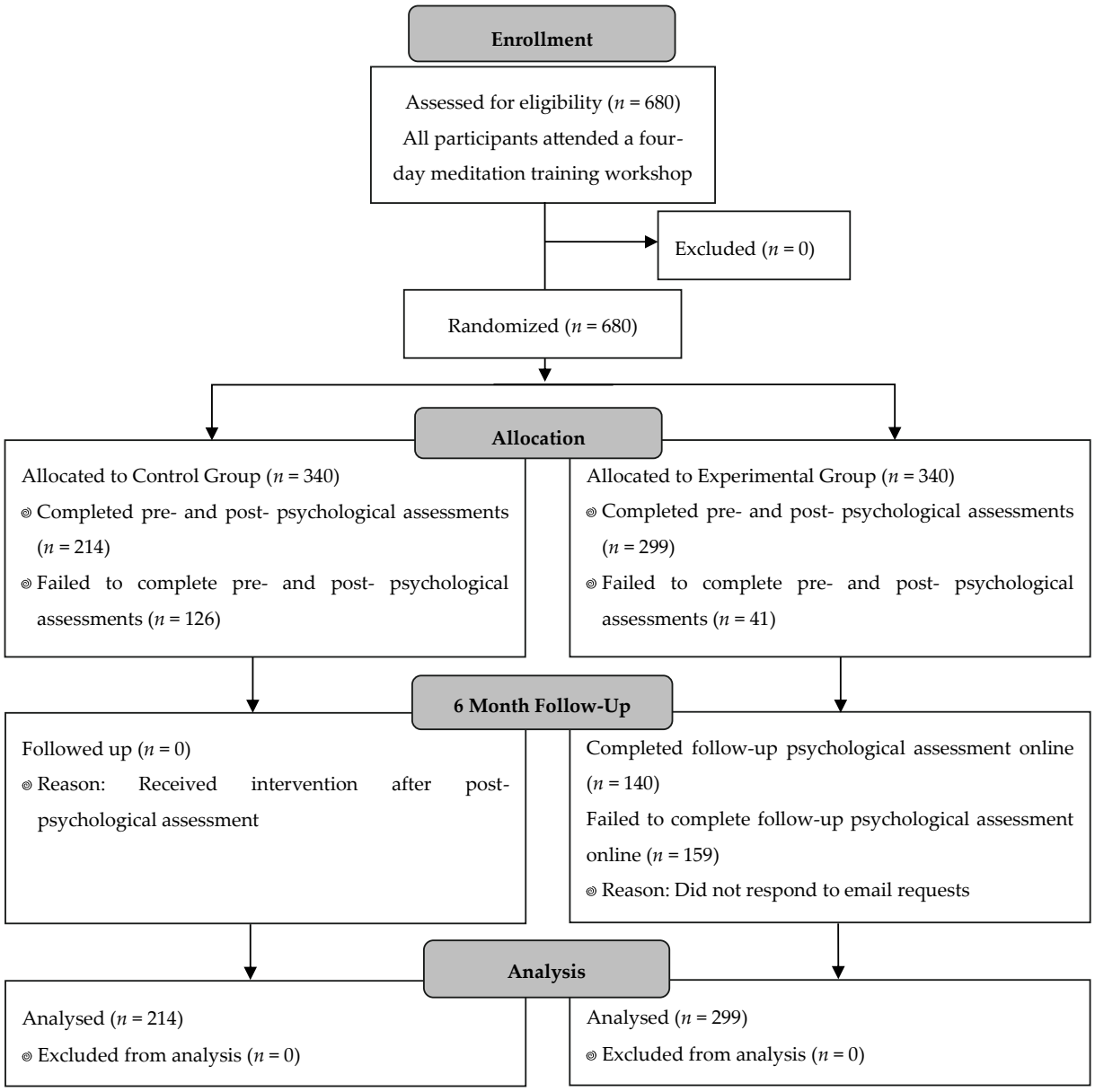

FIGURE 1
CONSORT flow diagram of study methodology.

states were measured with the Oneness Beliefs Scale (Garfield et al., 2014), created to assess "the inherent unity of all phenomena, or oneness. . . a central concept of mysticism". It has two sub-scales, one measuring physical oneness with nature, and the other spiritual oneness, "a short, reliable measure of spirituality not characterized by the language of traditional Western religiousness". The physical oneness subscale "allows researchers to juxtapose spiritual beliefs with a non-spiritual, materialist counterpart" (Garfield et al., 2014).

While the PHQ9 assesses symptoms and experiences of the previous 2 weeks, pre and posttest were administered about 1 week apart. However, it has been noted that using assessments with time frames longer than the interval between pre and posttest can assess psychological change, because after successful treatment, the way participants perceive the past often changes even though the past itself does not change (Groesbeck et al., 2018). Happiness and pain were assessed using 11-item Likert scales ranging from 0 to 10 with 0 representing minimum and 10 maximum values (Farrar et al., 2001; Abdel-Khalek, 2006). PTSD was assessed with the 2-item form of the PTSD Checklist (PCL) (Lang et al., 2012). All assessments are reliable and valid.

Salivary cortisol is a standard measure of stress (Church et al., 2012). Cortisol rises and falls in a consistent diurnal rhythm, with the typical peak being at 8 a.m. each day in normal individuals, and the trough between midnight and 4 a.m. In those with disrupted endocrine function, such as patients with fibromyalgia, chronic fatigue, or posttraumatic stress disorder, circadian cortisol secretion patterns are dysregulated. In cases of adrenal burnout, cortisol levels may be low throughout the day, and associated with a lack of physical energy and psychological motivation. Successful treatment of psychological conditions such as anxiety and depression can regulate cortisol (Church et al., 2012).

Salivary immunoglobulin A (SIgA) is an important immunological protein present in the body's mucous membranes. Its primary function is to neutralize pathogens and toxins, a process known as "immune exclusion." It assists the body in generating mucus in important membranes such as the sinuses and intestinal linings, as well as downregulating inflammation caused by ingested pathogenic bacteria. High levels of SIgA are associated with increased immunity and low levels with decreased immunity. The reduction in stress produced by meditation can result in an increase in beneficial proteins including those responsible for immunity and cell repair. SIgA was therefore measured as a proxy for beneficial cellular processes such as immunity upregulation and the anti-inflammatory response.

Electroencephalograph was measured using a standard 19-electrode array, and then processed as qEEG data. Two measures representing mental quiescence were derived. The first was the time it took for participants to achieve sustained alpha waves (called "time into meditation"). A sustained amplitude of alpha brainwave frequencies, from 9 to 12 Hz, is commonly regarded as a reliable EEG measure of a meditative state. For the purposes of this study, "time into meditation" was defined as the ability of a participant to achieve stable brainwave activity in the alpha frequency band for 15 s or more. On each EEG recording, markers showed the time taken by the participant to reach this sustained alpha threshold. The amplitude and frequency of brain waves waxes and wanes, but when alpha is acquired and consistent for 15 s or longer, this indicates a state change from normal waking consciousness.

The second measure of mental quiescence was the ratio between delta waves and high frequency beta waves (beta 2; 15–30 Hz). An in-depth EEG study examined experienced meditators from five different meditation traditions (Lehmann et al., 2012). The investigators performed a systematic evaluation of the brain activity of participants in all brain regions. From this comprehensive data, they sought common measures that would represent the depth of the meditative state. They found that the two frequency bands in which all five meditation practices produced significant differences were delta and beta 2. Participants in these states reported a loss of a discrete sense of an isolated self and a "subjective experience of non-involvement, detachment and letting go, as well as of all-oneness and dissolution of ego borders." Beta 2 is associated with stress; highly anxious individuals have large amplitudes of high beta and often exhibit low amplitudes of alpha, theta and delta frequencies. Effective meditation training might therefore be expected result in a reduction in beta 2, increased amplitude of delta, and a concomitant change in the ratio between the two frequencies. Brain wave ratio differences have been observed in other stressed populations (Sheerin et al., 2018; Ulke et al., 2018).

Results

In order to detect an effect size of Cohen's $d = 0.3$ with 80% power (alpha = 0.05, two tailed), G*Power indicated a total sample size of 90 participants in a paired sample t-test. Therefore the current sample of 513 exceeded this.

Across both PL and Experimental groups, participants at recruitment had a mean age of 54 years and predominantly held a college or graduate degree, with more than two-thirds of total participants being women (PL $N = 76.17\%$, Experimental $N = 76.26\%$). Despite gender disparity, a chi-squared test of independence ($\alpha = 0.05$) found no significant differences between groups in relation to gender, $\chi^2(1, N = 513) = 0.001$, $p = 0.982$. There were no statistically significant demographic differences between the PL and Experimental groups.

The summary statistics for pre- and post-test psychological measures are presented in **Table 1**. As can be observed, the two groups were similar at baseline, with comparisons showing no significant difference on any measure. The within group pre- and post-test comparisons were conducted using paired t-tests, displaying significant psychological symptom improvements in the Experimental group from pre-test to post-test in all measures, and improvements in some psychological measures in the PL group (PTSD, PHQ9, PHQ15, and happiness). We further compared the post-test symptom levels between PL and Experimental groups using independent t-tests. The Experimental group showed significant psychological improvement compared to the PL group, in PTSD and PHQ15 scores (both $p < 0.001$), PHQ9 scores ($p = 0.038$), physical oneness scores ($p = 0.035$) and pain scores ($p = 0.001$); additionally, fewer participants demonstrated anxiety symptoms at post-test ($p < 0.001$). Participants in the Experimental group on average were happier at post-test compared with the PL group ($p < 0.001$).

Biological measures were obtained from 117 participants in the Experimental group at pre- and post-test. Due to skews in these measures, non-parametric methods were applied in the form of Wilcoxon signed rank tests to test the pre- and post-difference. The median and interquartile ranges (25–75%) are reported in **Table 2** along with the median percentage change for each measure. As can be observed, a significant increase was

TABLE 1 Pre- and post-test psychological measures (N = 513).

	Placebo			Experimental			Between group comparison	
Measure	**Pre**	**Post**	***P-value***	**Pre**	**Post**	***P-value***	**Pre vs pre p-value**	**Post vs post *p-value***
PTSD mean (SD)	4.59 (1.82)	3.86 (1.66)	<0.001	4.33 (1.85)	3.45 (1.50)	<0.001	0.162	0.019
PHQ9 mean (SD)	4.63 (4.43)	3.84 (3.86)	0.005	3.91 (4.04)	2.71 (3.52)	0.038	0.093	0.007
Anxiety N (%)	121.00 (67.2)	89.00 (65.0)	0.248	150.00 (69.10)	92.00 (52.00)	<0.001	0.766	0.028
PHQ15 mean (SD)	6.47 (4.39)	5.94 (4.34)	0.003	6.11 (4.64)	4.63 (4.09)	<0.001	0.434	0.006
Happiness mean (SD)	7.32 (1.83)	7.62 (1.53)	0.002	7.54 (1.79)	8.22 (1.61)	<0.001	0.230	0.001
Pain mean (SD)	2.50 (2.40)	2.25 (2.32)	0.105	2.36 (2.45)	1.74 (2.32)	0.001	0.560	0.050
Spiritual Oneness mean (SD)	65.28 (13.75)	64.82 (13.30)	0.318	63.96 (16.47)	62.40 (20.30)	0.026	0.393	0.227
Physical Oneness mean (SD)	22.91 (5.76)	23.62 (4.98)	0.307	22.41 (6.42)	22.02 (7.91)	0.035	0.427	0.038

TABLE 2 Experimental group pre- and post-test biological measures (N = 117).

	Pre			Post			Post-pre% change	
Measure	**Median**	**25%**	**75%**	**Median**	**25%**	**75%**	**Median**	***P-value***
Cortisol (mcg/dL)	3.00	2.21	4.36	3.13	2.35	4.288	3.04	0.888
SIgA (μg/mL)	47.70	40.15	65.00	52.50	39.89	83.78	5.63	0.01
Time into meditation (s)	99.50	87.00	106.00	79.00	68.00	85.00	−18.42	<0.001
Delta	0.29	−0.47	0.84	2.02	−0.48	4.52	149.31	<0.001
Beta 2	−0.28	−0.92	0.40	−1.45	−3.99	0.89	−123.78	<0.001
Power (Delta/Beta 2)	0.04	−0.92	1.37	−0.68	−1.40	0.63	−62.18	0.033

TABLE 3 Experimental group (n = 140) psychological measures at follow-up compared to pre- and post-test.

	Experimental group			*P-value*		
Measure	**Pre**	**Post**	**Follow-up**	**Pre vs post**	**Pre vs follow-up**	**Post vs follow-up**
PTSD mean (SD)	4.33 (1.85)	3.45 (1.50)	3.72 (1.66)	<0.001	<0.001	0.359
PHQ9 mean (SD)	3.91 (4.04)	2.71 (3.52)	3.71 (4.44)	0.038	0.762	<0.001
Anxiety N (%)	150 (69.10)	92 (52.00)	78 (55.7)	<0.001	0.055	0.999
PHQ15 mean (SD)	6.11 (4.64)	4.63 (4.09)	5.40 (4.41)	<0.001	0.002	0.095
Happiness mean (SD)	7.54 (1.79)	8.22 (1.61)	7.75 (1.73)	<0.001	0.174	0.022
Pain mean (SD)	2.36 (2.45)	1.74 (2.32)	2.11 (2.52)	0.001	0.078	0.523
Spiritual Oneness mean (SD)	63.96 (16.47)	62.40 (20.30)	65.49 (13.93)	0.026	0.964	0.015
Physical Oneness mean (SD)	22.41 (6.42)	22.02 (7.91)	22.81 (6.04)	0.035	0.871	0.021

observed in the SIgA level (49.5%, p = 0.01), reduced time to enter meditation ($p < 0.001$), increased delta, and reduced beta 2 ($p < 0.001$ for both). A significant change occurred in the ratio of delta to beta 2 ($p < 0.001$). No significant change was observed in cortisol (16.25%, p = 0.888), and no adverse events were reported in either group.

Follow-up psychological assessments were obtained from the Experimental group at 6 months. Participants maintained their gains on some measures but not others (see Table 3). PTSD remained improved from pre-test to 6-month follow-up ($p < 0.001$), as did PHQ15 scores from pre-test to 6-month follow-up (p = 0.002).

Discussion

The results of this study demonstrate that guided meditation may lead to both psychological and physiological improvement. Physiological regulation is apparent in the brain function of participants as measured by EEG as well as in immune function as measured by SIgA. Participants were able to acquire and sustain a stable alpha brain state more quickly after the workshop. Their amplitude of the signature wave of stress – beta 2 – diminished. At the same time, their amplitude of the signature wave of a sense of oneness – delta – increased. Their psychological state improved, with PTSD and

anxiety symptoms both reducing relative to controls. They self-assessed as happier, with a greater sense of oneness with both nature and the universe. Pain was diminished. These results are consistent with the many other studies of meditation and guided imagery.

The one biological marker that did not improve was cortisol. One possible reason for this is that cortisol synthesis is relatively stable, with a circadian rhythm that does not change markedly over time. Four days may have been insufficient to produce a change in this consistent biorhythm.

The control condition of reading and contemplating Rumi poems was selected because of its anticipated plausibility as a placebo or active control. The improvement of this group on several measures including PTSD, PHQ and happiness suggests that this particular control was in fact an effective intervention. Anecdotal reports provided to the investigators by participants suggested that some had profound transcendental experiences resultant of this activity.

When designing the study, the investigators had difficulty finding an instrument with which to measure transcendent mystical states. After consulting with colleagues with decades of experience in the field, it was found that most assessments measure religious as opposed to spiritual experience. Typical questions relate to frequency of church attendance, prayer, and scripture reading. There is little in the literature to capture the experience of those who are "spiritual but not religious." Though the Oneness Beliefs Scale was eventually selected, it is our belief that a brief yet robust and representative assessment of transcendent states is required for future research. Until recently, researchers had not asked patients about their spiritual experiences; one of the first studies to do so examined a population of AIDS patients and found that their belief in either a punishing or benevolent universe was the single strongest predictor of the course of the disease (Ironson et al., 2005). Obtaining meaningful data illuminating individual experience is dependent on asking the right questions.

There were a number of limitations to the study. Not all the participants in the Experimental group could receive the biological tests due to limitations of time and equipment. As such, although sufficient to obtain statistical significance, only approximately half of participants completed the biological tests. Additionally, the biological tests were not administered to participants on follow-up because the data was obtained online, thereby rendering the durability of these biological improvements over time unknown. As the PL group was also tested online, no biological measurements of their changes were made, and so no comparison with the Experimental group was possible.

A further limitation is the non-specific effect of any positive social experience such as workshop participation. Demand characteristics and therapeutic allegiance may have played a role in the results. In group settings such as this one, positive emotional contagion can easily spread; at least a portion of the observed effects were likely due to this factor. A further limitation is the limited response rate of participants to the online follow-up. These attrition levels are typical of online post-tests (Church and Brooks, 2010). It therefore cannot be assumed that those who did not respond experienced the same psychological improvements as those who did. Mitigating this limitation, other studies report non-response rates of up to 85% and note that when data are subsequently collected from dropouts by telephone, non-response is not found to bias the outcome (Couper et al., 2007; Ruwaard et al., 2013).

Further research might also illuminate possible dose-dependencies of the duration of meditation experience; would 7 days produce greater change, and do extreme durations like the 3-year retreats of Tibetan Buddhist monks scale in a measurable way? Specialized assessments might be required to determine the effects of very short and very long periods of meditation. We also propose the testing of the beta 2 vs. delta brain wave ratio as a general measure for use in future studies. The field of neurofeedback has been hampered by the lack of such a universally accepted clinical measure.

Despite these limitations, this study adds to the growing body of literature demonstrating the immediate beneficial psychological and physiological effects of meditation. It shows that such experiences may improve immune function, downregulate the brain waves typical of anxiety and stress, upregulate the frequencies associated with relaxation and calmness, improve general measures of physical health, and increase subjective experiences of oneness with the universe and nature. Psychological health is improved, with reduced anxiety, PTSD and pain, and increased happiness. As an easily learned, non-pharmacological intervention without side effects, guided meditation offers both psychological and physiological benefits.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics Committee of National Institute for Integrative Healthcare (US) (Approval #NIIHUS20170109). All participants provided their written informed consent to participate in this study.

Author contributions

DC: conceptualization, validation, investigation, resources, writing—original draft preparation and review and editing,

supervision, and project administration. JF: methodology. AY: formal analysis and visualization. KB: data curation. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

JF was employed by Thought Genius LLC.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Clinical EFT as an evidence-based practice for the treatment of psychological and physiological conditions: A systematic review

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Background: Since the turn of the century, Emotional Freedom Techniques (EFT) has come into widespread use in medical and psychological treatment settings. It is also used as self-help by tens of millions of people each year. Clinical EFT, the manualized form of the method, has been validated as an "evidence-based" practice using criteria published by the American Psychological Association (APA) Division 12 Task Force on Empirically Validated Therapies. Its three essential ingredients are exposure, cognitive framing, and acupressure.

Objectives: In 2013 we published a paper defining Clinical EFT and reviewing published research. It has been viewed or downloaded over 36,000 times, indicating widespread interest in this treatment modality. Here we update our findings based on subsequently published literature and propose directions for future research.

Method: We performed a systematic review of the literature to identify randomized controlled trials (RCTs) and meta-analyses. Retrieval of 4,167 results resulted in the identification of 56 RCTs ($n = 2{,}013$), 41 of which were published subsequent to our earlier review, as well as eight meta-analyses.

Results: RCTs have found EFT treatment to be effective for (a) psychological conditions such as anxiety, depression, phobias, and posttraumatic stress disorder (PTSD); (b) physiological issues such as pain, insomnia, and autoimmune conditions; (c) professional and sports performance; and (d) biological markers of stress. Meta-analyses evaluating the effect of EFT treatment have found it to be "moderate" to "large." Successful independent replication studies have been carried out for anxiety, depression, PTSD, phobias, sports performance, and cortisol levels. We outline the next steps in EFT research. These include determining its impact on cancer, heart disease, diabetes, and cognitive impairment; analysis of the large-scale datasets made possible by mobile apps; and delivery through channels such as virtual

practitioner sessions, artificial intelligence agents, online courses, apps, virtual reality platforms, and standardized group therapy.

Conclusions: Subsequent research has confirmed the conclusions of earlier studies. These find Clinical EFT to be efficacious for a range of psychological and physiological conditions. Comparatively few treatment sessions are required, treatment is effective whether delivered in person or virtually, and symptom improvements persist over time. Treatment is associated with measurable biological effects in the dimensions of gene expression, brain synchrony, hormonal synthesis, and a wide range of biomarkers. Clinical EFT is a stable and mature method with an extensive evidence base. Its use in primary care settings as a safe, rapid, reliable, and effective treatment for both psychological and medical diagnoses continues to grow.

KEYWORDS

emotional freedom techniques (EFT), anxiety, depression, PTSD, somatic symptoms, pain, insomnia, obesity

Introduction

Emotional Freedom Techniques (EFT) is an "evidence-based" therapeutic method (Church, 2013a). It combines elements of cognitive and exposure therapy with acupressure. It is popularly termed "tapping" because its distinguishing feature is the stimulation of acupuncture points using fingertip percussion. EFT (Craig, 2008/2010; Church, 2018) is a simplified method of an earlier innovation termed Thought Field Therapy (TFT) developed by clinical psychologist Roger Callahan (Callahan, 1985). Though Callahan popularized tapping on acupressure points in the 1980s, he learned the method from others (Diamond, 1985; Goodheart, 1987) and tapping itself has been used in Chinese medicine, Japanese massage, qigong, and yoga for thousands of years. One of Callahan's students simplified Callahan's TFT method and described it in *The EFT Manual* (Craig and Fowlie, 1995). With instruction available free online, the modality has spread widely.

Evidence-based practices are methods that meet formally established criteria for efficacy (Beautler et al., 2005; Melnyk and Fineout-Overholt, 2005). There are several organizations that define and publish such standards. Two US government's agencies that perform this function are the Food and Drug Administration (Food and Drug Administration [FDA], 1998) and the Institute of Medicine (Institute of Medicine [IOM], 2008). Another is the UK government's National Institute for Health and Clinical Excellence (National Institute for Health and Clinical Excellence [NICE], 2009). Between 1996 and 1998 an influential set of standards in the field of psychology was published by the Task Force on Empirically Validated Treatments set up by Division 12 (Clinical Psychology) of the American Psychological Association (APA; Chambless et al., 1996, 1998; Chambless and Hollon, 1998). For convenience these are referred to as "APA standards."

Updates to the standards have been proposed (Tolin et al., 2015). These have been implemented in the most recent APA practice guideline for Post Traumatic Stress Disorder (PTSD) (Courtois et al., 2017). However, errors in the guideline (Dominguez and Lee, 2017) and controversy surrounding the entire approach to updating the standards (Norcross and Wampold, 2019) have made their wider acceptance uncertain. Virtually all of the studies reviewed in this paper were designed while the original standards were in effect, and consensus has not been reached on updates to the standards, so we continue to refer to the original standards (Chambless et al., 1996, 1998; Chambless and Hollon, 1998) as the "APA standards."

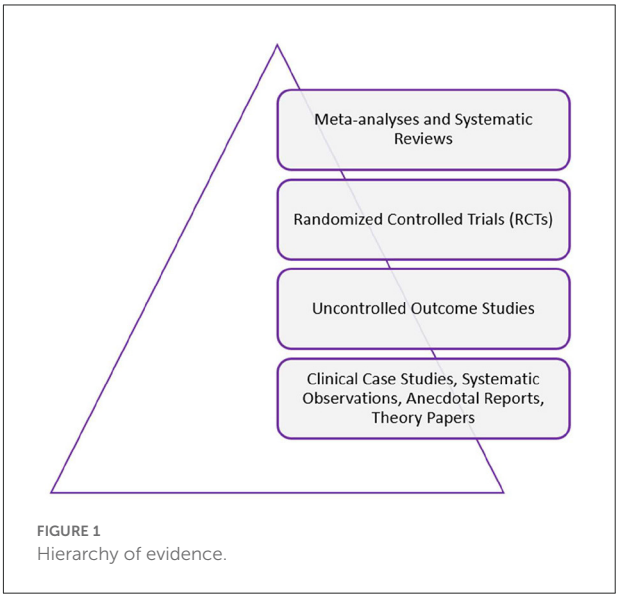

FIGURE 1
Hierarchy of evidence.

The need for a definition of clinical EFT

Several million people worldwide practice EFT (Feinstein, 2021). Sources for virtual EFT such as websites, online events, and apps attract millions of people annually. Reports from Google Analytics, Semrush, and WebsiteIQ.com, tools for analyzing web traffic, found that in the last quarter of 2021, a monthly average of 336,674 people visited the top four EFT websites using computers and smartphones. Over a million subscribers had opted in to receive the newsletters published by these sites. As of 2022, over three million individuals had downloaded the self-help instructions for EFT, *The EFT Manual* (Craig and Fowlie, 1995) and *The EFT Mini-Manual* (Church, 2009/2013). An annual virtual conference called the Tapping World Summit entered its 14th year in 2022. It attracted 605,355 participants (personal communication, Nick Ortner, March 11, 2022). The most popular EFT app is called the Tapping Solution. Between its introduction in 2018 and mid-2022, over 2,107,000 users downloaded the app, while over 10 million sessions were recorded (personal communication, Nick Ortner, March 11, 2022). Available data indicates that, worldwide, tens of millions of people use EFT.

EFT is also practiced in medical and mental health settings. A survey of 149 licensed psychotherapists found that 42% were using or had considered using acupressure-based techniques similar to EFT (Gaudiano et al., 2012). In 2017, the Integrative Medicine office of the US Veterans Administration designated EFT as a "generally safe therapy" and listed it as such on the VA intranet (Church, 2017). Numerous licensed mental health professionals within the VA have trained in EFT and use it with their clients. EFT is taught or used with patients in other hospital systems such as Kaiser Permanente in the US and the National Health Service in the UK. There are over 90 EFT studies published in non-English-language journals and these demonstrate its use in non-Western countries in many conventional medical settings such as hospitals, universities, and clinics (Freedom et al., 2022).

While EFT is used in many professional settings, the number of sessions recorded on EFT websites and in the tapping app makes it apparent that the majority of its use is as self-help. While the skillful and therapeutic use of the many EFT techniques requires extensive training, its basic tapping routine is easily learned; *The EFT Mini-Manual* (Church, 2009/2013) concludes with "EFT on a Page."

There are several professional organizations that offer training and certification in EFT. However, there is no central organization defining EFT and controlling its intellectual property, as is the case with EMDR (Eye Movement Desensitization and Reprocessing), Sensorimotor Psychotherapy, and many other modalities. Many of those who learned EFT informally created their own unique versions of the method (Feinstein, 2009). Few present the original EFT method as it is detailed in the manual (in four editions, Craig and Fowlie, 1995; Craig, 2008/2010; Church, 2013b/2018). This resulted in considerable confusion as to what EFT actually was and, in turn, to the need for a formal definition of EFT. This led in 2013 to a formal consensus paper. It defined Clinical EFT as the evidence-based manualized method that has been validated in research studies that meet the APA standards defined below (Church, 2013a).

Research studies conforming to these standards typically use a manual, *The EFT Manual* (Church, 2013b/2018; Craig, 2008/2010), and employ fidelity checks to ensure that practitioners apply EFT as described in the manual. Training of practitioners is performed using the precise methods described in the manual and validated in research.

Clinical EFT identifies 48 distinct techniques described in the manual and supplementary materials (www.ClinicalEFT.com). Clinical EFT includes techniques from Cognitive Behavioral Therapy (CBT) and Prolonged Exposure therapy (PE). These include awareness building, imaginal exposure, cognitive reframing, preframing, and systematic desensitization. To this it adds the novel ingredient of acupressure. Rather than using acupuncture needles, practitioners stimulate acupuncture points by tapping on them with their fingertips. For this reason EFT is popularly referred to as "tapping." The addition of acupressure to established psychological techniques has been found in a meta-analysis to contribute to EFT's therapeutic results (Church et al., 2018b).

Clinical EFT was formally defined in an earlier paper by the first author (Church, 2013a). The need for a definition of Clinical EFT is demonstrated by the interest in that paper. It has been cited over 100 times and been viewed or downloaded from the journal's website over 36,000 times (personal communication, Ray Wong, November 11, 2021). In the decade since that publication, the number of studies has more than doubled, while several meta-analyses and review papers have been published. For this reason, this update of the earlier paper has been undertaken.

The current paper differs from the previous paper in several regards. Increased research has resulted in a better-defined picture of EFT's therapeutic effects. Since the previous paper was published in 2013, eight systematic reviews with meta-analyses have been performed (see Table 1). While the earlier paper summarized key studies, this update focuses on meta-analyses where available.

For conditions for which meta-analyses are not available, such as phobias and weight loss, we draw on the evidence provided by individual studies, preferably RCTs. The earlier paper called for more research into EFT's physiological mechanisms of action and such research is now available. While many of the studies in the earlier paper were performed by practitioners, current research often involves universities, granting agencies, governments, and institutes. While a review paper like this is limited to the studies published to date,

TABLE 1 EFT systematic reviews with meta-analyses published since 2013.

S.R.No.	Condition	Study name
1	Anxiety	Clond (2016). Emotional Freedom Techniques for anxiety.
2	Depression	Nelms and Castel (2016). A systematic review and meta-analysis of randomized and nonrandomized trials of clinical Emotional Freedom Techniques (EFT) for the treatment of depression.
3	PTSD	Sebastian and Nelms (2017). The effectiveness of Emotional Freedom Techniques in the treatment of posttraumatic stress disorder: A meta-analysis.
4	PTSD	Mavranezouli et al. (2019). Psychological and psychosocial treatments for children and young people with posttraumatic stress disorder: A network meta-analysis.
5	PTSD	Mavranezouli et al. (2020). Psychological treatments for post-traumatic stress disorder in adults: A network meta-analysis.
6	Somatic symptoms	Stapleton et al. (2021). Emotional Freedom Techniques (EFT) for somatic symptoms: A systematic review and meta-analysis.
7	Pain, anxiety, depression, burnout, stress, phobia	Church et al. (2018b). Is tapping on acupuncture points an active ingredient in Emotional Freedom Techniques? A systematic review and meta-analysis of comparative studies.
8	Pain, anxiety, depression, PTSD, food cravings, phobia	Gilomen and Lee (2015). The efficacy of acupoint stimulation in the treatment of psychological distress: A meta-analysis.

Sr. No., systematic review number.

additional studies continue to be published. A current list is maintained at Research.EFTuniverse.com.

APA standards

The original APA standards were defined in a series of papers (Chambless et al., 1996, 1998; Chambless and Hollon, 1998). Therapies demonstrating efficacy according to certain criteria, such as two high-quality studies performed by independent investigators finding the method statistically superior to a placebo or another method, are said to be "efficacious." Methods that meet lesser standards are classified as "probably efficacious."

The APA standards may be summarized as comprising seven essential criteria (Energy Psychology, 2017) and studies are deemed "empirically validated" if they meet all seven. Chambless and Hollon (1998) also list additional criteria designated as "highly desirable" or "desirable". The seven essential criteria are:

1. **Randomized controlled trials** (RCTs)—subjects were randomly assigned to the treatment of interest condition or to one or more comparison conditions.
2. **Adequate sample size** to detect statistically significant ($p < 0.05$ or better) differences between the treatment of interest and the comparison condition(s) was used.
3. **The population for which the treatment was designed and tested must be clearly defined** through the use of diagnosis by qualified clinicians, through cutoff scores on questionnaires that are reliable and valid, through interviews identifying the focus of the study's interest, or through some combination of these.
4. Assessment tools must have demonstrated **reliability and validity** in previous research.
5. Any interview assessments were made by interviewers who were **blind to group assignment**.
6. **Treatment manuals** that make clear the nature of the treatment being tested were used. If the treatment was relatively simple, it could be described in the procedure section of the journal article presenting the experiment, in lieu of a treatment manual.
7. The paper reporting the study **provided enough data** that the study's conclusions can be reviewed for appropriateness, including sample sizes, use of instruments that detect changes targeted by the study's design, and **magnitude of statistical significance**.

Studies of efficacious or probably efficacious therapies are required to demonstrate "statistically significant" results, meaning there is <1 possibility in 20 (i.e., 0.05%) that the results are due to chance (Criterion #2). Statistical significance is defined as $p < 0.05$. The term "highly significant" is often used to refer to studies with <1 possibility in 1,000 that the results are due to chance, or $p < 0.001$.

Revisions to the APA standards were proposed in 2015 (Tolin et al., 2015) and used in a treatment guideline for PTSD (Courtois et al., 2017). The standards by which treatments were assessed were made extremely rigorous, such as prioritizing the number and quality of RCTs and meta-analyses. However, these revisions drew criticism for the obvious reason that older therapies have more studies, while newer therapies (which might be innovative and effective) have fewer. Norcross and Wampold (2019, p. 393) observed: "The difference in recommendations resides in the number

of RCTs conducted on each treatment. If numbers are good, more numbers must prove better! We understand the decision to elevate those trauma psychotherapies that possess more studies—'strength of evidence'—to the category of strongly recommended. However, at the risk of stating the obvious, more studies do not mean more effectiveness. . . . Practitioners seek what is effective for their patients, not what is most studied." Division 12 maintains an online list of treatments (American Psychological Association [APA], 2021) based on both the original APA standards and the revised standards (Tolin et al., 2015).

For more than a quarter-century, the original APA criteria (Chambless et al., 1996, 1998; Chambless and Hollon, 1998) have provided a stable, well-defined, published set of common standards by which the efficacy of a therapeutic technique may be judged. When that technique is then translated into training, certification, and clinical practice, these criteria provide reasonable assurance that the method as practiced in the field is the method that has been validated in research. A 1-year certification program that trains practitioners in the 48 Clinical EFT techniques has been offered since 2010 (UltimateEFTcertification.com).

Most of the meta-analyses summarized in Table 1 above used the APA criteria as a quality control. The RCTs performed subsequent to the meta-analyses and reported in this paper are not evaluated against the APA criteria because no statistical analysis of their results has been performed and because a primary goal of this review is to make the entire evidence base easily available and comprehensible to clinicians.

EFT as an empirically validated treatment

Having defined Clinical EFT and identified the set of standards upon which measurement of efficacy is based, we can now examine the evidence base for the method. The first group of EFT studies performed were outcome studies. Outcome studies use experimental designs that highlight participant outcomes, asking the question "Are participants better off after treatment?" We examine studies demonstrating the efficacy of Clinical EFT for:

- Psychological conditions such as PTSD, phobias, depression, and anxiety;
- Physiological problems such as pain and autoimmune conditions; and
- Performance in sports, business, and academic pursuits.

We also summarize the key research on the physiological mechanisms of action of Clinical EFT, showing how EFT works in the body to effect change. These studies, rather than measuring whether treatment benefits patients, ask the questions characteristic of basic science, such as "How does this treatment work?" and "What is changing in the body as a result of this treatment?"

The final group of studies reviewed investigates EFT's application to performance issues such as business and sports performance. We also examine the evidence for whether EFT's somatic component, tapping with the fingertips on acupressure points, is an inert placebo or an active ingredient in the results obtained.

As shown in Figure 1, we use the "hierarchy of evidence" model, which places meta-analyses and systematic reviews at the top of a pyramid of evidence (Feinstein, 2021). In the tier below these come RCTs and then uncontrolled outcome studies. Below these are clinical case studies, systematic observations, anecdotal reports, and theory papers.

To provide a measure of clinical significance and show the magnitude of the effect of EFT treatment, we use the Cohen's *d* or Hedge's *g* statistic. On this scale a score of 0.2 indicates an observable treatment effect, 0.5 a moderate effect, and 0.8 a large effect.

In cases where important studies were published after the date of a meta-analysis, we catalog them to bring the evidence base current. We also note whether meta-analyses were performed by proponents of EFT or by independent statisticians with no stated conflict of interest. If a paper was written by proponents, but the statistician was independent, that distinction is clarified.

Finally, we derive the meaning of this whole body of work and extend it to show the next steps in EFT research and clinical practice. These include extending its accessibility through apps, its applicability to personalized medicine, the use of new technologies such as virtual reality (VR) and artificial intelligence (AI), the analysis of the huge datasets made available by apps, the accessibility advantages of video treatment, the utility of online and virtual courses, and Clinical EFT's widespread adoption in primary care.

Replications

Studies that explicitly set out to replicate earlier studies are highlighted. There has been a great deal of discussion in the research community about the "replication crisis" in science (Kaiser, 2017). Shortly after the turn of this century, the multinational biotech company Amgen set out to replicate 53 "landmark" studies on which it planned to base its next generation of cancer drug development. The company was able to replicate only six. An analysis in the journal *Nature* characterized this "a shocking result" (Begley and Ellis, 2012). Another pharma company, Bayer, had similar results. An attempt to replicate five cancer biology trials was successful for only two (eLife, 2017; Kaiser, 2017).

The paucity of replicable results is similar in the social sciences. An international group of 270 investigators set out to

replicate 100 studies published in 2008 in three top psychology journals. They found that they were able to replicate fewer than half of them (Open Science Collaboration, 2015).

The journal *Nature* also conducted a survey of 1,576 researchers to identify their experiences with replication. It found that over 70% of them had failed when attempting to reproduce another scientist's research findings. Over half could not even replicate their own research (Baker, 2016).

For this reason, we identify studies that were explicitly designed as replications or extensions of earlier research and note similarities and differences between the findings of the replications and the original studies.

Methods

Systematic review procedure

For this systematic review, the fourth author conducted searches in three online databases: PsychINFO, Medline/Pubmed, and EBSCO Essentials. Search terms limited the results to peer-reviewed English-language professional journals. The search terms "EFT," "Emotional Freedom Technique" (singular), and "Emotional Freedom Techniques" (plural) were used. Allied and hybrid methods such as Thought Field Therapy (TFT) and Spiritual EFT (SEFT) were excluded.

We ranked studies using the "hierarchy of evidence" approach (Feinstein, 2021). Where a meta-analysis that included RCTs was available, no RCTs included in that meta-analysis were included in our results, only RCTs published after that date.

To satisfy the inclusion criteria based on the aims of the review, two initial searches were conducted of the PsychINFO and PubMed databases on April 25, 2022, followed by a third database (EBSCO) on April 28, 2022. The PsychINFO and PubMed searches used the following terms: ((EFT) OR (Emotional Freedom Technique) OR (Emotional Freedom Techniques)) NOT (Thought Field Therapy) NOT (Spiritual EFT). Results were filtered by "Meta-Analysis, Randomized Controlled Trial, Systematic Review, Validation Study, English" in PubMed, resulting in 187 articles and "English Language, Peer Reviewed Journal" in PsychINFO, resulting in 3,830 articles. The latter EBSCO Essentials search, using the term "Emotional Freedom Technique" filtered by "Academic (Peer-Reviewed) Journals, English" and conducted as a title search, resulted in 150 articles. A checklist comparing the reporting of this systematic review with the standards of the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) Statement is available as a Supplementary File.

The final results returned a total of 4,167 studies for consideration. After removing duplicates and ineligible studies, abstract and in-text screening was performed. The reference lists of included studies were manually reviewed by the fourth author for additional studies. This resulted in a final total of 139 studies, 56 of which were RCTs. Of these, 41 had been published subsequent to the available meta-analyses. Where uncertainty about including a study existed, the other three authors were consulted until consensus had been reached.

Many studies of EFT have been conducted in non-English-speaking countries. A systematic review of these, conducted in October 2021, identified 91 studies published in non-English-language journals (Freedom et al., 2022). While the inclusion criteria for the current investigation excluded this body of literature, it is noteworthy that EFT is being investigated in many different parts of the world other than English-speaking countries.

Results

Psychological health outcome studies

Clinical EFT has met APA standards as an "efficacious" treatment for a number of conditions, including anxiety, depression, phobias, and PTSD (Church et al., 2018b). Meta-analyses of EFT for anxiety, depression, and PTSD are available. The methodology of some of these encompasses only RCTs. Others use RCTs for the primary analysis but also examine the data from uncontrolled outcome studies in a secondary analysis. Since RCTs are just below meta-analyses in the hierarchy, the sections on mental health outcomes focus on these. Occasionally, a study of particular interest that is not an RCT is described if it is particularly relevant to clinicians. Each section begins with a description of the meta-analysis if one is available for that condition. Where no meta-analyses or RCTs for a condition are available, we describe illustrative studies further down the hierarchy.

Anxiety

An independent meta-analysis of EFT for anxiety was published in 2016 (Clond, 2016). Its literature review included all anxiety RCTs published up through the end of 2015 and it used the APA standards as a quality control screen. It identified 14 studies ($N = 658$). It found a "large" treatment effect size, with a Cohen's $d = 1.23$ ($p < 0.001$). Control therapies included Progressive Muscular Relaxation (PMR), Diaphragmatic Breathing (DB), and Cognitive Behavior Therapy (CBT). The effect size for the combined controls was 0.41 ($p = 0.001$), indicating that EFT produced superior treatment effects.

Among the populations studied in the 14 trials were veterans with PTSD, students suffering from presentation anxiety and test anxiety, gifted children, hospital patients, subjects with specific phobias, fibromyalgia patients, and weight loss program participants. Treatment time frames ranged from one to six sessions. Follow-ups demonstrated that participant gains were durable. Clond (2016) noted that a limitation of the meta-analysis was the small number of studies comparing EFT to a

TABLE 2 Anxiety RCTs included in Clond (2016) meta-analysis.

S.R.No.	References	Population	Assessment tool	EFT (*n*) and sessions	Control/s (*n*) and sessions	dEFT – dctrl (95% CI)	*p*
1	Baker and Siegel (2010)	31 people with specific phobia	FQ, DSM-IV	($n = 11$) One 45-min session	1. NT ($n = 10$) 2. Interview ($n = 10$) 1 Interview session	0.83 (−0.26–1.92) 0.91 (−0.18–2.00)	$p = 0.136$ $p = 0.102$
2	Brattberg (2008)	86 women with fibromyalgia (>50% with anxiety)	HADS	($n = 26$) 1/day for 8 weeks	WL ($n = 36$)	0.49 (−0.06–1.04)	$p = 0.083$
3	Church et al. (2013)	59 veterans with PTSD	SA-45	($n = 30$) 6 sessions	TAU ($n = 29$)	1.52 (0.81–2.23)	$p < 0.001$*
4	Church et al. (2016)	21 subclinical PTSD veterans	SA-45	($n = 12$) 6 sessions	TAU ($n = 9$)	1.18 (0.04–2.32)	$p = 0.043$*
5	Church et al. (2012c)	83 nonclinical subjects (Almost 50% with anxiety)	SA-45	($n = 28$) One 1-h session	1. NT ($n = 27$) 2. Interview ($n = 28$) One 1-h supportive Interview session	1.34 (0.66–2.02) 0.71 (0.00–1.42)	$p < 0.001$* $p = 0.049$*
6	Fox (2013)	20 undergraduate students	AEQ	($n = 10$) One 40-min session	Modified EFT ($n = 10$) 1 session	0.47 (−0.55–1.49)	$p = 0.366$
7	Gaesser and Karan (2017)	63 gifted children	RCMAS-2, IQ score	($n = 20$) 3 sessions	1. WL ($n = 21$) 2. CBT ($n = 21$) 3 sessions	(0.18–2.02) 0.23 (−0.79–1.25)	$p = 0.019$* $p = 0.658$
8	Geronilla et al. (2016)	58 veterans with PTSD	SA-45	($n = 32$) 6 sessions	TAU ($n = 26$)	2.3 (1.38–3.22)	$p < 0.001$*
9	Jain and Rubino (2012)	40 undergraduate students	WTAS, SA-45	($n = 11$) 1 session	1. WL ($n = 23$) 2. DB ($n = 6$) 1 session	0.45 (−0.36–1.26) −0.73 (−2.42–0.96)	$p = 0.275$ $p = 0.396$
10	Karatzias et al. (2011)	46 NHS psychotherapy referrals with PTSD	HADS, DSM-IV	($n = 23$) Four 1-h sessions/individual	EMDR ($n = 23$) Four 1-h sessions/individual	−0.28 (−1.16–0.60)	$p = 0.531$
11	Salas et al. (2011)	22 students meeting criteria for phobic response to specific stimulus	BAI, SUD	($n = 11$) One session with five 2-min round of tapping	DB ($n = 11$) One session with five 2-min round of DB	0.37 (−0.63–1.37)	$p = 0.468$
12	Sezgin and Özcan (2009)	32 students with test anxiety	TAI	($n = 16$) 1 session	PMR ($n = 16$) 1 session	1.81 (0.10–3.52)	$p = 0.038$*
13	Stapleton et al. (2013)	96 overweight patients (>50% with anxiety)	SA-45	($n = 48$) One session/week for 4 weeks	WL ($n = 48$) NT for 4 weeks and then had EFT.	0.27 (−0.12–0.66)	$p = 0.177$
14	Wells et al. (2003)	35 participants with specific phobias	FQ, DSM-IV	($n = 18$) 1 session	DB ($n = 17$) 1 session	1.64 (0.48–2.8)	$p = 0.006$*

*Significant results. AEQ, Achievement Emotions Questionnaire; BAI, Beck Anxiety Inventory; CBT, Cognitive Behavior Therapy; DB, Diaphragmatic Breathing; DSM-4, Diagnostic and Statistical Manual of Mental Disorders, 4th edition; EMDR, Eye Movement Desensitization and Reprocessing; FQ, Fear Questionnaire; HADS, Hospital and Anxiety Depression Scale; NHS, National Health Service; NT, no treatment; PCL-M, PTSD Checklist–Military; PMR, Progressive Muscular Relaxation; RCMAS-2, Revised Children's Manifest Anxiety Scale−2; SA-45, Symptom Assessment−45; SUD, Subjective Units of Distress; TAI, Test Anxiety Inventory; TAU, treatment as usual; WL, wait-list; WTAS, Westside Test Anxiety Scale. Sr. No., systematic review number.

known effective treatment such as CBT. Table 2 shows the RCTs included in the meta-analysis.

Subsequent to the meta-analysis, several noteworthy new studies of anxiety have been published. An RCT of PTSD in female survivors of gender violence in the Congo assessed anxiety and depression as secondary measures, and also compared EFT to CBT (Nemiro and Papworth, 2015). Participants received two 2–1/2 h group treatment sessions per

week for four consecutive weeks. Assessments occurred before and after treatment, and 6 months later. Follow-up showed that participants maintained their gains over time whether treated with EFT or CBT. The investigators used the Hopkins Symptom Checklist−25 (Derogatis et al., 1974), which includes 25 items, 15 for depression and 10 for anxiety. However, they did not report anxiety and depression separately, instead interpreting the overall score as a measure of general mental health.

After six sessions in a veterans' RCT (Church, 2014), there was a significant reduction in anxiety ($p < 0.0001$) and these gains were maintained at follow-up, after 6 months ($p < 0.0001$).

An RCT with 76 nursing students compared EFT to Breathing Therapy (BT). Both therapies were found to be effective, but the treatment effect size for EFT ($d = 3.18$) was significantly greater than that for BT ($d = 1.46$; Dincer et al., 2020). BT was also the control for an RCT of 120 pregnant women (Vural and Aslan, 2019). It found that those in the EFT group demonstrated significantly greater ability to release the pain and fear associated with labor.

Somatic anxiety and psychological anxiety were evaluated in an RCT of 50 women awaiting surgery. They received two 10-min EFT sessions, one on the day prior to surgery and the second session on the day of surgery. Anxiety scores in the EFT group dropped from 27.28 (±2.47) to 7.60 (±2.00) and were highly statistically significant ($p < 0.0001$; Thomas et al., 2017). An RCT examined the changes in anxiety levels in 60 nursing students (Inangil et al., 2020). EFT and Music Therapy (MT) were compared to a no-treatment control. It found that both EFT and MT decreased anxiety levels and that there was no statistically significant difference between their effects.

An RCT performed in India (Jasubhai and Mukundan, 2018) screened patients for stress, anxiety, depression, short-term memory, and psychophysiological coherence. Those who presented with clinical levels were randomized into two groups and given eight weekly sessions of either EFT or CBT. Follow-ups were performed after 6 weeks, 5 weeks, 1 month, and 6 months. EFT treatment produced marked improvement in depression after three sessions. After 8 weeks of intervention, the CBT group reported significant improvement ($p < 0.05$) in depression and short-term memory, while the EFT group showed significant improvement ($p < 0.05$) in depression at the 1- and 6-month follow-up points. Examination of individual cases showed clinically significant improvements in stress, anxiety, depression symptoms, short-term memory, and psychophysiological coherence across both interventions. The results are consistent with a previous study (Chatwin et al., 2016) of which the Indian study was designed as a replication.

EFT was compared to Systematic Desensitization (SD) in 16 students with high levels of public speaking anxiety (Madoni et al., 2018). The RCT concluded that both treatments were effective. However, when measured by the average result and the effect of time, the EFT decreased anxiety more than SD. The longer the duration of EFT treatment, the more anxiety decreased (pretest, $p < 0.01$; posttest, $p < 0.001$; follow-up, $p < 0.01$).

Another assessed the anxiety levels of 83 patients in treatment for obesity. It compared two 8-week programs, one EFT and the second using CBT. The CBT group did not demonstrate any significant changes in anxiety scores over time. In the EFT group, anxiety decreased significantly, and participant gains were maintained at 6- and 12-month follow-up (Stapleton et al., 2017).

In an RCT with a population of 63 high-ability students aged 10–18, EFT was also compared to CBT. They received three individual sessions with one of the two modalities. A waitlist served as control. The effect size for EFT was large, with $d = 0.74$. CBT participants also showed reductions in anxiety but did not differ significantly from the EFT or control groups (Gaesser and Karan, 2017).

In an RCT for test anxiety in Turkish nursing students preparing for their clinical exam, both music therapy (MT) and EFT led to a decrease in anxiety scores ($p < 0.05$; Inangil et al., 2020). An RCT by Kwak et al. (2020) studied anxiety in Hwabyung patients using EFT and Progressive Muscle Relaxation (PMR). Hwabyung is a psychosomatic diagnosis used in Korea to identify the suppression of anger over an extended period. It is associated with increased incidence of cancer, hypertension, and other major diseases. Patients received 4 weeks of group sessions with either EFT or PMR. Follow-ups were performed at 4 and 24 weeks. Both the EFT ($n = 15$) and PMR group ($n = 16$) demonstrated decreased Hwabyung symptoms (−13.95 and −11.46%, respectively) and state anxiety (−12.57 and −12.64%, respectively). Similarly, in an RCT measuring aggression in single mothers (Abdi and Abolmaali, 2015), symptoms were reduced after six EFT sessions ($p < 0.01$).

In a German RCT (König et al., 2019) where the treatment given to anxiety patients was either EFT or PMR, anxiety levels on the NAS scale dropped significantly in the total sample from pre to posttest ($p = 0.001$). This reduction could be shown in both intervention groups when calculating t-tests within both groups (EFT, $p = 0.033$; PMR, $p = 0.013$).

An Australian RCT with 168 chronic pain participants (Stapleton, 2022), which provided EFT as both online and face-to-face treatment, showed significant reduction in anxiety from pre to 6 months ($p < 0.001$). An RCT by Dincer et al. (2020) investigated the efficacy of a brief online EFT session in the prevention of stress, anxiety, and burnout among nurses involved in the treatment of COVID patients. It was conducted in the COVID department of a university hospital in Turkey and was designed using the Consolidated Standards of Reporting Trials (CONSORT) guidelines. Reductions in anxiety reached high levels of statistical significance for the intervention group ($p < 0.001$). The control group showed no statistically significant changes ($p > 0.05$).

TABLE 3 Anxiety RCTs published since the Clond (2016) meta-analysis.

S. No.	References	Population	Instrument	EFT (*n*) and sessions	Control(s) (*n*) and sessions	*p* (EFT)
1	Church (2014)	59 veterans with PTSD	SA-45	($n = 30$) 6 sessions	WL ($n = 29$) NT	$p \leq 0.0001$ (at both pretest and 6 month follow-up)
2	Nemiro and Papworth (2015)	50 female survivors of sexual gender violence in Congo	HTQ, HSC-25	($n = 25$) Two 2.5 h group treatment/week for 4 weeks	CBT ($n = 25$) 2 group treatments/week for 4 weeks	No significant difference between EFT and CBT
3	Chatwin et al. (2016)	10 community members with MDD	DASS-21	($n = 6$) 1 session/ week for 8 weeks	CBT ($n = 4$) 1 session/week for 8 weeks Community sample ($n = 57$)	$p = 0.871$ (same as CBT) $p = 0.005$ (compared to Community)
4	Thomas et al. (2017)	50 women awaiting surgery	MHARS	($n = 25$) Two 10-min sessions +TAU	Control group, TAU ($n = 25$)	Anxiety scores ($p < 0.0001$), Psychological and somatic anxiety scores ($p < 0.002$)
5	Stapleton et al. (2017)	83 overweight or obese adults	PHQ	($n = 51$) 1 session/week for 8 weeks	CBT ($n = 34$) 1 session/week for 8 weeks	6 and 12 month follow-up $p = 0.001$ and $p < 0.001$. No significant changes in CBT group at 6 and 12 months
6	Gaesser and Karan (2017)	63 high-ability students aged 10–18 yrs	RCMAS-2	($n = 20$) 3 sessions	CBT ($n = 21$) 3 sessions WL ($n = 21$)	Compared to WL: $p = 0.005$ Compared to CBT: $p = 0.18$
7	Jasubhai and Mukundan (2018)	10 community members with MDD	DASS-21	($n = 10$) 8 sessions	1. CBT ($n = 10$) 8 sessions 2. Control group ($n = 57$)	Pre and post EFT DASS-21 anxiety: $p = 0.02$
8	Inangil et al. (2020)	120 nursing students with situational anxiety	SAS and TVSF	($n = 30$) One 20-min session	Breathing exercise ($n = 30$) One 20-min session Music therapy ($n = 30$) One 20-min session Control group ($n = 30$) 20-min free time	$p < 0.05$
9	Madoni et al. (2018)	16 students with high levels of public speaking anxiety	PRPSA	($n = 8$) 2 group sessions	Systematic Desensitization ($n = 8$) 2 group sessions	Pretest ($p < 0.01$) Posttest ($p < 0.001$) Follow-up ($p < 0.01$)
10	Vural and Aslan (2019)	120 pregnant women with pain and fear associated with labor	SUD, WDEQ (version B)	($n = 35$) 15-min demo followed by 9 EFT sessions with each pregnant woman	1. Breathing Awareness (BA) ($n = 35$) 10-min demo followed by women doing BA on their own as long as they wanted 2. Control group ($n = 50$)	Group score difference ($p < 0.001$)
11	Stapleton et al. (2019c)	282 people with food cravings and obesity	PHQ	($n = 145$, at end of 12 months) 1 online group session/week for 8 weeks	Wait-list control group ($n = 137$) NT	Anxiety score after 8 weeks $p = 0.012$ 12 mo postintervention $p < 0.001$
12	Dincer et al. (2020)	78 nursing students with public speaking anxiety	SUD, STAI, Speech Anxiety Scale	($n = 25$) 1 session with 3 rounds of tapping, 3 min each	Breathing therapy ($n = 26$) *One* instructional session with practice Control group ($n = 25$) NT	$p < 0.001$

(Continued)

TABLE 3 (Continued)

S. No.	References	Population	Instrument	EFT (*n*) and sessions	Control(s) (*n*) and sessions	*p* (EFT)
13	Inangil et al. (2020)	90 nursing students with test anxiety	SAS and TVSF	($n = 30$) 1 session with 3 rounds of tapping, 3 min each	1. Music therapy ($n = 30$) 15 min 2. Control group ($n = 30$) NT	$p < 0.05$
14	Baghini et al. (2020)	60 male PTSD patients with anxiety	SGLVJAI	($n = 15$) Six 60-min sessions	EMDR ($n = 15$) Six 45-min sessions CBT ($n = 15$) Six 60-min sessions Control group ($n = 15$) NT	$p < 0.02$
15	Kwak et al. (2020)	31 Hwabyung patients	TSH, VAS-HS, BDI, STAI and STAXI	($n = 15$) 4 group sessions	PMR ($n = 16$) 4 group sessions	$p < 0.05$
16	Dincer and Inangil (2020)	72 nurses caring for COVID-19 patients	STAI-SAS, SUD, BI	($n = 35$) 1 guided online group session	NT control group ($n = 37$)	$p < 0.001$
17	Abdi and Abolmaali (2015)	30 single mothers with high aggression	AAT	($n = 15$) 12 EFT sessions	NT control group ($n = 15$)	$p < 0.01$
18	König et al. (2019)	22 anxiety patients	NAS score	($n = 9$) One 60-min session	PMR ($n = 13$) One 60-min session	Pre to posttest EFT $p = 0.033$ PMR $p = 0.013$
19	Stapleton (2022)	168 chronic pain patients	PHQ	($n = 91$) 6-week live facilitator led ($n = 90$) Self-paced online program	WL for live group ($n = 45$) WL for self paced ($n = 50$) WL group was later given EFT	Pre to 6-month $p < 0.001$

AAT, Abolmaali Aggression Test; BDI-2, Beck Depression Inventory, 2nd edition; BI, Burnout Inventory; CBT, Cognitive Behavior Therapy; DASS-21, Depression, Anxiety, and Stress Scale−21; HSC-25, Hopkins Symptom Checklist−25; HTQ, Harvard Trauma Questionnaire; ICD-10, International Classification of Diseases 10th revision; MDD, Major Depressive Disorder; MHARS, Modified Hamilton Anxiety Rating Scale; NAS, Numeric Analog Scale; NT, no treatment; PHQ, Patient Health Questionnaire; PMR, Progressive Muscular Relaxation; PRPSA, Personal Report of Public Speaking Anxiety; RCMAS-2, Revised Children's Manifest Anxiety Scale−2; SAS, Situational Anxiety Scale; SGLVJAI, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs's Anxiety Inventory; STAI, State-Trait Anxiety Inventory; STAI-SAS, State-Trait Anxiety Inventory–State Anxiety Scale; STAXI, State-Trait Anger Expression Inventory; SUD, Subjective Units of Distress; TAU, treatment as usual; TSH, The Hwabyung Scale; TVSF, The Vital Signs Form; VAS-HS, Visual Analog Scale of Hwabyung Symptoms; WDEQ, Wijma Delivery Expectancy/Experience Questionnaire.

Table 3 shows RCTs published between the date of the Clond (2016) meta-analysis and April 2022.

Three studies that are not RCTs deserve mention. The development of smartphone apps has presented new opportunities for gathering data. The dominant EFT app is called the Tapping Solution. Between October 2018 and October 2019, data were gathered from 270,461 app users (Church et al., 2020a). It was found that across 12 tapping meditations targeting anxiety and stress, users reported a 44% reduction in symptoms ($p < 0.001$). This study illustrates the power of smartphone data collection, which allows the participation of hundreds of thousands of participants, as well as the efficacy of EFT when practiced in this format.

The second uncontrolled study took the form of a "service evaluation" in a clinic in Britain's National Health Service (Boath et al., 2014a). It examined patient acceptance of EFT as well as EFT's success in reducing symptoms. It identified a significant improvement in anxiety, with a mean treatment time frame of eight sessions. It also found a significant improvement in overall psychological health and physical functioning. This is one of a number of studies applying EFT in primary care settings.

The final study is also not an RCT but worth mentioning because it is the study most often cited by EFT's critics. Waite and Holder (2003) compared EFT to two sham tapping interventions and a non-tapping control group. One control group tapped on points not specified in the EFT protocol. The second tapped on a doll. Statistically significant improvements were found in all three tapping groups but not in the control group. The authors concluded that because those who tapped on other points or the doll improved, "certain components of EFT were effective, but not dependent on meridian points as EFT supporters contend." They interpreted their findings to mean: "It is possible that systematic desensitization and distraction are mediators of EFT's apparent effectiveness" (p. 24).

The study suffered from a number of design limitations, however. It was not randomized (APA Criterion #1). It failed to use valid and reliable assessments (APA Criterion #4), failed to apply EFT with fidelity to the manual (APA criterion #6), and failed to recognize that the "sham" points chosen

were in fact actual acupressure points (APA criterion #6). Reappraisals of the study have pointed out that the results can be interpreted to support the efficacy of tapping, because the "sham" points selected by the investigators were in some cases actual acupuncture points (Pasahow, 2010; Church, 2013a). It is also noteworthy that all three tapping groups improved, while the non-tapping group did not.

A Canadian survey asked students about their recommendations for reducing stress and anxiety while enhancing coping skills (Ledger, 2019). It found that 67% of students recommended that EFT be taught in schools; 63% indicated they could benefit from learning EFT in smaller groups, and 33% indicated they would be interested in having one-on-one assistance from a counselor using EFT. Gaesser (2020) recommends formal training in EFT for stress and anxiety management for students and staff in school settings.

Since the publication of the anxiety meta-analysis (Clond, 2016), six RCTs comparing EFT to CBT have been performed, as was called for at the conclusion of the meta-analysis. Overall, these demonstrate that EFT and CBT have similar treatment effect sizes for anxiety. The number of sessions required for successful remediation of anxiety with EFT is small. When a subsequent meta-analysis including the new studies is performed, a statistical comparison between CBT and EFT will be available. Taken as a whole, these findings provide empirical support for EFT as a primary treatment for anxiety.

Depression

In 2016, an independent team conducted a meta-analysis of studies performed from 2005 to 2015 that evaluated the use of EFT to alleviate depression (Nelms and Castel, 2016). They identified 20 studies: 12 RCTs with 398 participants and 8 outcome studies with 461 participants. Depressive symptoms were compared at three different intervals: postintervention, follow-up in <90 days, and follow-up in more than 90 days. Like Clond (2016), they noted that relatively few studies compared EFT to other established treatments. They came to the following conclusions: EFT was more efficacious than DB and supportive interview (SI) in posttest measurements ($p = 0.06$ vs. DB, $p < 0.001$ vs. SI) and sleep hygiene education (SHE) at follow-up ($p = 0.036$). No significant treatment effect difference between EFT and EMDR was found. EFT was superior to treatment as usual (TAU) and efficacious in treatment time frames ranging from one to 10 sessions. The mean of symptom reductions across all studies was −41%. Cohen's d across all studies was 1.31, indicating a large treatment effect, with little difference between randomized controlled trials and uncontrolled outcome studies. Effect sizes at posttest, <90 and >90 days were 1.31, 1.21, and 1.11, respectively, indicating durable maintenance of participant gains. Table 4 shows the RCTs included in the Nelms and Castel (2016) meta-analysis. Note that the columns do not match the format of the other tables because of the way the analysis was performed, assessing outcomes at different time points.

TABLE 4 Depression RCTs included in Nelms and Castel (2016) meta-analysis.

S.R.No.	References	Population	Analytical sample size	Instrument	Pre vs. post % change (%)	Posttest effect size d	Posttest effect size SE (d)	Pre and posttest p-value	Posttest effect size p (d)
1	Brattberg (2008)	Fibromyalgia patients	330	HADS	−29	0.62	0.26	$p = 0.02$	0.02
2	Church et al. (2013)	Veterans with PTSD	49	SA-45	−58	8.02	0.78	$p = 0.001$	<0.001
3	Church and Brooks (2014)	Veterans at risk of PTSD	18	SA-45	−47	3.11	0.68	$p = 0.001$	<0.001
4	Church et al. (2012c)	Nonclinical subjects	28	SA-45	−49	1.12	0.29	$p = 0.001$	<0.001
5	Chatwin et al. (2016)	Patients with MDD	96	SA-45	−23	0.28	0.22	$p = 0.01$	0.21
6	Karatzias et al. (2011)	NHS psychotherapy referrals	23	HADS	−28	0.69	0.39	$p = 0.001$	0.08
7	Lee et al. (2013)	Senior insomnia patients	10	GDS-K	−60	1.41	0.41	$p = 0.005$	<0.001
8	Church et al. (2012a)	Psychology students	9	BDI	−74	7.57	1.29	$p \leq 0.05$	<0.001
9	Geronilla et al. (2016)	Veterans with PTSD	58	SA-45	−48	1.93	0.3	$p = 0.001$	<0.001
10	Church and Nelms (2016)	Adults with frozen shoulder	16	SA-45	−44	0.88	0.37	$p = 0.001$	0.02
11	Church et al. (2018c)	Veterans	16	SA-45	−38	0.9	0.36	$p = 0.001$	0.01
12	Stapleton et al. (2013)	Overweight and obese adults	45	SA-45	−21	0.37	0.23	$p = 0.001$	<0.001

Weighted effect size—RCTs = 1.8498. BDI, Beck Depression Inventory; GDS-K, Geriatric Depression Scale in Korea; HADS, Hospital and Anxiety Depression Scale; MDD, Major Depressive Disorder; NHS, National Health Service; SA-45, Symptom Assessment−45. Sr. No., systematic review number.

Since the depression meta-analysis (Nelms and Castel, 2016), eight RCTs have been published. Four of these compare EFT to CBT and one to PMR.

An early study comparing EFT to CBT for Major Depressive Disorder (Chatwin et al., 2016) and a replication of this study (Jasubhai and Mukundan, 2018) revealed that both treatment approaches produced significant reductions in depressive symptoms. In the former, the CBT group reported a significant reduction postintervention, but this was not maintained over time. The EFT group reported a delayed effect involving a significant reduction in symptoms at the 3- and 6-month follow-ups only. Examination of the individual cases revealed clinically significant improvements in anxiety across both interventions. In the replication, EFT treatment produced marked improvement in depression symptoms after three sessions. EFT showed significant results within a month, compared to 8 weeks for CBT (Jasubhai and Mukundan, 2018).

TABLE 5 Depression RCTs published since the Nelms and Castel (2016) meta-analysis.

S.R.No.	References	Population	Instrument	EFT (*n*) and sessions	Control/s (*n*) and sessions	*p*
1	Kwak et al. (2020)	31 Hwabyung patients	THS, VAS-HS, BDI, STAI, STAXI	($n = 15$) 4 group sessions	PMR ($n = 16$) 4 group sessions	$p < 0.05$
2	Jasubhai and Mukundan (2018)	10 community members with MDD	DASS-21, BDI-2	($n = 10$) 8 sessions	1. CBT ($n = 10$) 8 sessions 2. Control group ($n = 57$)	Pre and post EFT DASS-21 anxiety: $p = 0.02$ BDI-2: $p = 0.008$
3	Chatwin et al. (2016)	10 community members with MDD	BDI-2, DASS-21	($n = 6$) 1 session/week for 8 weeks	CBT ($n = 4$): 1 session/week for 8 weeks Community sample ($n = 57$)	$p = 0.871$ (same as CBT) $p = 0.005$ (compared to Community)
4	Mehdipour et al. (2021)	88 menopausal women	BDI-2	($n = 44$) Self-participatory EFT 1/day for 8 weeks	Sham therapy ($n = 44$) Self-participatory sham acupressure points 1/day for 8 weeks	$p < 0.001$
5	Stapleton et al. (2019c)	314 people with food cravings and obesity	PHQ	($n = 145$, at end of 12 months) 1 online session/week for 8 weeks	Wait-list control group ($n = 137$) NT	Anxiety score after 12 months postintervention $p < 0.001$
6	Stapleton et al. (2017)	83 overweight or obese adults	PHQ	($n = 51$) 1 session/week for 8 weeks	CBT ($n = 34$) CBT: 1 session/week for 8 weeks	Both EFT and CBT at postintervention $p = 0.097$
7	Church (2014)	59 veterans with PTSD	SA-45	($n = 30$) 6 sessions	WL ($n = 29$) NT	$p \leq 0.0001$ (at both pretest and 6 month follow-up)
7	Nemiro and Papworth (2015)	50 female survivors of gender violence	HTQ, HSC-25	($n = 25$) Two 2.5-h group treatment/week for 4 weeks	CBT ($n = 25$) 2 group treatments/week for 4 weeks	Both treatments had the same effect
8	Stapleton and Stewart (2020)	83 (49 for EFT) in-person and 314 online participants with food cravings	PHQ	In-person ($n = 49$) One 2 h session/week for 8 weeks	Online EFT ($n = 314$) Eight 2-h sessions split into 65 online modules designed to be accessed over 8 weeks	$p < 0.001$
10	Stapleton (2022)	168 chronic pain patients	PHQ	($n = 91$) 6-week live facilitator led ($n = 90$) Self-paced online program	WL for live group ($n = 45$) WL for self paced ($n = 50$) WL group was later given EFT	Pre to post $p < 0.001$ Pre to 6-month $p < 0.001$

BDI, Beck Depression Inventory; BDI-2, Beck Depression Inventory, second edition; CBT, Cognitive Behavior Therapy; DASS-21, Depression, Anxiety, and Stress Scale−21; HSC-25, Hopkins Symptom Checklist−25; HTQ, Harvard Trauma Questionnaire; MDD, Major Depressive Disorder; PHQ, Patient Health Questionnaire; PMR, Progressive Muscular Relaxation; STAI, State-Trait Anxiety Inventory; STAXI, State-Trait Anger Expression Inventory; THS, The Hwabyung Scale; VAS-HS, Visual Analog Scale of Hwabyung Symptoms. Sr. No., systematic review number.

In a Korean study comparing EFT and PMR, both EFT ($n = 15$) and PMR ($n = 16$) improved depression, with scores dropping further in the EFT group (−32.11 vs. −18.68%; Kwak et al., 2020). An Iranian study of the effect of EFT on depression in postmenopausal women (Mehdipour et al., 2021) showed that mean scores reduced in comparison to the control group ($p = 0.001$). At the end of 8 weeks, 63.4% of participants in the intervention group and 34.15% of controls were below the diagnostic threshold for depression ($p < 0.001$). The authors recommended using EFT in public health centers for postmenopausal women.

Secondary psychological outcomes, including depression, were evaluated in a trial comparing EFT to CBT in the treatment of food cravings (Stapleton et al., 2017). For EFT, preintervention to postintervention measured $p = 0.017$ with this improvement maintained at 6- and 12-month follow-ups ($p = 0.016$ and $p = 0.116$, respectively). There was no significant difference between groups at 12-month follow-up, indicating that depressive symptomatology for both EFT and CBT had reduced to the level of a nonclinical control group.

Several weight loss studies have delivered the EFT intervention online. In a 2-year follow-up to a trial for food cravings, the EFT group showed reduced depression (−12.3%) as a secondary outcome (Stapleton et al., 2019b). Pairwise comparisons revealed that symptoms decreased significantly from pre to posttest, from pre to 6-month follow-up ($p < 0.001$), and from pre to 12 months ($p = 0.001$). The chronic pain study mentioned above (Stapleton, 2022) showed significant reduction in depression from pre to post as well as pre to 6 months ($p < 0.001$).

After six sessions in a veterans' RCT (Church, 2014), there was a significant reduction in depression ($p < 0.0001$) and these gains were maintained at follow-up, after 6 months ($p < 0.0001$).

The study of Congolese survivors of sexual violence by Nemiro and Papworth (2015) described earlier used a general measure of mental health and did not report the 15 items of its depression component separately. It found similar effects for EFT and CBT.

Table 5 summarizes RCTs published since the Nelms and Castel (2016) meta-analysis.

A noteworthy conclusion of the depression meta-analysis (Nelms and Castel, 2016) was that participant outcomes after EFT treatment were "equal or superior" to TAU and other active treatment controls. The posttest effect size for EFT ($d = 1.31$) was "larger than that measured in meta-analyses of antidepressant drug trials and psychotherapy studies." The authors further noted that "EFT produced large treatment effects whether delivered in group or individual format, and participants maintained their gains over time" (p. 416). EFT may thus be regarded as a robust evidence-based treatment for depression.

Phobias

Three RCTs have been conducted for specific phobias such as fear of spiders, small animals, or heights. They are summarized in Table 6. The earliest study showed that the Clinical EFT protocol, including the tapping component, was more successful at reducing anxiety associated with a specific phobia ($p < 0.005$) than a control protocol that replaced tapping and EFT's cognitive reframing statement with DB (Wells et al., 2003).

A replication and extension by Baker and Siegel (2010) assessed whether such findings reflected (a) nonspecific factors common to many forms of psychotherapy; (b) a methodological artifact such as regression to the mean, fatigue, or the passage of time; and/or (c) therapeutic ingredients specific to EFT. Using a carefully prepared design, it found that the effects noted in Wells et al. (2003) were due to EFT and not to experimental artifacts.

A second study designed explicitly as a partial replication of Wells et al. (2003) also used DB as a control intervention (Salas et al., 2011). It found that EFT significantly reduced

TABLE 6 Phobia RCTs.

S.R.No.	References	Population	Instruments	EFT (n) and sessions	Control(s) (n) and sessions	p
1	Wells et al. (2003)	35 participants with specific phobia	FQ, DSM-4	($n = 18$) One 45-min session	DB ($n = 17$) One 30-min session	$p < 0.005$
2	Baker and Siegel (2010)	31 participants with specific phobia	FQ, DSM-4	($n = 11$) One 45-min session	1. NT ($n = 10$) 2. Interview ($n = 10$) 1 interview session	$p = 0.136$ $p = 0.102$
3	Salas et al. (2011)	22 students with specific phobia	BAT, SUD, BAI	($n = 11$) Two rounds of EFT tapping, 5 min each	DB ($n = 11$) One session with five 2-min round of DB ($n = 17$)	Phobia related anxiety BAI: $p = 0.042$ SUD: $p = 0.002$ Ability to approach feared stimulus BAT: $p = 0.046$

BAI, Beck Anxiety Inventory; BAT, Behavioral Approach Test; DB, Diaphragmatic Breathing; DSM-4, Diagnostic and Statistical Manual of Mental Disorders, 4th edition; FQ, Fear Questionnaire; NT, no treatment; SUD, Subjective Units of Distress. Sr. No., systematic review number.

specific phobia-related anxiety ($p = 0.042$) and the ability of participants to approach the feared stimulus ($p = 0.046$).

The two independent replications of the initial phobia study by Wells et al. (2003) provides strong empirical support for EFT's efficacy for phobias.

König et al. (2019) performed an RCT comparing EFT to PMR and measuring brain activity for responses during fear stimuli using EEG. The study authors posit that if the emotional experience of fear is elicited by anger rather than fearful stimuli, it is plausible that tapping alters the processing of these stimuli, as their reframing is an important part of the tapping intervention. Consequently, the Late Positive Potential (an important component in Explicit Recognition Memory) might decrease.

PTSD

An independent meta-analysis using the APA criteria for quality control identified seven RCTs (Sebastian and Nelms, 2017). It concluded that EFT is efficacious and reliable as a treatment for PTSD in time frames ranging from four to 10 sessions. The effect size resulting from treatment was extremely large, with $d = 2.98$. No treatment effect difference was found in studies comparing EFT to other evidence-based therapies such as EMDR and CBT, though like the anxiety and depression meta-analyses, a limited number of studies (one for each of these two methods) was available for comparison. The authors concluded that EFT is safe and effective, can be used as a self-help practice, and is applicable to heterogeneous populations. Table 7 shows the RCTs included in the Sebastian and Nelms meta-analysis.

More recently, a second independent team undertook a systematic review and network meta-analyses of psychological and psychosocial interventions for children and young people with PTSD (Mavranezouli et al., 2019) and for adults (Mavranezouli et al., 2020). The former included 32 trials of 17 interventions involving 2,260 participants and the latter included 90 trials, 6,560 individuals, and 22 interventions. The study included interventions such as trauma-focused CBT (TF-CBT), EMDR, and talk therapy. In the 2019 study, EFT proved to be one of the two most effective therapies in reducing PTSD symptoms at the treatment endpoint, while it demonstrated the second best results with Standard Mean Difference (SMD) = −1.69 in the 2020 study. The investigators noted the positive evidence for EFT. However, they also considered its limited evidence base beyond the treatment endpoint and recommended EMDR and TF-CBT as the two therapies with the greatest evidence bases.

The earlier meta-analysis by Sebastian and Nelms (2017) included a study of the effects of EFT treatment on veterans with PTSD (Church et al., 2013), as well as a replication of this study (Geronilla et al., 2016). In the initial study ($N = 59$), after six treatment sessions, and a 6 month follow-up period, 90% of the participants no longer qualified for a clinical diagnosis of PTSD (Church et al., 2013). The replication ($N = 58$) found similar treatment effects (Geronilla et al., 2016).

The outcomes of the two studies were remarkably similar. After treatment, 90% of participants in the initial study and 96% of those in the replication had dropped below the diagnostic threshold for PTSD. The mean scores on the PTSD assessment used dropped from 64 to 37 in the initial study and from 65 to 34 in the replication. Significant reductions in other forms of psychological distress were significant in both the first trial ($p = 0.0012$) and the second ($p = 0.001$). On long-term follow-up, 86% of participants in the initial study and 95% in the replication no longer met the PTSD diagnostic criteria. The meta-analysis also included a study of veterans at risk for PTSD because of heightened symptom levels. Performed by the same research team as the first PTSD study, it used methodology identical to the above two trials. Symptom declines were similar (Church et al., 2016). Two replications thus confirmed the results of the initial study (Church et al., 2013).

The data from the initial PTSD trial (Church et al., 2013) were reanalyzed to examine the efficacy of EFT when delivered by life coaches vs. licensed mental health professionals (Stein and Brooks, 2011). It found larger reductions in symptoms in veterans treated by licensed practitioners, though the difference did not rise to the level of statistical significance. A second reanalysis compared phone to in-person treatment (Hartung and Stein, 2012). While in-person treatment was significantly superior, nonetheless 67% of those treated by phone no longer met the diagnostic criteria for PTSD at a 6-month follow-up. These analyses indicate the utility of EFT when delivered over the telephone and by practitioners with basic levels of training.

The meta-analysis also included an extension of these studies. While analyzing the psychological symptoms of veterans, it also measured the physiological effects of treatment. Gene expression as well as other physiological markers were examined. EFT was found to produce epigenetic effects, with upregulation of genes associated with improved immunity and the control of inflammation (Church et al., 2018c). Though it had not yet been published, data from this study had been reported at the time of the meta-analysis, so it was included. It thus appears in Table 7 rather than Table 8, which shows the PTSD RCTs published since the meta-analysis.

A second RCT of EFT for PTSD has been reported since the date of the Sebastian and Nelms (2017) meta-analysis and appears in Table 8. In a comparison of EFT and Narrative Exposure Therapy (NET), both EFT and NET demonstrated efficacy (Al-Hadethe et al., 2015). Participants were 60 secondary school students aged 16–19 years who met the criteria for PTSD defined in the *Diagnostic and Statistical Manual of Mental Disorders,* fourth edition (DSM-IV). Between pre and posttest, both treatments produced improvements in variables such as anxiety, reexperience, and avoidance behavior. However, EFT also led to statistically significant improvements in depression

TABLE 7 PTSD RCTs included in Sebastian and Nelms (2017) meta-analysis.

S.R.No.	References	Population	Instruments	EFT (*n*) and sessions	Control(s) (*n*) and sessions	Cohen's *d* (95% CI) and/or *p*-value
1	Karatzias et al. (2011)	46 NHS patients with PTSD	CAPS, PCL-C, HADS	($n = 23$) Four 1-h sessions/individual	EMDR ($n = 23$) Four 1-h sessions/individual	PCL: 1.08 (0.38–1.73) Anxiety: 1.11 (−0.41–1.77) Depression:0.69 (−0.02–1.32)
2	Church et al. (2012b)	16 institutionalized teenage boys	SUD, IES	($n = 8$) 1 session	WL ($n = 8$) NT	Intrusive memories −3.95 (2.26–5.63) Avoidance: 6.89 (4.31–9.47) IES total: 8.07 (5.11–11.03)
3	Church et al. (2013)	59 veterans with PTSD	SA-45, PCL-M	($n = 30$) Six 1-h sessions	WL (SOC/NT) ($n = 29$)	PCL: 1.93 (1.28–2.58) Psychological distress ($p < 0.0012$) Anxiety: 1.36 (0.77–1.95) PTSD symptom level $p < 0.0001$ Depression: 1.76 (1.13–2.39)
4	Geronilla et al. (2016)	58 veterans with PTSD	SA-45, ISI, PCL-M	Six 1-h sessions ($n = 32$)	WL ($n = 26$) TAU	PCL: 3.06 (2.30–3.82) Anxiety: 1.55 (0.96–2.14) Depression: 1.65 (1.06–2.25)
5	Church et al. (2018c)	16 veterans with PTSD	SA-45, HADS, ISI, BPI, PCL-M	($n = 8$) Ten 1-h sessions	WL ($n = 8$) TAU	PCL: 2.18 (1.25–2.99) PTSD symptoms $p < 0.00001$ Anxiety: 0.78 (0.04–1.47) Significant differential expression of six genes was found ($p < 0.05$) Depression:0.89 (0.15–1.60)
6	Church et al. (2016)	21 veterans at risk of PTSD	SA-45, ISI, PCL-M	($n = 12$) Six 1-h sessions	WL($n = 9$) TAU	PCL: 6.63 (4.44–8.81) Anxiety: 3.64 (2.24–5.04) Depression: 4.32 (2.76–5.89)
7	Nemiro and Papworth (2015)	50 female survivors of gender violence	HTQ, HSCL	($n = 25$) Two 2.5-h group sessions/week for 4 weeks	CBT ($n = 25$) 2 group treatments/week for 4 weeks for 4 weeks	HSCL: 1.26 (0.61–1.87) HTQ: 2.29 (1.51–2.99)

BPI, Brief Pain Inventory; CAPS-5, Clinician-Administered PTSD Scale for DSM-5; CBT, Cognitive Behavior Therapy; EMDR, Eye Movement Desensitization and Reprocessing; HADS, Hospital and Anxiety Depression Scale; HSCL, Hopkins Symptom Checklist; HTQ, Harvard Trauma Questionnaire; IES, Impact of Event Scale; ISI, Insomnia Severity Index; NHS, National Health Service; NT, no treatment; PCL-C, PTSD Checklist–Civilian; PCL-M, PTSD Checklist–Military; SA-45, Symptom Assessment−45; SUD, Subjective Units of Distress; TAU, treatment as usual; WL, wait-list. Sr. No., systematic review number.

and hyperarousal. The effect sizes for EFT were greater than for NET. While participant gains were durable in the EFT group on 3-, 6-, and 12-month follow-up, they were unstable for NET. Table 8 does not include the Babamahmoodi et al. (2015) RCT with veterans, because while anxiety and other mental health issues were measured, PTSD was not.

There are two outcome studies that are not RCTs that are worth examining for their clinical implications. At Fort Hood, the largest military base in the US, EFT as well as other complementary therapies were available to traumatized warriors through the Warrior Combat Stress program for 7 years, 2008–2015. Treatment outcomes were analyzed for 764 service members who attended a 3-week program between 2008 and 2013 (Libretto et al., 2015). The investigators identified significant declines in PTSD, anxiety, depression, and pain (all $p < 0.001$).

The second study examined PTSD symptoms in veterans and their spouses attending one of six 7-day retreats ($n = 218$). The investigators hypothesized that social support could provide a useful adjunct to EFT and other complementary therapies.

TABLE 8 PTSD RCT published since Sebastian and Nelms (2017) meta-analysis.

S.R.No.	References	Population (verification tool)	Instrument	EFT sessions	Control(s)	*p*
1	Al-Hadethe et al. (2015)	60 male Iraqi students with PTSD	Scale of Posttraumatic Stress Syndromes	4 sessions ($n = 20$)	Narrative Exposure Therapy ($n = 20$) 4 sessions Control group ($n = 20$) NT	Pretest and posttest from T1 to T2 $p > 0.05$

DSM-4, Diagnostic and Statistical Manual of Mental Disorders, 4th edition; NT, no treatment. Sr. No., systematic review number.

At the start of the retreats, 83% of veterans and 29% of spouses met the PTSD diagnostic criteria. By the end of the 7 days, only 28% of veterans and 4% of spouses were still in the clinical range (Church and Brooks, 2014). Follow-up results were similar, with spousal symptom levels dropping even further. When each of the six retreats was analyzed independently, as though it were a small study in and of itself, the downward slope of symptoms was similar to that observed in the aggregated statistics.

Other studies find EFT effective for PTSD in a variety of populations. These include motor vehicle accident survivors (Swingle et al., 2004), business owners (Church and House, 2018), victims of sexual assault (Anderson et al., 2019), Haitian earthquake survivors (Gurret et al., 2012), Congolese gender violence victims (Nemiro and Papworth, 2015), adolescents (Church et al., 2012b), civilian survivors of war (Boath et al., 2014b), and earthquake survivors (Rahmi, 2012).

In a study gathering survey responses from 448 EFT practitioners who had experience treating clients with PTSD, 65% stated that more than 60% of PTSD clients are fully rehabilitated, and 89% of practitioners stated that fewer than 10% of clients make little or no progress (Church et al., 2017). The authors of the meta-analysis concluded that EFT "can be used both on a self-help basis and as a primary evidence-based treatment for PTSD" (p. 16). The evidence accumulated since the publication of the meta-analysis augments the body of literature supporting EFT's status as an empirically based treatment for a wide variety of traumatized populations.

Physiological issues—Somatization, pain, physical symptoms, weight loss, insomnia, gene expression, autoimmune conditions, hormones, and cravings

The first decade after the turn of the current century witnessed extensive measurement of the psychological improvements produced by EFT. The subsequent decade produced increased investigation of EFT's physiological dimensions. The results of these studies are presented below. A meta-analysis is available for only one, somatic symptoms, therefore trials lower down the hierarchy of evidence are presented for the others.

Somatic symptoms

A meta-analysis examined EFT's effect on somatic symptoms (Stapleton et al., 2021). Using the Cochrane Collaborative procedure and filtering studies through the APA criteria for quality control, eight RCTs ($n = 640$) were identified. Upon analysis, the effect size pre-post EFT was found to be $d = -1.09$, indicating a large treatment effect (95% CI, −1.217 to −0.964, $p < 0.001$). These results are presented in Table 9. The essential characteristics of those studies not qualifying for the meta-analysis appear in Table 10.

The meta-analysis used the somatization scale employed in its component studies. Other trials have examined a variety of physiological markers other than somatization. A 2019 outcome study sought to elucidate EFT's mechanisms of action across the central nervous system (CNS) by measuring heart rate variability (HRV) and heart coherence (HC); the circulatory system using resting heart rate (RHR) and blood pressure (BP); the endocrine system using cortisol; and the immune system using salivary immunoglobulin A (SigA). Posttest, significant declines were found in pain (−57%), and cravings (−74%), all $p < 0.00$. Happiness increased (+31%, $p = 0.000$), as did SigA (+113%, $p = 0.017$). Significant improvements were found in RHR (−8%, $p = 0.001$), cortisol (−37%, $p < 0.000$), systolic BP (−6%, $p = 0.001$), and diastolic BP (−8%, $p < 0.000$). Positive trends were observed for HRV and HC and gains were maintained on follow-up, indicating EFT results in positive health effects as well as increased mental wellbeing (Bach et al., 2019).

A key early RCT examined EFT's effects on the stress hormone cortisol (Church et al., 2012c). It found that in a single session, psychological symptoms dropped twice as much in an EFT group as in groups either resting or engaging in a talk therapy session. Cortisol dropped significantly more. A direct

TABLE 9 Somatization RCTs included in the Stapleton et al. (2021) meta-analysis.

S.R.No.	References	Population	Instrument	Control(s)	Results type	Cohen's *d***	*p*
1	Stapleton et al. (2020b)	53 nonclinical adults	SA-45	Psychoeducation ($n = 17$) One 60-min session NT ($n = 17$)	Pre/post EFT***	−0.16	$p = 0.60$
					Post EFT vs. post control	0.11	$p = 0.72$
2	Stapleton et al. (2019c)	282 overweight adults	PHQ	WL ($n = 137$)	Pre/post EFT	−0.48	$p < 0.0001$*
					Post EFT vs. post control	0.46	$p = 0.0002$*
					Post to 6-month follow-up	−5.18	$p < 0.0001$*
3	Stapleton et al. (2017)	83 overweight adults	PHQ	CBT ($n = 34$) 1 session/week for 8 weeks	Pre/post EFT	−0.36	$p = 0.068$
					Post EFT vs. post control	0.35	$p = 0.10$
					Post to 6-month follow-up	0.3	$p = 0.14$
4	Geronilla et al. (2016)	58 veterans with PTSD	SA-45	Standard care ($n = 26$)	Pre/post EFT	−1.5	$p < 0.0001$*
					Post EFT vs. post control	1.18	$p = 0.0001$*
					Post to 6-month follow-up	0.22	$p = 0.41$
5	Church et al. (2018c)	16 veterans with PTSD	SA-45	Standard care ($n = 8$)	Pre/post EFT	−0.055	$p = 0.628$
					Post to 6-month follow-up	0.11	$p = 0.89$
6	Church et al. (2016)	21 veterans at risk of PTSD	SA-45	Standard care ($n = 9$)	Pre/post EFT	−3.23	$p < 0.0001$*
					Post EFT vs. post control	2.93	$p < 0.0001$*
					Post to 6-month follow-up	1.54	$p = 0.001$*
7	Church et al. (2013)	59 veterans with PTSD	SA-45	Standard care ($n = 29$)	Pre/post EFT	−6.71	$p < 0.0001$*
					Post EFT vs. post control	5.32	$p < 0.0001$*
					Post to 6-month follow-up	0.84	$p = 0.002$*
8	Church et al. (2012c)	83 nonclinical adults	SA-45	Psychoeducation ($n = 28$) One 50-min session	Pre/post EFT	−1.2	$p < 0.0001$*
					Post EFT vs. post control	1.15	$p = 0.0001$*

*Significance $p < 0.05$. **Cohen's *d*: small, $d = 0.2$, medium, $d = 0.5$, and large, $d = 0.8$. ***follow-up was 1 h only, therefore no data available. CBT, Cognitive Behavior Therapy; NT, no treatment; PHQ, Patient Health Questionnaire; SA-45, Symptom Assessment−45; WL, wait-list. Sr. No., systematic review number.

TABLE 10 RCTs of EFT studies on somatic symptoms not included in the Stapleton et al. (2021) meta-analysis.

S.R.No.	References	Population	Instrument	EFT (*n*) and sessions	Control/s (*n*) and sessions	*p* (EFT)
1	Tack et al. (2021)	121 cancer survivors with cognitive impairment	CFQ	($n = 59$) 8 weeks EFT + 8 weeks observation	WL ($n = 62$) Received EFT after 8 weeks	$p < 0.01$
2	Cici and Özkan (2021)	162 patients with lumbar disc herniation	PIF, LFF, SUD, STAI-S	($n = 54$) 30 min	Music group ($n = 54$) 30 min Control group ($n = 54$) NT	$p < 0.05$
3	Babamahmoodi et al. (2015)	28 chemically pulmonary injured veterans	GHQ, SGRQ	($n = 14$) 8-week group session	WL control group ($n = 14$) No treatment but received EFT program after second evaluation	Somatic symptoms: $p = 0.02$ Frequency and severity of respiratory symptoms: $p < 0.001$
4	Ghaderi et al. (2021)	50 women with multiple sclerosis	FSS	($n = 25$) 2 sessions/week for 4 weeks	Placebo tapping on non-acupuncture points ($n = 25$) 2 sessions/wk for 4 weeks	Fatigue severity after 4 weeks $p < 0.001$

CFQ, Cognitive Failures Questionnaire; FSS, Fatigue Severity Scale; GHQ, General Health Questionnaire; LFF, Life Findings Form; PIF, Patient Information Form; SGRQ, Saint George Respiratory Questionnaires; STAI-S, State and Trait Anxiety Scores; SUD, Subjective Units of Distress; WL, wait-list. Sr. No., systematic review number.

replication of this study was undertaken (Stapleton et al., 2020b). The EFT group experienced a decrease in cortisol greater than in the original study (−43.24%, $p < 0.05$). This was superior to that of a control psychoeducation group (−19.67%), as well as a no treatment (NT) group (2.02%).

Studies have also shown that EFT is associated with epigenetic effects. A PTSD study referenced previously (Church et al., 2018c) found regulation of six genes associated with inflammation and immunity. A pilot study comparing an hour-long EFT session with placebo in four nonclinical participants found differential expression in 72 genes (Maharaj, 2016). These included genes associated with the suppression of cancer tumors, protection against ultraviolet radiation, regulation of type 2 diabetes insulin resistance, immunity from opportunistic infections, antiviral activity, synaptic connectivity between neurons, synthesis of both red and white blood cells, enhancement of male fertility, building white matter in the brain, metabolic regulation, neural plasticity, reinforcement of cell membranes, and the reduction of oxidative stress.

As part of the meta-analysis (Stapleton et al., 2021), the investigators also examined the studies of EFT for physical conditions other than somatization but found the heterogeneity among them to be too large to combine for analysis. We thus must rely on the individual studies to present an evaluation of EFT's physiological effects.

An RCT compared cognitive function in cancer survivors. The experimental group received EFT for 16 weeks and was compared to a WL group. After treatment, less than half those in the EFT group scored positive for cognitive impairment compared to controls (4.8 vs. 87.3% respectively; $p < 0.01$). Linear mixed model analyses indicated a statistically significant reduction in cognitive impairment scores and also in distress, depressive symptoms, and fatigue. Quality of life improved (Tack et al., 2021).

In an RCT conducted with patients hospitalized for surgical treatment of lumbar disc herniation, EFT and MT were determined to remediate participants' state anxiety and subjective discomfort ($p < 0.001$). EFT significantly reduced pulse and respiratory rates, as well as systolic blood pressure, while MT significantly lowered both diastolic and systolic blood pressure ($p < 0.05$). Further analyses showed that EFT was more effective for state anxiety and reducing respiratory rate than MT (Cici and Özkan, 2021).

Ghaderi et al. (2021) conducted an RCT measuring effect of EFT on the severity of fatigue among women with multiple sclerosis (MS). The investigators identified a significant decrease in symptoms, both immediately after treatment, and 4 weeks after the intervention ($p < 0.001$). An RCT was conducted with a population of chemically pulmonary injured veterans (Babamahmoodi et al., 2015). Veterans injured with chemical weapons encounter many stressors such as chronic respiratory problems, as well as war-induced psychological and physical problems that affect their health, immunity, and quality of life. In this population, EFT improved mental health ($p = 0.000$) and health-related quality of life ($p = 0.001$). Treatment was associated with decreased somatic symptoms ($p = 0.02$), anxiety/insomnia ($p < 0.001$), social dysfunction ($p < 0.001$), and frequency and severity of respiratory symptoms ($p < 0.001$).

The authors of the meta-analysis concluded: "Clinical EFT is effective in reducing somatic symptoms in a variety of populations and settings. As a fast-acting, patient-applied, non-pharmacological and evidence-based method, EFT is recommended in primary settings for somatoform disorders" (Stapleton et al., 2021, p. 1). The results of the RCTs not included in the meta-analysis, as well as the uncontrolled outcome studies,

support this conclusion. The literature demonstrates that EFT is an effective, evidence-based primary intervention for treating somatic symptoms.

Many physical symptoms have responded favorably to EFT treatment. A study comparing EFT to DB among participants with frozen shoulders (Church and Nelms, 2016) showed that both groups improved after treatment, but only the EFT group maintained their gains over time (47% reduction in symptoms, $p < 0.001$). Large treatment effects were found, with a Cohen's $d = 0.9$ for anxiety and pain. Reductions in psychological distress were associated with reduced pain as well as with improved range of motion.

In women suffering from fibromyalgia, pain catastrophizing measures such as rumination ($p < 0.001$), magnification ($p = 0.006$), and helplessness ($p < 0.001$) were significantly reduced and their activity level significantly increased ($p = 0.001$) posttest (Brattberg, 2008). A study of patients with tension headaches performed at the Red Cross Hospital in Athens found that the frequency and intensity of their headaches dropped by more than half after EFT ($p < 0.001$), and other physical symptoms improved (Bougea et al., 2013). In a study of 39 business executives using EFT as a group (Church and David, 2019), pain was reduced by 41% and cravings relating to food and drink reduced by 50%.

Apart from the previous studies, several other studies on pain (Church and Brooks, 2010; Church, 2014; Ortner et al., 2014), obesity (Stapleton et al., 2012, 2016a), traumatic brain injury (Church and Palmer-Hoffman, 2014), and seizure disorders (Swingle, 2010) have demonstrated the ability of EFT to treat a disparate range of physiological conditions.

Pain

Stress and pain are related. When psychological stress is reduced by treatment, reductions in physical pain are often noted. Many EFT studies have assessed pain as a primary or secondary outcome measure. These are summarized in Table 11.

Brattberg's 2008 RCT of women with fibromyalgia found significant reductions in three dimensions of pain using the Pain Catastrophizing Scale. These were rumination ($p < 0.001$), magnification ($p = 0.006$), and helplessness due to pain ($p < 0.001$). The same study reported increased levels of activity on the Chronic Pain Acceptance Questionnaire ($p = 0.001$).

Veterans were also found to experience significant drops in physical pain after EFT ($p < 0.0001$; Church, 2014), and when PTSD was remediated, symptoms of traumatic brain injury (TBI) reduced by 41% after three sessions ($p < 0.0021$; Church and Palmer-Hoffman, 2014). Participant gains were maintained on 3- and 6-month follow-up ($p < 0.0006$). The study of patients with frozen shoulder summarized above also found reductions in pain (Church and Nelms, 2016), as did the study of tension headache sufferers (Bougea et al., 2013).

An RCT for chronic pain (Stapleton, 2022) delivered EFT in two formats: self-paced (online) and facilitator-led (delivered live online due to COVID). Participants ($N = 168$) were randomly allocated to either option or WL. Pain was significantly less from baseline (pre) to 6-month follow-up ($p < 0.001$). A significant positive correlation was found between the ACE (adverse childhood experience) score and Pain Interference scores, somatic symptoms, anxiety symptoms, and depressive symptoms. As the ACE score increased, so did these other variables. Similarly, a negative correlation was found between the ACE score and Quality of Life (QoL). As the ACE score increased, QoL decreased. QoL improved (pre to 6 months, $p < 0.001$) as pain reduced.

An RCT of Turkish nursing students with premenstrual syndrome (PMS; Bakir et al., 2021) found improvements in depression, fatigue, nervousness, sleep-related changes, swelling, and other PMS symptoms ($p < 0.05$).

The Geronilla et al. (2016) replication study of Church et al. (2013) showed reduction in pain symptoms and this was maintained at 6-month follow-up ($p < 0.001$). In the Church et al. (2018c) study of the epigenetic results of Clinical EFT treatment, the severity of conditions commonly noted as sequelae to traumatic stress, including pain, declined, suggesting a general stress reduction effect ($p = 0.009$). However, in the study of subclinical veterans at risk of PTSD (Church et al., 2016), changes in pain were not significant ($p = 0.835$).

A number of uncontrolled studies merit mention due to their clinical significance. Pain was significantly reduced by 41% and cravings relating to food and drink dropped by 50% in an uncontrolled study of 39 business executives using EFT as a group during a daylong workshop (Church and David, 2019). A study of 216 health care workers identified a 68% reduction in physical pain ($p < 0.001$; Church and Brooks, 2010).

Ortner et al. (2014) observed significant improvements in pain severity, interference, life control, affective distress, and dysfunction, with pain catastrophizing dropping significantly over the course of a 3-day workshop (−42%, $p < 0.001$). Stapleton et al. (2016b) offered a brief intensive 4-h treatment protocol to participants in a persistent pain program and found a significant decrease in the severity (−12.04%, $p = 0.044$) and impact (−17.62%, $p = 0.008$) of pain.

The Scandinavian Association for the Study of Pain has shown evidence of the relationship between physical pain and anxiety and stress (Curtin and Norris, 2017). The research presented above provides clear evidence of EFT's ability to reduce pain reliably and quickly. It is effective when delivered in a variety of formats, in both clinical settings and as self-help, and in brief treatment time frames.

Physical symptoms

Studies show that EFT's effects are measurable in physical symptoms other than pain (see Table 12). This includes psychoimmunological factors, blood sugar, quality of life,

TABLE 11 RCTs measuring pain as a primary or secondary outcome.

S.R.No.	References	Population	Instruments	EFT (*n*) and sessions	Control/s (*n*) and sessions	*p* or *d* or %
1	Church and Nelms (2016)	47 participants with frozen shoulder	MPRS	($n = 16$) 1 individual 30-min Clinical EFT session	DB ($n = 18$) 1 individual 30-min session WL control group ($n = 13$)	Pain EFT: posttest $p = 0.003$ Follow-up $p = 0.004$ Pain DB: posttest $p = 0.004$ Follow-up $p = 0.018$
2	Bougea et al. (2013)	35 tension headache sufferers	SFQ-36 (One of the variables in this questionnaire is body pain)	($n = 19$) Twice a day for 2 months	Standard care ($n = 16$) TAU	$p = 0.008$
3	Brattberg (2008)	62 fibromyalgia patients	SFQ-36 (One of the variables in this questionnaire is body pain), PCS, CPAQ	($n = 26$) 8 weeks	WL ($n = 36$)	Body pain $p = 0.20$ Rumination ($p < 0.001$), Magnification ($p = 0.006$), and Helplessness due to pain ($p < 0.001$)
4	Stapleton (2022)	168 chronic pain patients	PCS, CPAQ	($n = 91$) 6-week live facilitator led Self-paced online program ($n = 90$)	WL for live group ($n = 45$) WL for self paced ($n = 50$) WL group was later given EFT	Pain severity and Pain Interference pre to post $p < 0.001$ Pre to 6-month $p < 0.001$
5	Church (2014)	59 veterans with PTSD	MPRS	($n = 30$) 6 sessions	WL ($n = 29$) NT	−41%, $p < 0.0001$
6	Bakir et al. (2021)	50 nursing students with PMSS	PMSS	($n = 25$) Self EFT participation for 3 menstrual cycles	WL ($n = 25$) NT	$p < 0.05$
7	Geronilla et al. (2016)	58 veterans with PTSD	MPRS	($n = 32$) 6 sessions	WL ($n = 26$) TAU	$p < 0.001$
8	Church et al. (2018c)	16 veterans with PTSD	BPI-PS, BPI-PI	($n = 8$) 1 session/week for 10 weeks	WL ($n = 8$) TAU	BPI-PS at posttest $p = 0.025$ and 6 mo $p = 0.188$ BPI-PI at posttest $p = 0.009$ and 6 mo $p = 1$
9	Church et al. (2016)	21 veterans at risk of PTSD	MPRS	($n = 12$) 1-h sessions/week for 6 weeks	WL ($n = 9$) TAU	$p = 0.835$

BPI-PI, Brief Pain Inventory–Pain Interference; BPI-PS, Brief Pain Inventory–Pain Scale; CPAQ, Chronic Pain Acceptance Questionnaire; DB, Diaphragmatic Breathing; GHQ, General Health Questionnaire; GSES, General Self-Efficacy Scale; GSI, Global Severity Index; HADS, Hospital and Anxiety Depression Scale; MHLCS, Multidimensional Health Locus of Control Scale; MPRS, Matheson Pain Rating Scale; NT, no treatment; PCS, Pain Catastrophizing Scale; PMSS, Premenstrual Syndrome Scale; PSS, Perceived Stress Scale; SA-45, Symptom Assessment−45; SFQ-36, Short-Form Questionnaire−36; SGRQ, Saint George Respiratory Questionnaires; SOC, standard of care; SUD, Subjective Units of Distress; TAU, treatment as usual; WL, wait-list. Sr. No., systematic review number.

perceived stress, cortisol salivary levels, seizures, and certain autoimmune conditions.

The Babamahmoodi et al. (2015) study mentioned in other sections indicated decreased social dysfunction ($p < 0.001$) and frequency and severity of respiratory symptoms ($p < 0.001$). This test also used the Lymphocyte Transformation Test (LTT), which measures lymphocyte proliferation in response to stimuli. The greater the proliferation, the more effective the immune response. Post EFT tests showed increased lymphocyte proliferation with nonspecific mitogens concanavalin A (Con A; $p = 0.001$), phytohemagglutinin (PHA; $p = 0.002$), and peripheral blood interleukin 17 (IL-17; $p = 0.006$).

In an investigation of EFT's effectiveness in diabetic patients' blood sugar control (Hajloo et al., 2014), 30 diabetic patients with high blood sugar and HbA1c > 6 were randomly classified into an EFT treatment group and non-treatment group. The study concluded that EFT is associated with a reduction of blood sugar levels (Fob:7.24>Fcr:4.22). Significant differences were

TABLE 12 RCTs assessing other physical symptoms.

S.R.No.	References	Population	Instrument	EFT (n) and sessions	Control/s (*n*) and sessions	Results
1	Babamahmoodi et al. (2015)	28 chemically pulmonary injured veterans	Immunological tests	($n = 14$) Eight 90-min weekly group sessions and 2 times daily home practices	WL control group ($n = 14$)	1. Increased lymphocyte proliferation a. Con A ($p = 0.001$) b. PHA ($p = 0.002$)| c. Peripheral blood IL-17 ($p = 0.006$) 2. Reduced severity of respiratory symptoms ($p < 0.001$) 3. Decreased social dysfunction ($p < 0.001$),
2	Hajloo et al. (2014)	30 diabetic patients with high blood sugar and HbA1c>6	HbA1C	($n = 15$) 12 sessions across 3 months	NT ($n = 15$)	Fob:7.24 > Fcr:4.22
3	Bougea et al. (2013)	35 patients with tension-type headache	MHLCS	($n = 19$) Twice a day for 2 months	NT control group $n = 16$	Improved physical functioning ($p = 0.005$)
4	Brattberg (2008)	26 women with fibromyalgia	SF-36, HQ, GSE	($n = 26$) 8 weeks *via* internet	WL ($n = 36$)	Role-physical: ability to manage daily life with physical impairment ($p = 0.001$)

Con A, concanavalin A; GSE, General Self-Efficacy scale; HbA1c, test measuring sugar level in hemoglobin A1c; HQ, Health Questionnaire; IL-17, interleukin 17; MHLCS, Multidimensional Health Locus of Control Scale; NT, no treatment; PHA, phytohemagglutinin; SF-36, Short-Form−36 questionnaire; WL, wait-list. Sr. No., systematic review number.

found after EFT intervention in the Bougea et al. (2013) RCT with tension-type headache patients, particularly in physical functioning ($p = 0.005$), role limitations due to physical health ($p = 0.001$), energy/fatigue ($p = 0.001$), and general health ($p = 0.002$), except for social functioning ($p = 0.082$).

In the RCT with fibromyalgia patients (Brattberg, 2008), those who practiced EFT reported increased activity levels and their ability to manage daily life with physical impairment improved ($p = 0.001$) in comparison to the wait-list group.

Apart from the RCTs listed above, there are a few studies that provide useful clinical indicators. A study measuring the effect of EFT on psoriasis (Hodge and Jurgens, 2011) showed significant improvement in psychological, emotional, and physical symptoms. Assessments indicated improvements in psoriasis symptoms (−49.05%; $p = 0.001$) and functioning (−58.31%; $p = 0.001$) posttest, as well as a decrease in emotional distress (−41.56%, $p = 0.002$). In conjunction with the fibromyalgia and MS studies, this suggests that Clinical EFT can moderate the symptoms of autoimmune conditions.

A service evaluation assessed EFT for improving mood, menopausal symptoms, and fatigue in women with breast cancer receiving hormonal therapies (Baker and Hoffman, 2014). At both 6 and 12 weeks, statistically significant improvements were found in both mood ($p = 0.005$, $p = 0.008$) and fatigue ($p = 0.008$, $p = 0.033$). Improved results in seizure disorders (Swingle, 2010) as well as clinical case histories of dyslexia (McCallion, 2012) and TBI (Craig et al., 2009) are suggestive of a range of conditions for which EFT's stress-reduction ability can provide relief.

Hypotheses about why a psychological and energy treatment like EFT is effective for a heterogeneous group of physiological ailments range from the technique's capacity to rapidly reduce stress levels (Lane, 2009; Church et al., 2012c) to its postulated strengths in facilitating the adaptive processing of emotional information (Feinstein, 2015). However, EFT cannot yet be considered an evidence-based treatment for the physiological conditions listed above because of the small number of well-designed RCTs available and the lack of independent replications.

Insomnia

Six RCTs have examined the effect on insomnia after EFT treatment (see Table 13). The veterans' PTSD study referenced previously (Church et al., 2013) found a significant improvement in insomnia scores, with mean values dropping from the clinical to the subclinical range ($p < 0.001$). It also showed significant correlations ($p < 0.03$) between insomnia and anxiety ($r = 0.40$), depression ($r = 0.41$), interpersonal sensitivity ($r = 0.29$), and the Global Severity Index (GSI; $r = 0.32$). The replications of that study identified similar effects. The RCT of pulmonary-impaired Iranian veterans also identified decreased insomnia ($p < 0.001$;

TABLE 13 RCTs measuring insomnia as a primary or secondary outcome.

S.R.No.	References	Population	Instruments	EFT (n) and sessions	Control/s (n) and sessions	p (EFT)
1	Church et al. (2018c)	16 veterans with PTSD	ISI	($n = 8$) 1 sessions/week for 10 weeks	TAU ($n = 8$)	$p = 0.005$ after 10 sessions
2	Church et al. (2016)	21 veterans at risk of PTSD	ISI	($n = 12$) 6 sessions + TAU	WL group: ($n = 9$) TAU	$p = 0.004$
3	Church et al. (2013)	59 veterans with PTSD	ISI	($n = 30$) 6 sessions	SOC/WL ($n = 29$)	ISI noted $p < 0.0001$ at 6-month follow-up
4	Babamahmoodi et al. (2015)	28 chemically pulmonary injured veterans	GHQ and Immunological tests	($n = 14$) Eight 90-min weekly group sessions + 2 times daily home practices	WL control group ($n = 14$)	Anxiety/insomnia $p < 0.001$
5	Lee and Kim (2015)	20 senior insomnia patients	GDS-K	($n = 10$) Eight 1-h group EFT sessions twice a week for 4 weeks	Sleep Hygiene Education (SHE) ($n = 10$) 8 sessions	No significant difference between EFT and SHE in PSQI score (5-week $p = 0.818$ and 9-week $p = 0.047$). SS scores: 5th week ($p = 0.040$) 9th week ($p = 0.010$)
6	Souilm et al. (2022)	60 elderly insomnia patients	PSQI	($n = 30$) Eight 1-h group EFT sessions twice a week for 4 weeks	Sleep Hygiene Education ($n = 30$) 8 sessions	$p = 0.005$

GDS-K, Geriatric Depression Scale in Korea; GHQ, General Health Questionnaire; ISI, Insomnia Severity Index; ISS, Insomnia Severity Scale; PSQI, Pittsburgh Sleep Quality Index; SS, Sleep Scale; SOC, standard of care; TAU, treatment as usual; WL, wait-list. Sr. No., systematic review number.

Babamahmoodi et al., 2015). Reduction of insomnia was noted in veterans at risk of PTSD ($p = 0.004$; Church et al., 2016) as well as in the epigenetic study described previously ($p = 0.005$; Church et al., 2018c).

A pilot study of 10 geriatric patients noted a similar reduction in insomnia, along with decreases in anxiety and depression and an increase in life satisfaction (Lee et al., 2011). This led to an RCT conducted with 20 participants that compared EFT to an active control, Sleep Hygiene Education (SHE; Lee et al., 2013). It demonstrated significant reductions in depression and insomnia in both treatment groups, with EFT superior to SHE.

However, a second RCT comparing EFT to SHE found that while both were effective for insomnia, SHE was superior (Souilm et al., 2022). After the intervention, 73.3% of the EFT group had good sleep quality, compared to 100.0% in the SHE group ($p = 0.005$). The median score for depression was lower in the SHE group ($p < 0.001$) while there was no difference in life satisfaction.

Insomnia was also assessed in an RCT of a stress management program offered to lawyers from the Athens Bar Association (Christina et al., 2016). While it found significant reductions in both quality of sleep and insomnia symptoms, it is not included in Table 13 because it combined a variety of methods, so the results were not due solely to EFT.

Insomnia is related to stress and to the regulation of the autonomic nervous system. The improvements found in the RCTs in Table 13 demonstrate a robust association between a reduction in stress symptoms following EFT treatment and decreases in insomnia.

Weight loss, cravings, and binge eating

Numerous RCTs have examined the use of EFT for weight loss and food cravings, summarized in Table 14. Among adolescents, EFT is an effective treatment strategy for increasing healthy eating behaviors, self-esteem, and compassion, as well as improving associated weight-related psychopathology (Stapleton et al., 2016c). It has demonstrated effects comparable with CBT in the treatment of food cravings among obese adults (Stapleton et al., 2017). In a study of a 6-week online EFT program, significant improvements were found for body weight ($p < 0.001$), behaviors to restrain eating ($p = 0.025$), and the association of food with reward ($p = 0.018$). Participant weight decreased an average of 1 pound per week during the course and 2 pounds per month between pretest and 1-year follow-up (Church et al., 2018a).

TABLE 14 Weight and eating behavior RCTs.

S.R.No.	References	Population	Instruments	EFT (*n*) and sessions	Control/s (*n*) and sessions	*p* (EFT)/*d*/%
1	Stapleton et al. (2017)	83 overweight or obese adults	PHQ	($n = 51$) 1 session/week for 8 weeks	CBT ($n = 34$) 1 session/week for 8 weeks	Body weight ($p < 0.001$) Restraint ($p = 0.025$) Power of food in external environment ($p = 0.018$)
2	Stapleton et al. (2019b)	451 obese adults	FCI, SA-45, Anthropometric Measures, SRWWM, SUD	($n = 314$) 1 session/week for 8 weeks	WL Group ($n = 137$)	Weight (post): $p = 0.002$ Food craving pre and post: $p < 0.001$ (stayed same at 12 months) Power of food pre and post diff: $p < 0.001$ Restraint capacity: $p < 0.001$ Pre and post BMI measurement diff: $p = 0.002$
3	Stapleton et al. (2020a)	357 bariatric surgery patients	BMI, TFEQ-R18, FCI, RSE,	($n = 107$) PPBP kit in addition to an 8-week online self-paced EFT treatment	1. PPBP ($n = 109$) Asked to follow the PPBP kit for 8 weeks 2. TAU ($n = 127$)	Emotional eating (−16.33%) Uncontrolled eating (−9.36%) Self-esteem (+4.43%)
4	Stapleton et al. (2011)	96 overweight or obese adults	FCI, SA-45, Anthropometric Measures. SRWWM, SUD	($n = 49$) 1 session/week (2 h) for 4 weeks	WL group ($n = 47$)	Food craving $p < 0.001$ Power of food $p < 0.001$ Restraint $p < 0.001$
5	Stapleton et al. (2012)	96 overweight or obese adults	FCI, SA-45, Anthropometric Measures. SRWWM, SUD	($n = 49$) One 2-h session/week for 4 weeks	WL group ($n = 47$)	$p < 0.05$ for weight, BMI, food cravings, subjective power of food, craving restraint, and psychological coping for EFT participants from pretest to 12 months
6	Stapleton et al. (2016c)	44 college students	FCI, SA-45, Anthropometric Measures, SRWWM, SUD	($n = 14$) 1 session/week for 6 weeks	WL group ($n = 12$)	There were clinically valid decreases in the psychological distress scores (but not a statistical significance). Results also indicated the students had significantly higher self-esteem and also self-compassion scores after the program.
7	Stapleton et al. (2016a)	83 overweight or obese adults	PHQ	($n = 51$) 1 session/week for 8 weeks	($n = 34$) CBT 1 session/week for 8 weeks	Anxiety: Across time $p < 0.001$, $p = 0.002$ from pre intervention to 6- and 12-month follow-up. No significant changes across time for CBT group. Depression: No significant differences for both groups at postintervention. At 6 months and 12 months, EFT ($p = 0.16$ and $p = 0.116$) and CBT ($p = 0.246$ and $p = 0.124$).

(Continued)

TABLE 14 (Continued)

Sr. No.	References	Population	Instruments	EFT (*n*) and sessions	Control/s (*n*) and sessions	*p* (EFT)/*d*/%
8	Glisenti et al. (2021)	21 binge eating participants	DSM-5, SCID-5-RV, EDEQ, BES	($n = 10$) 12 weekly 1-h sessions	EFT WL ($n = 11$)	Objective binge episode: $p = 0.17$, $d = 0.98$ Binge episode days: $p = 0.001$, $d = 1.39$ Binge eating psychopathology: $p = 0.003$; $d = 0.62$
9	Stapleton et al. (2019a)	15 overweight or obese adults	FCI	($n = 10$) 1 session/week for 4 weeks	EFT WL ($n = 5$)	Food craving $p = 0.031$

BES, Binge Eating Scale; BMI, body mass index; CBT, Cognitive Behavior Therapy; DSM-5, Diagnostic and Statistical Manual of Mental Disorders, 5th edition; EDEQ, Eating Disorders Examination Questionnaire; FCI, Food Craving Inventory; PHQ, Patient Health Questionnaire; PPBP, Portion Perfection for Bariatric Patients; RSE, Rosenberg's Self-esteem Scale; SA-45, Symptom Assessment−45; SCID-5-RV, Structured Clinical Interview for DSM-5–Research Version; SRWWM, self-reported weight and weight measurements; SUD, Subjective Units of Distress; TFEQ-R18, Three-Factor Eating Questionnaire-Revised 18; WL, wait-list. Sr. No., systematic review number.

In a pilot randomized clinical trial of obese adults that investigated the effect of Clinical EFT on brain activation in response to food craving stimuli using fMRI, findings indicated that EFT may decrease limbic region brain activity and reduce food related symptoms in overweight/obese individuals (Stapleton et al., 2019a). Brain scans revealed deactivation in the superior temporal gyrus, among the functions of which is multisensory integration, as well as the lateral orbito-frontal cortex. This structure contains the secondary taste cortex and is also essential for the control and organization of behavior. The mean score for food cravings was reduced by 18% for the EFT group compared to 5% in the control group, with gains maintained over time ($p = 0.031$).

Analyses of the online EFT weight loss program described earlier (Stapleton et al., 2019b) indicated significantly reduced scores for food cravings (−28.2%, $p < 0.001$), the power of food over behavior (−26.7%, $p < 0.001$), depression (−12.3%, $p < 0.001$), anxiety (−23.3%, $p = 0.005$), and somatic symptoms (−1.6%, $p < 0.001$). Gains were maintained on 2-year follow-up. When EFT was added to a program called Portion Perfection for Bariatric Patients (PPBP), emotional eating decreased, with results maintained on 6-month follow-up (Stapleton et al., 2020a). A comparison of a brief 4-week (8-h) program vs. an 8-week (16-h program) yielded significant reductions in all measures for both intervention lengths (Stapleton and Chatwin, 2018).

Binge-eating disorder (BED) is the most prevalent of all the eating disorders (Kornstein et al., 2019). In a pilot RCT for BED (Glisenti et al., 2021), all participants experienced reliable recovery from binge-eating psychopathology and a significant decrease in binge-eating frequency. Emotion regulation and psychological conditions improved significantly.

Avery Lane for Women is an addiction clinic located in Novato, California. Data from 123 clients in their Rehabilitation Program were collected over a 3.5-year period (Popescu, 2021). Depression scores reduced from 79% at intake to 16% during the final contact point, which was usually a few months after completion of treatment ($p < 0.001$). Anxiety scores dropped from 73 to 8% ($p < 0.001$), trauma symptoms from 76 to 30% ($p < 0.001$), suicidality from 53 to 11% ($p < 0.001$), binge eating from 33 to 11% ($p < 0.01$), and compensatory eating disorder behaviors from 41 to 11% ($p < 0.074$). Instead of the usual pattern of relapse after leaving treatment, the Avery Lane study identified long-term maintenance in the majority of patients.

Among older studies, an RCT found that EFT improved dysfunctional restraint behaviors (Stapleton et al., 2011) and that, in the year following an EFT weight loss program, participants lost an average of 11.1 pounds (Stapleton et al., 2012). In the health care workers study summarized previously (Church and Brooks, 2010), cravings for substances such as chocolate, sweets, and alcohol were reduced by 83% in a single EFT session ($p < 0.001$). An uncontrolled study of clients in a 6-week online weight loss program found a 12-pound weight reduction during the 6 weeks of the program, followed by a further 3-pound drop in the ensuing 6 months ($p < 0.001$; Church et al., 2022).

Two RCTs compared EFT to CBT (Stapleton et al., 2016a, 2017). In the 2016 study, both CBT and EFT were found to be vital adjunct tools in a multidisciplinary approach to managing obesity. Both approaches demonstrated comparable efficacy in reducing food cravings, responsiveness to food in the environment (power of food), and dysfunctional dietary restraint. Both EFT and CBT normalized participant scores to the same level as a nonclinical community sample. In the 2017 study, both the EFT and CBT groups showed improvement on psychological metrics, with most gains maintained over time. The authors of these two studies concluded that EFT is comparable to Gold Standard approaches such as CBT.

An Egyptian study measured cravings in 90 patients diagnosed with substance use disorders at a psychiatric hospital in Alexandria (Balha et al., 2020). Significant improvements in somatization, obsessive-compulsive behaviors, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism were identified after EFT, as well as a reduction in cravings ($p < 0.001$). This and the Avery Lane study are notable because, rather than enrolling research subjects, they studied populations of patients *in vivo* in clinical settings.

Introducing EFT into the treatment of food and substance use disorders allows the recovery process to be augmented by somatic procedures that strategically impact the neurological foundations of emotions, thought, and behavior in ways that facilitate desired changes. Brain imaging studies suggest that the demonstrated effectiveness of the approach is related to the way specific acupuncture points, when stimulated, send activating or deactivating signals to brain areas involved in targeted emotional and cognitive processes (Feinstein, 2016). Whether considered from a biological or behavioral perspective, ample evidence demonstrates that EFT is an extraordinarily effective non-drug treatment for food and substance use disorders. It warrants adoption as a first-line treatment of choice in clinical settings.

Sports, academic, and professional performance, and positive emotions

Mental health studies typically measure reductions in conditions such as anxiety, depression, and PTSD. The focus of performance studies is different. They take individuals who are already performing at a certain level and seek to determine if an increase in performance is associated with an intervention. There is a wide range of performance metrics from points scored in sports, to test scores in students, to productivity in professional occupations. Performance can also be measured by decreases in symptoms such as anxiety and stress and correlated with increases in measures of success. One of the earliest uses of EFT was for sports performance, and in the past decade, athletes from school tennis players to Olympic runners to professional baseball players have been recorded using EFT. Table 15 summarizes RCTs of EFT for performance.

Two RCTs have examined EFT's efficacy for sports performance. One measured the difference in basketball free throw percentages between an EFT and a placebo control group and found a performance difference of 38% after a brief session (Church, 2009; Baker, 2010). Another found similar benefits for soccer free kicks (Llewellyn-Edwards and Llewellyn-Edwards, 2012). A case study of golf performance found stress-related errors decreasing after EFT (Rotherham et al., 2012). A 20-min EFT session was found to increase confidence and decrease anxiety in an uncontrolled study of female college-aged athletes (Church and Downs, 2012).

Several studies summarized in the previous paragraphs examined the application of EFT to professional performance issues such as public speaking anxiety and test anxiety and found improvements (Sezgin and Özcan, 2009; Jones et al., 2011). The NHS service evaluation performed by Boath et al. (2014a) examined patient self-esteem and mental wellbeing and found that both improved significantly ($p < 0.001$).

A non-randomized sample of 53 university students was given a public speaking assignment known to generate anxiety, followed by a brief EFT session. Significantly reduced anxiety was observed in those in the EFT group, accompanied by an increase in focus and calmness (Boath et al., 2013). Similar effects were observed in social work students, who characterized EFT as calming and relaxing (Boath et al., 2017). A similar reduction in anxiety was found in an RCT assessing a group of students preparing for university entrance exams (Sezgin and Özcan, 2009). Their test scores increased, though the improvement did not reach the threshold for statistical significance. The uncontrolled study of female college athletes found that confidence increased as anxiety decreased (Church and Downs, 2012).

Nursing students had reduced stress 4 weeks after learning EFT ($p < 0.005$; Patterson, 2016). They also exhibited decreases in both state and trait anxiety ($p < 0.05$), with students reporting lowered stress and somatic symptoms.

In academic settings, EFT is an efficacious intervention to reduce anxiety significantly in high-ability adolescents (Gaesser and Karan, 2017), and in recent years, teachers have underscored the importance of formal training in EFT for stress and anxiety management among students and staff in school settings (Gaesser, 2020). The Canadian study reviewed previously (Ledger, 2019) found that a large majority of students believed EFT should be taught in schools.

A number of studies both published and in press have used a Likert scale to measure happiness. They generally find that happiness levels increase as negative emotions subside in intensity (Bach et al., 2019). Positive emotions typically have an inverse relationship with negative ones. Performance, whether in athletic competitions, academic tests, interpersonal relationships, or business productivity, is generally observed to be inhibited by excessive stress. In the studies summarized previously that contain a measure of positive emotions, this effect is found to accompany EFT treatment.

Physiological mechanisms of action

Outcome studies, which compare patient results before and after treatment, are clearly the most clinically important type of research. However, while showing *that* a treatment works allows it to be designated as an "evidence-based" practice, showing

TABLE 15 Sports and other performance RCTs.

S.R.No.	References	Population	EFT sessions	Control(s)	*p* (EFT)/*d*/%
1	Church (2009)	26 college basketball players	($n = 13$) One 15-min session	Control group ($n = 13$) received an encouraging talk	A statistically significant difference between the treatment groups was found ($p < 0.03$). EFT Group: 21% better individually in free throws. Control group scored an average of 17% lower ($p < 0.028$).
2	Baker (2010), a reexamination of Church (2009) study	26 college basketball players	($n = 13$) One 15-min session	Control group ($n = 13$) received an encouraging talk	This reanalysis of Church (2009) produced the same conclusion as above.
3	Llewellyn-Edwards and Llewellyn-Edwards (2012)	26 female soccer players	($n = 13$) 10 min EFT session	($n = 13$) Normal soccer technique coaching	Increase in free kick accuracy ($p < 0.05$)
4	Sezgin and Özcan (2009)	70 high school students with high anxiety	EFT 1 session + self-treatment at home ($n = 35$)	PMR 1 session + self-treatment at home ($n = 35$)	EFT and PMR were effective in decreasing test anxiety; reduction in TAI scores was greater in EFT group ($p < 0.05$)

PMR, Progressive Muscular Relaxation. Sr. No., systematic review number.

how and why it works allows us to understand the physiological changes that underlie its clinical benefits. Such studies provide objective physiological evidence to augment subjective self-report. RCTs that illuminate EFT's physiological mechanisms of action are presented in Table 16.

Three studies have used electroencephalogram (EEG) to examine the brain wave frequencies of participants before and after EFT. Swingle et al. (2004) compared the EEG readings of auto accident victims before and after they learned EEG and found a reduction in the frequencies associated with PTSD. Lambrou et al. (2003) used acupressure tapping with claustrophobics, comparing them with a non-claustrophobic group, and found an increase in theta EEG frequencies associated with relaxation. Using electromyography (EMG), they also found significant relaxation of the trapezius muscle. Anxiety also declined and participant gains were maintained on 2-week follow-up. Swingle (2010) found EFT to be beneficial in the treatment of seizure disorders.

The effect of acupressure as used in EFT echoes that found in studies of acupuncture needling. In a 10-year research program conducted at Harvard Medical School, fMRI studies demonstrated that the needling or electronic stimulation of acupoints consistently produced changes in activation in the hippocampus, amygdala, and other brain areas associated with fear and pain (Hui et al., 2005; Napadow et al., 2007; Fang et al., 2009).

If EFT is regulating the body's stress response and the hypothalamus-pituitary-adrenal (HPA) axis, then it is also logical to look for changes in stress hormones such as norepinephrine (adrenaline) and cortisol. To test this hypothesis, a triple-blind RCT examined the cortisol levels of 83 normal subjects before and after an hour of EFT (Church et al., 2012c). A second treatment group received a supportive interview while a control group simply rested. Comparison of the three groups revealed significant reductions in cortisol in the EFT group compared to the other two groups ($p < 0.03$). A statistically significant relationship between the reduction in psychological conditions such as anxiety (−58%), and cortisol (−24.4%) was also identified.

In a direct replication of Church et al. (2012c), an RCT to reexamine the effect of EFT on stress biochemistry (Stapleton et al., 2020b) examined changes in stress biochemistry and psychological distress symptoms. It randomly allocated 53 participants to one of three 60-min group interventions: EFT, PE, and NT. The EFT group's reduction in cortisol (−43.24%) was significantly different from that of the PE (−19.67%) or NT group (2.02%) ($p < 0.05$). In the section on performance above, the specific results of the Bach et al. (2019) study are described. It found significant improvement across a wide spectrum of biomarkers, including immune factors, heart rate, cortisol, and blood pressure. The Church et al. (2018c) and Maharaj (2016) studies found significant changes in gene

TABLE 16 RCTs illuminating EFT's mechanisms of physiological action.

S.R.No.	References	Population	Instruments	EFT (n) and sessions	Control/s (n) and sessions	p (EFT), %, d
1	Church et al. (2012c)	83 nonclinical subjects	SA-45,| Salivary cortisol assay	($n = 28$) One 50-min session	Supportive interview based on CBT ($n = 28$) One 50-min session NT ($n = 27$)	EFT: Cortisol (−24.39%, $p < 0.03$) Anxiety (−58.34%, $p < 0.05$) Depression (−49.33%, $p < 0.002$) Overall severity of symptoms (−5.5%, $p < 0.001$) Symptom breadth (−41.93%, $p < 0.001$)
2	Stapleton et al. (2020b)	53 nonclinical subjects	SA-45, Salivary cortisol assay	($n = 17$) One 60-min group intervention	Psychoeducation ($n = 17$) One 60-min group intervention NT ($n = 17$)	EFT: Cortisol (−43.24%, $p < 0.05$)
3	Church et al. (2018c)	16 veterans with PTSD	Blood gene expression assay SA-45, HADS, ISS, SF-12v2, Rivermead	($n = 8$) One session/week for 10 weeks	TAU only ($n = 8$)	EFT: PTSD symptoms (−53%, $p < 0.00001$) Differential expression of six genes ($p < 0.05$)
4	Church and Nelms (2016)	47 participants with frozen shoulder	SA-45, MPRS, PST	($n = 16$) One 30-min EFT session with acupoint tapping	DB ($n = 18$) One 30-min session WL ($n = 13$)	EFT: Psychological symptoms ($p < 0.001$) Cohen's $d = 0.9$ for anxiety and pain, and $d = 1.1$ for depression
6	Rogers and Sears (2015)	56 college students	Nine common stress symptoms	($n = 26$) 15–20 min single group session	Sham Acupressure group ($n = 30$) 1 session	EFT: Stress symptoms reduced −39.3% ($p < 0.001$)
7	Yount et al. (2019)	16 veterans with PTSD	SA-45, mRNA test	($n = 8$) 10 60-min sessions	NT ($n = 8$)	Decrease in expression levels of 2 depression-linked microRNAs: let-7b ($p = 0.021$) and let-7c ($p = 0.015$)

AEQ, Achievement Emotions Questionnaire; CBT, Cognitive Behavior Therapy; DB, Diaphragmatic Breathing; HADS, Hospital and Anxiety Depression Scale; ISS, Insomnia Severity Scale; MPRS, Matheson Pain Rating Scale; NT, no treatment; PST, Positive Symptom Total; Rivermead, Rivermead Post-Concussion Symptoms Questionnaire; SA-45, Symptom Assessment−45; SF-12v2, Short Form−12 item, version 2; TAU, treatment as usual. Sr. No., systematic review number.

expression, while Yount et al. (2019) identified microRNAs associated with epigenetic changes after EFT treatment.

Several studies have used fMRI to measure changes in brain activity before and after tapping. In an independent German investigation, Wittfoth et al. (2020) exposed 17 participants to disgust- and fear-inducing images. Brain regions involved in emotion and information processing were upregulated when viewing the images. But when participants alternated their attention between the images and tapping, those same regions were downregulated. The investigators found that this "bifocal" activity was effective for "re-organizing the underlying neural pathways" (p. 1).

The same research team investigated tapping in participants with fear of flying. Mean fear scores dropped ($p < 0.001$) and the percentage of participants meeting clinical criteria dropped from 89.7 to 24%. Differential regulation in several brain regions, including the amygdala, hippocampus, and temporal pole, was found (Wittfoth et al., 2022). In a French study using magnetoencephalography (MEG) to study the brain activity of a subject with fear of flying, investigators found that EFT downregulated regions implicated in the fear response (Di Rienzo et al., 2018). It also increased activity in the prefrontal areas active in executive control and the management of emotions.

In an Australian study, 15 obese adult patients self-administered an EFT protocol at regular intervals over a 4-week period (Stapleton et al., 2019a). Foods that activated areas of the brain associated with hunger and craving

prior to the program produced less activation in those areas at the end of the program, as shown by fMRI. This decreased activation corresponded with a diminished desire for those foods.

In the study of EFT for chronic pain patients (Stapleton, 2022), 24 adults were allocated to a 6-week online group EFT treatment and underwent resting-state fMRI pre and postintervention. A repeated measures MANOVA indicated significant differences in the levels of pain severity (−21%), pain interference (−26%), quality of life (+7%), somatic symptoms (−28%), depression (−13.5%), anxiety (37.1%), happiness (+17%), and satisfaction with life (+8.8%) from pre to posttest. fMRI analysis showed significantly decreased connectivity between the medial prefrontal cortex (a pain modulating area) and bilateral gray matter areas in the posterior cingulate cortex and thalamus, both areas being related to the modulating and catastrophizing of pain. There were no brain areas that showed significantly increased connectivity.

Improvements in mental health after therapy can be reflected in reduced levels of cortisol and regulation of the genes that code for such hormones (Feinstein and Church, 2010). Scientists studying epigenetics emphasize the role stress and emotion play in gene expression (Eley and Plomin, 1997; Fraga et al., 2005; Jirtle and Skinner, 2007; Church, 2010). The research into EFT's physiological mechanisms of action demonstrates this relationship. EFT has now been associated with changes in brain-wave activity (Lambrou et al., 2003; Swingle et al., 2004; Swingle, 2010), stress hormone levels (Church et al., 2013; Stapleton et al., 2020b), gene expression (Maharaj, 2016; Church et al., 2018c), brain region activation (Wittfoth et al., 2020, 2022), epigenetic microRNA activity (Yount et al., 2019), and biomarkers such as heart rate, immunity, and blood pressure (Bach et al., 2019). A wide range of physiological mechanisms, including epigenetic, endocrinal, cardiovascular, immunological, and neurological components, have thus been found to be associated with EFT treatment.

Is acupoint tapping an active ingredient in EFT?

EFT's "Setup Statement" is an essential part of the "Basic Recipe." The Setup Statement has two parts. One is a statement of the client's presenting problem, prefaced with, "Even though I have this problem…" while tapping on a specified point on the small intestine meridian. They repeat the name of the problem while tapping on the other points. This focus on the problem is reminiscent of the techniques practiced in Prolonged Exposure (PE) and other exposure therapies.

The second half of the Setup Statement directs the client toward acceptance of conditions as they are: "… I deeply and completely accept myself." This cognitive reframe is akin to certain techniques used in cognitive therapies that seek to modify dysfunctional client cognitions and emotional responses to events. In a review of therapies for PTSD, the US government's Institute of Medicine [IOM] (2008) found that therapies using exposure and cognitive shift were efficacious. EFT's Setup Statement draws from elements of these two established therapies.

The third ingredient used by EFT is tapping on points used in acupuncture and acupressure (acupoints). Is this component of EFT an active ingredient or is EFT's efficacy dependent solely on the exposure and cognitive components it shares with other therapies?

During the first meta-analysis testing the efficacy of acupressure tapping in the treatment of psychological distress (Gilomen and Lee, 2015), it was concluded that due to methodological shortcomings in the studies examined, it was not possible to determine whether EFT's effects were due to acupoint stimulation or simply due to treatment elements common to other therapies.

A meta-analysis was performed to address this question (Church et al., 2018b). It examined six studies in which an active control, such as diaphragmatic breathing or sham acupoints, was used in place of tapping on actual acupoints. Studies ($n = 403$) were assessed using the APA standards for quality control, and three ($n = 102$) were identified as meeting them. Pretest vs. posttest EFT treatment showed a large effect size, Cohen's $d = 1.28$ (95% confidence interval [CI], 0.56–2.00) and Hedges' $g = 1.25$ (95% CI, 0.54–1.96). Acupressure groups demonstrated moderately stronger outcomes than controls, with weighted posttreatment effect sizes of $d = -0.47$ (95% CI, −0.94–0.0) and $g = -0.45$ (95% CI, −0.9–0.0). This meta-analysis indicated that the acupressure component was an active ingredient and outcomes were not due solely to placebo, nonspecific effects of any therapy, or non-acupressure components.

This meta-analysis was subsequently challenged (Spielmans et al., 2020), which led to the discovery of statistical errors in the original calculation, primarily incorrect standard deviations, and the correction of these (Church et al., 2020b). The revised analysis found a slightly more robust effect for EFT's long-term effects than the original analysis. The cumulative fixed effects Hedges' g was found to be 0.73 (95% CI = 0.42–1.04, $p < 0.0001$). The corresponding random effects Hedges' g is 0.74 (95% CI = 0.34–1.13, $p < 0.0001$). This result echoed the studies themselves, every one of which indicated that tapping made a contribution to EFT's reported effects.

Collectively, these results demonstrate that EFT's acupoint stimulation is an active ingredient. It is supported by the Harvard studies cited earlier that used fMRI to measure the effects of acupuncture on the areas of the brain associated with fear (Hui et al., 2005; Napadow et al., 2007; Fang et al., 2009). These studies uniformly report acupuncture to produce rapid regulation of these brain regions, as do EFT fMRI studies (Stapleton et al., 2017; Wittfoth et al., 2020, 2022). When

the established protocols drawn from exposure and cognitive therapies are paired with acupressure, their effects are enhanced.

Borrowing benefits: EFT as group therapy

During the early development of EFT, therapists reported lower levels of stress and burnout than they had experienced administering conventional treatments. This led to the hypothesis that tapping on oneself while demonstrating tapping to others or witnessing tapping on others while tapping on oneself diminished distress. This phenomenon is known as "Borrowing Benefits" (Craig, 2008/2010). A series of studies has measured the efficacy of Borrowing Benefits for psychological and physical symptoms, especially when performed in group settings.

The first such study was performed by Rowe (2005) who examined the psychological symptom levels of 259 participants in a weekend EFT workshop, 102 of whom provided complete data. He found reductions in nine common conditions such as anxiety and depression, with participant gains maintained on follow-up.

Group application of EFT was also found to reduce psychological symptoms such as anxiety in a group self-identified with addiction issues (Church and Brooks, 2013). The health care workers study cited previously (Church and Brooks, 2010) found similar results. At follow-up, the symptom levels of participants who had used EFT frequently were lower than those who had not. It found greater improvements in more frequent users. One of that study's replications (Palmer-Hoffman and Brooks, 2011) identified similar effects from Borrowing Benefits ($p < 0.001$).

PTSD symptoms were examined in a study of 218 veterans and spouses who used Borrowing Benefits during 7-day group retreats (Church and Brooks, 2014). On pretest, 82% of veterans and 29% of spouses met the criteria for clinical levels of PTSD symptoms. After the retreat, at 6-week follow-up, only 28% of veterans and 4% of spouses were PTSD-positive ($p < 0.001$). The study compared the results of five such retreats, reporting in effect the results of five individual substudies. Similar symptom declines were noted in all five groups.

At a 2-day EFT workshop (Church and House, 2018), Borrowing Benefits was associated with reductions in anxiety, depression, and PTSD ($p < 0.03$), with participants maintaining their gains at 6-month follow-up ($p < 0.02$).

Though these were uncontrolled studies, several RCTs also utilized Borrowing Benefits in a group therapy design. The study of college students with depression (Church et al., 2012a) offered the EFT intervention in four group counseling sessions. A study of depression in weight loss subjects also taught participants EFT in group classes (Stapleton et al., 2013). In two of the studies of sports performance (Church, 2009; Llewellyn-Edwards and Llewellyn-Edwards, 2012), the EFT cohort received at least part of the intervention as a group. EFT was also provided in groups of 10 in the Congo RCT of traumatized females and found to be as effective as CBT in reducing PTSD, anxiety, and depression (Nemiro and Papworth, 2015). The insomnia RCT also administered both EFT and active control in group format (Lee et al., 2013).

Other populations in which Borrowing Benefits has demonstrated efficacy include business executives (Church and David, 2019), chronic pain patients (Stapleton et al., 2016b), psoriasis patients (Hodge and Jurgens, 2011), students with public speaking anxiety (Madoni et al., 2018), people with food cravings (Stapleton and Stewart, 2020), nurses (Dincer and Inangil, 2020), and Hwabyung patients (Song et al., 2014; Kwak et al., 2020), to name a few.

These studies are notable in that significant reductions in symptoms occurred when EFT was delivered as group therapy, as opposed to individual counseling. The number of recent US veterans with PTSD from wars in the Middle East has been estimated at 500,000 (Thompson, 2015). Each veteran with PTSD is estimated to cost society $1,400,000 (Kanter, 2007), implying a social cost of about a trillion dollars to treat veterans of these and earlier conflicts. Group approaches such as Borrowing Benefits, which produce symptom reductions without the need for lengthy courses of individual psychotherapy or chronic use of prescription drugs, are efficient and cost-effective.

Disaster relief

Feinstein (2022) provided a summary of research examining the use of energy psychology techniques such as tapping after catastrophic events, including mass shootings, genocide, ethnic warfare, earthquakes, hurricanes, tornadoes, floods, wildfires, and the COVID pandemic. The studies show strong outcomes for energy psychology as psychological first aid in the days or weeks after a disaster and in later treatment of trauma-based psychological problems. Rapid relief and long-term benefits are corroborated across studies.

Virtual EFT

Not only are in-person groups effective, virtual administration of EFT can also yield favorable outcomes. A study comparing a virtual EFT group workshop with an in-person one found significant depression symptom reduction in both (Church and Clond, 2019). Several of the weight loss studies referenced previously were conducted entirely online, and those that used group interaction all demonstrated clinically and statistically significant results.

The tapping app study reviewed in the introduction to this paper is noteworthy. Significant decreases in anxiety and stress were measured after brief self-tapping sessions

(Church et al., 2020a). A meta-analysis found similar outcomes for several psychological conditions whether the interventions were conducted virtually or in person (Fernandez et al., 2021).

The model prevalent in the 20th century of a client sitting in a practitioner's office and receiving in-person treatment is being displaced by virtual interactions in the 21st century. Future studies will evaluate the efficacy of virtual tapping, and platforms and programs to deliver Clinical EFT virtually are likely to proliferate. These liberate treatment from the constraints of time and place, since they can be utilized by clients at their convenience. This will make the therapeutic benefits of tapping available to wider demographic segments and speed its proliferation.

Simultaneous symptom reduction

Most psychological research seeks to isolate a single condition and excludes multiple diagnoses (Seligman, 1995). However useful this exclusion criterion might be for research, most patients present with a complex of disorders rather than a single one (Gorman, 1998). The studies of EFT described in this paper are notable in this regard. Not only do multiple psychological conditions decline simultaneously, but multiple physiological diagnoses do as well. All organ systems are affected by stress, and when EFT reduces stress, the results are pervasive in body, mind, and emotions. Future research and treatment is likely to focus on the multidimensional benefits of Clinical EFT, rather than attempting to evaluate its utility in a single diagnostic category.

Safety

Cumulatively, over 2,000 subjects have participated in trials of EFT without a single adverse event being reported, indicating a high degree of safety. EFT also appears to be safe when administered by a therapist or life coach or self-administered. Therapists treating victims of childhood sexual abuse preferred energy psychology treatments such as EFT over talk therapy because they found the risk of abreaction low with the former (Schulz, 2009). Mollon (2007) reports a general reduction of client distress during acupoint tapping, while Flint et al. (2005) remark on the absence of abreactions during energy psychology treatments. Most studies of EFT have been performed after Institutional Review Board (IRB) review. IRB procedures require that studies be designed and conducted in a manner that protects human subjects, including a requirement that participants be monitored for adverse events. As mentioned previously, the US Veterans Administration has designated Clinical EFT a "generally safe therapy" (Church, 2017). These factors combine to indicate that the practice of EFT is not generally associated with the likelihood of harm.

Replication studies

Replication studies have been performed for PTSD, depression, anxiety, phobias, cortisol, pain, and sports performance, as noted previously. See Table 17 for summaries. Two replications (Baker and Siegel, 2010; Salas et al., 2011) corroborated the findings of the Wells et al. (2003) phobia study. Two replications (Geronilla et al., 2016; Church et al., 2018c) found results similar to the first PTSD RCT (Church et al., 2013).

A replication (Stapleton et al., 2020b) of the cortisol study (Church et al., 2013) also found significant effects. Anxiety replications, most notably for public speaking anxiety, have shown that a single EFT treatment session is usually sufficient. Depression replications have also corroborated the findings of earlier trials (Chatwin et al., 2016; Jasubhai and Mukundan, 2018). A study of sports performance (Llewellyn-Edwards, 2013) replicated the results of an earlier study (Church et al., 2009).

A study examined psychological symptoms, pain, and cravings in 216 health care workers such as doctors, nurses, chiropractors, psychotherapists, and alternative medicine practitioners who attended a 1-day Clinical EFT workshop at one of five professional conferences (Church and Brooks, 2010). Though this was an uncontrolled study, it examined the five different groups separately, making it, in effect, five small studies. In addition, EFT was delivered by two trained and certified Clinical EFT practitioners. Despite their disparities, all five groups showed similar results.

A study was designed to both replicate these results and extend them by measuring the effects of treatment by a variety of trained and certified practitioners (Palmer-Hoffman and Brooks, 2011). With four different practitioners offering Clinical EFT sessions in various settings, similar outcomes were observed. The authors concluded that it was the Clinical EFT method itself, rather than the unusual gifts of any one practitioner, that was responsible for the observed effects. A similar design was used in the uncontrolled addictions study described previously (Church and Brooks, 2013), which again found the effects of Clinical EFT to be independent of practitioner.

As noted in the earlier discussion of the "replication crisis" in science, large and well-funded efforts to replicate key studies have been successful for only a minority of studies. The finding that the results of EFT studies have been replicated for anxiety, depression, PTSD, phobias, cortisol, sports performance, and practitioner efficacy is notable.

Discussion

Characteristics of clinical EFT

The body of literature summarized in this paper allows us to draw several conclusions about Clinical EFT. These include:

TABLE 17 Original and replication RCTs.

Condition	Original	Replication	Results
Phobia	Wells et al. (2003)	Baker and Siegel (2010)	EFT lowers phobia of small animals
		Salas et al. (2011)	
PTSD	Church (2014)	Geronilla et al. (2016)	EFT lowers symptoms of PTSD
		Church et al. (2018c)	
Cortisol	Church et al. (2012c)	Stapleton et al. (2020b)	EFT lowers cortisol
Depression	Chatwin et al. (2016)	Jasubhai and Mukundan (2018)	EFT lowers depression in MDD
Anxiety	Madoni et al. (2018)	Dincer et al. (2020)	EFT lowers anxiety related to public speaking
Sports Performance	Church (2009)	Llewellyn-Edwards (2013)	EFT improves performance

MDD, Major Depressive Disorder.

Regulation of stress

The epigenetic, hormonal, and neurological evidence demonstrates that Clinical EFT regulates the body's hypothalamic-pituitary-adrenal (HPA) axis and attenuates the stress response. Since stress recruits all the body's major organ systems, the reduction of stress produces pervasive physiological regulation.

Reliability

When applied with fidelity to the manual, Clinical EFT can be relied upon to produce the magnitude of change identified in the evidence base.

Durability

Long-term follow-ups demonstrate that when issues are resolved after tapping, gains are maintained over time.

Safety

Clinical EFT, both when self-administered and when administered by trained and certified practitioners, produces a reduction in affect and has not been associated with adverse events.

Speed

Clinical EFT works quickly. Treatment time frames range from one session for phobias to 10 sessions for PTSD. For some conditions, it is effective in time frames of 15 min or less.

Simultaneous reduction of multiple psychological conditions

Clinical EFT's stress-reduction capacity makes it effective at the same time in alleviating multiple psychological conditions, including phobias, PTSD, anxiety, and depression.

Physical symptom reduction

The amelioration of psychological stress has a wide range of physiological benefits. Clinical EFT has been shown to remediate physical symptoms associated with pain, insomnia, immunity, addictions, hypertension, autoimmune conditions, traumatic brain injury, and a variety of other diagnoses. However, the lack of RCTs and replications means that Clinical EFT cannot yet be considered an evidence-based treatment for these conditions.

Replicability

Clinical trials in which trained and certified practitioners apply the method with fidelity to *The EFT Manual* produce consistent results.

Generalizability

Clinical EFT has demonstrated efficacy with widely disparate demographic samples, occupational groups, diagnoses, and conditions. It has produced consistent results among independent teams of investigators and in multiple geographic locations, making its measured effects generalizable.

Trainability

Rather than requiring extraordinary personal healing abilities, the 48 techniques of Clinical EFT can be learned in a structured and supervised training program. Practitioners trained in the form of the method described in the manual are able to produce consistent results.

Self-help

Clinical EFT is safe and effective when self-applied as well as when it is practiced by trained professionals.

Group therapy

Clinical EFT's group therapy method, described in the manual as "Borrowing Benefits," is effective in groups of various sizes and in virtual as well as in-person groups.

Virtual delivery

When EFT is delivered using virtual delivery platforms such as apps and online courses, initial evidence suggests efficacy comparable to in-person application. Future treatment and research options will extend the options for treatment delivery using artificial intelligence (AI), virtual reality (VR), and immersive reality (IR).

Public health impact

Clinical EFT's efficacy and ease of use makes it relevant to public health issues such as obesity, PTSD, disaster relief, stress, and addiction treatment. Clinical EFT is increasingly being adopted in primary care settings where it has the potential to produce pervasive improvements in public health.

Cost effectiveness

The brevity of treatment time frames required to produce symptom reduction, as well as Clinical EFT's efficacy when delivered using groups and virtual platforms, makes it a cost-effective treatment option.

Limitations

This systematic review has several limitations. While the meta-analyses used standards such as the APA criteria as a quality control for the RCTs reported, this review did not screen RCTs through a similar quality control filter. Because the purpose of the review was to make the evidence base available and comprehensible to clinicians, rather than meet any set of technical standards, or perform a statistical analysis, all RCTs regardless of quality were reported.

A further limitation is that because of the large number of RCTs reported since the meta-analyses, and the even larger number of primary and secondary outcomes, all outcomes were not reported. Only those determined to be most clinically relevant were included.

Another limitation is that a further quality assessment such as a risk-of-bias (ROB) analysis of the included studies was not undertaken. The reason for this was twofold. One is that ROB was not included in most of the original meta-analyses. The second is that when ROB standards are applied to trials of psychotherapeutic methods, including EFT, the results are often misleading.

For instance, one ROB standard is: "2.2. Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?" The answer in psychotherapy trials is virtually always "Yes" leading to a conclusion that there are "concerns of ROB."

However, it is clearly impossible for a therapist trained in the psychotherapeutic intervention being evaluated to deliver that intervention to a study participant while remaining blind to the intervention being delivered. While this and other ROB standards are perfectly appropriate for drug trials, many do not transfer well to mental health studies and lead to an inappropriately large calculation of ROB when ROB is actually low.

Future research and treatment directions

In the earlier iteration of this paper (Church, 2013a), future research directions were recommended. Over the past decade, progress has been made toward several of these, such as trials with larger Ns, institutional support for research, studies of virtual delivery platforms, evaluation of biomarkers, and measurement of Clinical EFT's stress-reduction effects on medical diagnoses. The large number of RCTs published since that time has greatly increased the evidence base, and as new studies are published, they appear on Research.EFTuniverse.com. Besides the studies published in English-language journals, a great deal of EFT research has occurred in non-Western countries. A recent review mentioned earlier identified 91 papers published in non-English-language journals (Freedom et al., 2022). Based on this literature, what are useful next steps for EFT research?

Institutional trials in western countries

While many studies have been performed in association with universities, hospitals, and clinics, the majority of those published in English-language journals have been conducted in outpatient settings by private foundations. In contrast, most of those published in non-English-language journals have been conducted within institutions. Many of these studies have been undertaken in primary care settings (Freedom et al., 2022), suggesting that EFT is available in many countries. This is not the case in North America and Northern Europe. In the US, for example, not a single study has been undertaken by the Veterans Administration despite its mission of caring for veterans with PTSD. Studies within institutions such as large hospitals that are published in English-language journals will contribute toward a framework for institutional implementation of EFT.

Virtual practitioner sessions

Virtual therapy is playing an ever-expanding role in delivering therapies of all types to clients. The COVID epidemic hastened the adoption of virtual therapy worldwide. Many therapists and coaches transitioned their practices from in-person to virtual sessions, and did not return to in-person practice afterward. Informal reports from EFT practitioners demonstrate the same pattern. A meta-analysis comparing the efficacy of virtual video with in-person therapy found no significant differences in outcomes for anxiety, depression, or PTSD (Fernandez et al., 2021).

Both clients and providers have become increasingly comfortable with, and proficient at, virtual platforms like Zoom and Facetime. Shortly before the pandemic, a platform called Stress Solution became available (MyStressSolution.com). It facilitates Clinical EFT video sessions between certified practitioners and clients. Clients log on, text an available practitioner, and initiate a session. The convenience of such virtual practitioner sessions makes Clinical EFT readily available. Because they can be offered across time zones and geographic locations, virtual video practitioner sessions also greatly expand access to efficacious treatments such as Clinical EFT.

Integrative wellness studies

Despite half a century of evidence of their value to patients, behavioral interventions such as meditation, yoga, acupuncture, and EFT are rarely integrated into primary care. Future research should determine how to introduce patients to EFT effectively and encourage compliance with a health-promoting stress-reduction regimen. Apps such as the Tapping Solution and Stress Solution can be offered as outpatient stress-reduction options and their results evaluated. Pre and post surgery, patients could be offered in-person or virtual EFT to cope with stress and support healing. Between psychotherapy sessions, EFT can be applied as self-help, with its results quantified by research.

On-demand sessions

Not only do virtual platforms like Stress Solution make EFT treatment available independent of location and time zones, they also make it possible to get interventions to clients when they require them most. For example, having a late-night session available to a client experiencing insomnia is more immediately useful than having to book a future appointment that will take place at a time when insomnia is no longer an immediate concern. Immediate access for a client who is suicidal has obvious benefits over an appointment-based system. For this reason, on-demand models and platforms are likely to proliferate, and by gathering data on these delivery systems, their efficacy can be measured.

Accessibility

Virtual therapy platforms such as Stress Solution make Clinical EFT available to underserved populations. Examples of the latter include clients who are geographically remote from mental health services, clients who perceive a stigma to treatment, and clients who have physical handicaps that prevent them from traveling to treatment locations. Research can catalog the benefits of the availability of mental health services to such samples.

Personalized medicine

The medicine of yesterday sought treatments that were generalizable to large populations. In the US, for instance, from the 1950s onward, oncology moved toward the enshrinement of chemotherapy, surgery, and radiation as standard care. In psychology, CBT became the one-size-fits-all recommendation in practice guidelines (e.g., Courtois et al., 2017). Today, advanced diagnostic tools allow treatments to be personalized to individuals. Genetic tests, for instance, identify alleles that allow individualized chemotherapy cocktails to be formulated for a single cancer patient.

Psychology is starting to recognize that combination therapies targeted to a particular client's neurological, developmental, and behavioral profile can be more effective than standardized approaches. As costs drop and assays become as noninvasive as a saliva sample, future studies will tailor psychotherapeutic approaches to a client's unique experience and track their success experimentally through frequent psychological and genetic assessments.

Virtual and immersive reality

Treatments using virtual reality (VR) goggles have already established themselves as effective treatments for PTSD (Rizzo and Shilling, 2017). VR has also been used to treat a variety of other psychological conditions (Mishkind et al., 2017). The resolution of VR is increasing steadily, while immersive reality (IR) experiences simulate other senses such as touch and smell. Eventually, the technology is expected to merge into a holographic environment akin to the "holodeck" experience depicted in science fiction media. Futurists estimate that by the middle of this century the technology will have advanced to the point that it will be impossible for human beings to tell whether they are in a virtual or actual environment (Diamandis and Kotler, 2020). EFT can be used in conjunction

with VR, even at the latter's current level of development. Exposure is one of the three cornerstones of Clinical EFT (the other two being cognitive framing and acupressure). The vivid reexperiencing made possible by VR makes it an effective prelude to tapping; future studies could evaluate this combination.

Artificial intelligence

Almost all personalized coaching and counseling relies on an encounter between practitioner and client. Most of the efficacy of psychotherapy has been found to be due to the therapist, not the particular therapeutic method employed (Wampold and Brown, 2005). The training, skill, temperament, and insight of the therapist is paramount, as is the degree of emotional rapport with the client. Though Clinical EFT relies on 48 clearly defined techniques, practitioner skill plays a role, even during virtual EFT sessions like those at MyStressSolution.com. A live practitioner interacts dynamically with a client to understand issues and select from among the possible therapeutic approaches.

Yet advances in artificial intelligence (AI) mean that many client cues can now be interpreted and responded to by automated agents. AI programs translate the client's speech to text, rapidly analyze it, and craft a personalized response. Ellie, an onscreen AI therapist funded by the US Defense Advanced Research Projects Agency (DARPA), has found a surprisingly high level of acceptance by veterans as a therapeutic tool for PTSD (Gamble, 2020). A similar trajectory is conceivable for AI-based Clinical EFT sessions, with tapping scripts customized to the nuances of a client's words, just as human therapists today select from among large numbers of possible responses and techniques.

AI continues to improve and it is possible to contemplate an app that reads and interprets client facial expressions, tone of voice, and other cues to personalize therapeutic recommendations. Research can measure the efficacy of AI against live therapy and advances in technology can reasonably be expected to produce progressively better client outcomes.

Online and virtual courses

Courses package EFT instruction into forms convenient to clients. A client might enroll for a specialized tapping course for weight loss, relationship skills, or financial literacy and be able to watch Borrowing Benefits videos, read text, and interact with exercises at any convenient time. Studies of two online courses, Naturally Thin You (NaturallyThinYou.com; Church et al., 2018a) and Skinny Genes (SkinnyGenesFit.com; Church et al., 2022), have demonstrated an association between tapping and weight loss, while the online fibromyalgia course (FibroClear.com; Brattberg, 2008) found a reduction in symptoms in two thirds of participants.

To date, two studies have made direct comparisons between an online course and in-person tapping. A study comparing an in-person Tapping Deep Intimacy workshop with an online course found similar outcomes for anxiety and relationship satisfaction but different demographic characteristics for subjects selecting the two delivery formats (TappingDeepIntimacy.com; Church and Clond, 2019). In the chronic pain study described previously (Stapleton, 2022), a subset of the sample (as the study is still ongoing) suggests that an online self-paced version of EFT achieved slightly better outcome in somatic symptoms, depression, anxiety, and panic disorder ($p < 0.001$) and that EFT delivered virtually may be as effective as consulting in person. Such comparisons of online courses to in-person experience represent a fruitful new area of research. Clinical EFT training is also available as a standardized online course based on the manual (TheTappingCourse.com) and this could be compared with in-person classes teaching the 48 techniques. If online tapping can produce effects comparable to in-person experiences, Clinical EFT will become convenient to extended demographic samples.

Wireless mobile devices and apps

Emerging technologies like smartphones allow EFT to be used portably during times of heightened stress. In the first study of an app described in this paper (Church et al., 2020a), reductions of over 40% in anxiety and stress were measured in users of the Tapping Solution app. This large treatment effect made available at a time and place convenient to a client, with the privacy and convenience of a wireless mobile device (WMD) such as a tablet or smartphone, without any personalized or formal therapy, extends the reach of Clinical EFT to new treatment dimensions. If a client wants to engage the services of a certified practitioner, they can do so through the Stress Solution app (TappingApps.com). This is an app version of the Stress Solution website described above. Whether through automated software like the Tapping Solution app or personal practitioners sessions like the Stress Solution app, the availability of Clinical EFT on WMD and the data culled from such interactions are likely to extend the benefits of tapping to a wider demographic.

Workplace and productivity assessments

The performance studies described in this paper link the stress-reducing effects of Clinical EFT to enhanced performance. Studies are now in progress measuring workplace productivity and the contribution Clinical EFT can make to both worker satisfaction and enhanced performance. If this effect is

substantial, as hypothesized, tapping might become a routine part of organizational cultures.

Primary care and medical treatment

The studies listed under the Physiological Conditions heading in this paper provide an early indication of Clinical EFT's potential role in healing, disease management, and medical practice. It is a non-pharmacological, natural, self-applied, and safe intervention, with stress-reduction effects that promote healing of many medical diagnoses and conditions. Most extant studies measure medical conditions as a secondary rather than primary outcome, but the coming decades are likely to see EFT explored as a primary treatment for these.

Modern medicine is particularly challenged by certain classes of disease. It has few remedies for fibromyalgia, psoriasis, multiple sclerosis, lupus, and other autoimmune conditions, and can at best provide palliative care. It has limited treatment options for cravings, addictions, and substance abuse, and relapse is the norm rather than the exception. It has been challenged by the increase in "lifestyle diseases" such as obesity, atherosclerosis, stroke, and diabetes.

Cancer, heart disease, hypertension, Alzheimer's, and many other diagnoses have been linked to stress, as has telomere shortening, cognitive decline, and loss of brain volume. Yet stress-reduction techniques such as meditation and tapping are rarely prescribed. Future trials could evaluate changes in all these conditions as primary outcomes. This would indicate for which conditions Clinical EFT might either be a first-line primary care treatment or an auxiliary behavioral option.

Group scale studies

EFT is notable in its ability to improve symptoms when delivered to groups. However, the optimal group size for various conditions has not yet been empirically tested. Groups have ranged from over 250 participants (Rowe, 2005) to 10 (Church and Brooks, 2010). What is the minimum size to produce a group effect? What is the optimum size for each condition? Is there a group size at which the effects diminish? Research that answers these questions of scale will assist institutions using group therapy to optimize their use of Clinical EFT.

Reduction of multiple symptoms

While research has tended to isolate conditions such as chronic pain or depression, EFT's ability to reduce both psychological and physiological symptoms in tandem strengthens the case for measuring symptom clusters. An approach to research that encourages the reduction of multiple symptoms simultaneously has clear clinical benefits.

Client-centered focus

The APA Standards (Chambless and Hollon, 1998) advocate the use of valid and reliable instruments. These are usually self-reports that measure clinical change relevant to the client's direct experience. In contrast, the Tolin et al. (2015) standards emphasize observer-rated clinical diagnoses. Clinical EFT has been taught as a client-centered approach since its inception, and while observer-rated measures can certainly amplify understanding of a method's healing effects, future research should continue its client-centered focus.

Biomarkers

The past decade has witnessed increasing use of biomarkers to measure the results of treatment with Clinical EFT. Future studies can expand the use of biomarkers such as oncogenes, telomerase, microRNAs, neurotransmitters, immunoglobulins, BMI, creatinine, T cells, heart rate, blood glucose, interleukins, hormones, blood pressure, HRV, cytokines, and C-reactive protein as objective measures of change.

Conclusion

Clinical EFT, as validated in over 100 RCTs and outcome studies, has established itself as an efficacious treatment for both psychological and physical conditions. Its large and growing body of research shows it to be an evidence-based practice that is safe, fast, reliable, and cost-effective. Treatment time frames are brief, symptom improvements are durable and, both virtual and in-person sessions are effective. The objective effects of EFT treatment have been measured in physiological dimensions such as gene expression, brain wave synchrony, hormonal synthesis, cardiac function, immunity levels, and other biomarkers. Clinical EFT enjoys increasing professional acceptance as a first-line treatment in primary care. In the coming decades, it is likely to experience even greater public acceptance and be formally classified as a primary treatment for a variety of conditions.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

DC and PS derive income from publications and presentations on the therapeutic method described.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer RH declared a shared affiliation with the authors DC and AV to the handling editor at the time of review.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.951451/full#supplementary-material

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Effect of virtual group EcoMeditation on psychological conditions and flow states

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Background: A plethora of literature has delineated the therapeutic benefits of meditation practice on psychological functioning. A novel meditative practice, EcoMeditation, includes elements of four evidence-based techniques: The Quick Coherence Technique for regulating heart rate variability (HRV), Emotional Freedom Techniques (EFT), mindfulness, and neurofeedback.

Objectives: Changes in psychological symptoms, including anxiety, depression, posttraumatic stress, pain, and happiness were measured following a one-day virtual EcoMeditation training workshop. The current study extended on previous literature by adding measures of transcendent experiences and flow states.

Methods: Participants were drawn from a convenience sample of 151 participants (130 female, 21 male) aged between 26 to 71 years (M=45.1, SD=9.19) attending a one-day virtual EcoMeditation workshop. They were assessed pre-workshop, post-workshop, and at 3-months follow-up.

Results: Post-workshop results (N=111) indicated a significant reduction in anxiety (–42.3%, p<0.001), depression (–37.5%, p<0.001), posttraumatic stress (–13.0%, p<0.001), and pain (–63.2%, p<0.001) Likert mean scores when compared to pre-workshop. There was also a significant increase in happiness (+111.1%, p<0.001), flow states (+17.4%, p<0.001), and transcendent experiences (+18.5%, p<0.001). At 3-months follow-up, a one-way repeated measures ANOVA (N=72) found significant decreases in anxiety, depression, and pain symptoms between pre-test and post-test, as well between pre-test and follow-up. Flow, happiness, and transcendent experiences increased significantly between pre-test and post-test, as well as between pre-test and follow-up, with over 71% of participants experiencing clinically significant improvements. Significant reductions in posttraumatic stress and depression symptoms between pre-test and follow-up were also noted.

Conclusion: EcoMeditation is associated with significant improvements in psychological conditions such as anxiety, depression, pain, and posttraumatic stress. EcoMeditation was also shown to enhance flow states and transcendent experiences. The benefits identified were similar to those found in the existing literature and provide support for the use of EcoMeditation as an effective stress reduction method that improves psychological symptoms and enhances transcendent states.

KEYWORDS

meditation, anxiety, depression, PTSD, group therapy, virtual, EcoMeditation, emotional freedom techniques

Introduction

A plethora of meditation literature has delineated the therapeutic benefits of meditation practice on psychological functioning (McGee, 2008; Ospina et al., 2008; Sedlmeier et al., 2012). Meditation is a practice designed to increase mental awareness, clarity, and calmness using an array of techniques such as mindfulness, mantra recitation, breathwork, and movement (Ospina et al., 2008; Church, 2020). Empirical studies have found that mindfulness-based interventions assist with emotional regulation, self-care, and mood (Chambers et al., 2007; Jain et al., 2007; Shapiro et al., 2007; Robins et al., 2011; Sedlmeier et al., 2012; Ding et al., 2014). Significant reductions in anxiety, depression, psychological distress, and pain have been identified following meditative practices (Shapiro, 2009; Bohlmeijer et al., 2010).

In India's Indus Valley approximately 5,000 BCE, archaeologists have revealed images of humans in meditative postures, with crossed legs, hands on knees, and eyes closed. However, it is likely that these practices originated much earlier, indicating that meditative experience has been valued by human beings for millennia (Puff, 2013). While the benefits of individual meditative practice has been well-supported in the literature, the psychological outcomes of group-based meditative practices has been less extensively explored in non-meditator samples (Fredrickson et al., 2008). It has been recommended that research expands on the social and relational aspects of meditation, with the assumption that the presence of others can enhance concentration, focus, and deepen the individual meditative experience (Cialdini and Goldstein, 2004; Vieten et al., 2018). Given the established cognitive impact of meditation, investigation of virtual and group-delivered models is warranted.

EcoMeditation is an emergent meditative practice derived from the Whole Energy Lifestyle (WEL) suite of evidence-based stress reduction and interpersonal relationship skills (Church, 2011). WEL was developed to combine evidence-based practices to move the field of energy healing above baseline (Church et al., 2020). WEL includes elements drawn from qigong, Gestalt therapy, yoga, and other evidence-based techniques (McCraty, 2005; Chiesa and Serretti, 2009; Jahnke et al., 2010; Feinstein, 2012; Church et al., 2014), which can be practiced supplementally to EcoMeditation (Church, 2011). In particular, EcoMeditation includes elements of four evidence-based techniques: The Quick Coherence Technique for regulating heart rate variability (HRV), Emotional Freedom Techniques (EFT), mindfulness, and neurofeedback (Davidson et al., 2003; Zotev et al., 2011; Church, 2013; McCraty and Zayas, 2014). The combined efficacy of the four empirical methodologies has only recently been tested (Church et al., 2020). Hence, the current study aimed to extend the findings of the existing literature to further establish the efficacy of EcoMeditation.

EcoMeditation instructs practitioners to imitate the breathing patterns and body postures of an experienced meditator. No prior training is necessary. A number of benefits have been identified with the practice. Pennington et al. (2019) identified advanced brainwave patterns using electroencephalogram (EEG), specifically increased gamma synchrony between the left and right hemispheres, during participants' first EcoMeditation experience. In addition, Groesbeck et al. (2018) explored psychological and physiological markers during a two-day EcoMeditation workshop and identified several health benefits. The study found significant reductions in anxiety, depression, and pain, along with a decrease in physiological measures of stress (i.e., cortisol, resting heart rate). However, due to a modest sample size ($N = 34$) not all measures reached statistical significance.

A randomized controlled trial using fMRI compared EcoMeditation to mindful breathing (Church et al., 2022). Participants in the experimental and control group listened to 22-min audio tracks for 28 days. The EcoMeditation group showed posttest changes in functional connectivity in several brain regions while no alterations were found in the control group. Activity diminished in the part of the default mode network typically identified with self-referential thinking and decreased happiness, the mid-prefrontal cortex. However, activity increased in the brain region associated with prosocial emotions and compassion, the insula (Church et al., 2022). The brain changes are typical of those found in studies of experienced meditators, such as Tibetan monks with 10,000 h of practice (Goleman and Davidson, 2017). The novelty of this study was that similar patterns were identified in novices after four weeks of EcoMeditation practice.

EcoMeditation consists of ideologically neutral, evidence-based physiological relaxation cues (e.g., "relax your tongue on the floor of your mouth."). It avoids language associated with philosophy, worldview, belief, religion, or spiritual practice (Pennington et al., 2019). Psychological benefits are often reported by novice practitioners after the first attempt, which increases long-term compliance of the practice. Since the development of the method by the first author in 2009, EcoMeditation has been made freely available. It can be downloaded online (www.EcoMeditation.com) which in turn makes it accessible to any aspiring meditator who wishes to experience it.

The distractions of "monkey mind" – the mind's tendency to jump from subject to subject when not focused on a task - present

a notoriously difficult challenge even for seasoned mediators (Goleman and Davidson, 2017). EcoMeditation circumvents this obstacle, as it does not require meditators to attenuate the stream of thoughts that move through daily human consciousness. Instead, the techniques are designed to provide the mind with an alternative focus. Quieting the mind is associated with a reduction of activity in the brain's default mode network (Cheng et al., 2020). This is one of the brain regions that the aforementioned fMRI study found to be significantly downregulated (Church et al., 2022). Previous literature has found that the brain's task-positive network automatically suppresses the activity of the default mode network when active (Cheng et al., 2020). The instructions for EcoMeditation are intended to take advantage of this phenomenon by keeping the task-positive network engaged using breathing exercises and guided imagery.

A previous study found robust psychological benefits from a one-day EcoMeditation workshop conducted using an in-person group format (Church et al., 2022). While the current study used the same one-day format, virtual delivery was implemented. To promote engagement, participants were instructed using a set of practices termed "active learning." This included techniques such as repeating key concepts to a partner in a virtual breakout room, posting questions and comments in chat, and providing wellbeing scores after exercises. Research shows that classes using this model produce better student comprehension than conventional lectures (Deslauriers et al., 2019).

Furthermore, this study extended the scope of previous research by collecting data on flow states and transcendent experiences, or what psychologist Abraham Maslow called "peak experiences" (Mathes, 1981). One of the iconic images of the human potential movement is Maslow's "hierarchy of needs" model (see Figure 1; Maslow, 1943). Survival needs, such as air, food, and water are at the base of the pyramid. Once these needs are met, higher-order goals, such as social relationships and self-esteem can be pursued.

Later, Maslow identified peak experiences beyond the self-actualization level that he had placed at the summit of the pyramid (see Figure 2; Church, 2022). Maslow termed his new capstone "self-transcendence." The word "transcendence" is conventionally defined as an experience beyond or above the range of normal human experience in the material universe (Oxford English Dictionary, 2022). Self-transcendence is an experience of identity beyond the material self. It is described by meditation adepts as "no-self" and in the Sufi tradition as the "dissolution of the ego" (Vidich, 2015). This state has been a consistent phenomenological experience described by meditation adepts over the course of millennia (Newberg and Waldman, 2017).

Recent brain imaging advances have allowed investigators to progress beyond subjective self-report to objective measurement of the neural correlates of self-transcendent experiences. MRI studies of monks with over 10,000 h of meditation practice show a reduction in default mode network brain activity during meditation. Activity in the mid-prefrontal cortex, critical to constructing the sense of "self," reduced greatly; the phenomenological experience of "no self" reported by these adepts is reflected in the attenuation of activity in these specific regions of their brains (Newberg and Waldman, 2017).

The second brain region notable in self-transcendent experiences is the insula. When long-term meditators focus on compassion, activity in the insula increases. The insula is highly active during the experience of pro-social and positive emotions including compassion, gratitude, and love. Here again, the activity of the brain matches the phenomenological self-report of meditation practitioners. The previous fMRI study of EcoMeditation identified similar patterns in the insula and mid-prefrontal cortices of participants (Church et al., 2022).

Maslow used the term "peak experiences" to describe the phenomenology of self-actualized and self-transcendent states. This was later amplified by Nakamura and Csikszentmihalyi (2014) and modelled as "flow." Flow is an experience "in which an individual is completely immersed in an activity without reflective

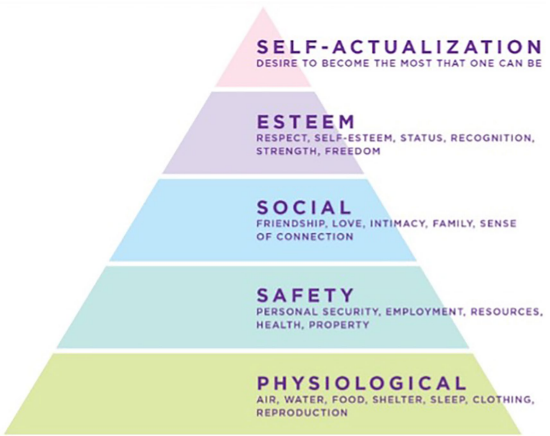

FIGURE 1
The traditional model of Maslow's "Hierarchy of Needs" (Maslow, 1943).

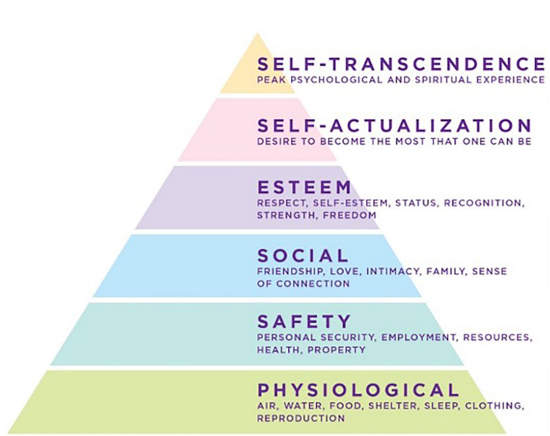

FIGURE 2
Maslow's revised model of the "Hierarchy of Needs" (Koltko-Rivera, 2006).

self-consciousness but with a deep sense of control" (Engeser et al., 2021). Flow research was one of the primary influences motivating the emerging field of positive psychology (Engeser et al., 2021). Csikszentmihalyi characterised flow as the "optimal experience" in the sense that it is defined as "a psychological state in which the person feels simultaneously cognitively efficient, motivated, and happy" (Moneta and Csikszentmihalyi, 1996).

While the relief of dysphoric states such as anxiety and depression have undoubted psychological utility, adding a measure of flow to a study addresses the capstone of Maslow's revised pyramid, the dimension of self-transcendence with its peak in psychological and spiritual experiences. Such measures allow investigators to determine whether an intervention both ameliorates emotionally distressing states and promotes peak states. For these reasons, the investigators in the current study built upon the existing scientific literature by adding measures of flow and transcendent experiences.

Aims and hypotheses

Thus, the current study aimed to extend Church et al. (2022)'s paper to examine the psychological effects of a one-day EcoMeditation intervention delivered in virtual group format. This study also explored changes in flow states and transcendent experiences to identify the co-occurrence of Maslow's "peak experiences" as described in the relevant literature.

Materials and methods

Participants and procedure

The study was reviewed by the Ethics Committee of the National Institute for Integrative Healthcare (NIIH20181101) and found to present minimal risk to participants. A convenience sample of 151 participants engaged in a one-day virtual EcoMeditation training workshop. The majority of the sample identified as female ($n = 130$, 85%) and participants ranged between 26 and 71 years old ($M = 45.1$, $SD = 9.19$). More than 50% had completed at least a high school level education. All provided consent by ticking a box on a virtual consent form prior to completing assessments. Following that, questionnaires were completed. Participants were required to provide consent and instructed to complete assessments pre-workshop, post-workshop, and at 3-months follow-up. Table 1 contains the demographic data for the sample.

TABLE 1 Frequencies and percentages of the virtual workshop demographics (N=151).

Variable	Category	*n* (%)
Age (years)	25–34	21 (13.9)
	35–44	51 (33.8)
	45–54	56 (37.1)
	55–64	21 (13.9)
Level of Education	65+	2 (1.32)
	Elementary	27 (17.9)
	High School	61 (40.4)
	College	56 (37.1)
	Graduate	7 (4.6)

n = Total number of participants in each group, % = Percentage of participants in each group.

Measures

The workshop registration process included the collection of demographic information such as age (years), gender, highest level of education (elementary, high school, college, or graduate) and contact details. Eight items from valid and reliable instruments assessed psychological symptoms of anxiety, depression, posttraumatic stress, general happiness, and pain as described below.

Anxiety

Two items from the Generalised Anxiety Disorder-7 inventory (GAD-7; Spitzer et al., 2006) measured participants' anxiety symptoms over the prior 2 weeks. Items were scored using a 4-point Likert scale, ranging from 0 (*not at all*) to 3 (*nearly every day*). A total anxiety score was derived from the summation of the two items (0–6), with higher scores indicative of greater symptoms. The GAD-7 is a valid and reliable measure used to screen for GAD in clinical research, with a score of 3 or greater indicating the likelihood of anxiety disorders (Donker et al., 2011). The PHQ-4 has demonstrated that the two anxiety items of GAD-2 indicated 84% of the total variance was explained by the first two factors (Kroenke et al., 2009).

Depression

Two items from the Patient Health Questionnaire-2 (PHQ-2; Kroenke et al., 2003) were included to assess symptoms of depression over the prior 2 weeks. Items were scored using the 4-point Likert scale, ranging from 0 (*not at all*) to 3 (*nearly every day*). A total depression score was derived from the summation of the two items (0–6), with higher scores indicative of greater symptoms. The measure has demonstrated good sensitivity (79%) and specificity (86%) for screening, with a score of 3 or greater indicating the likelihood of depressive disorders (Löwe et al., 2005). Internal reliability (Cronbachs α) was deemed good (>0.80) for PHQ-2 (Kroenke et al., 2009).

Posttraumatic stress

The two-item PTSD Checklist (PCL-2; Lang et al., 2012) was used to assess symptoms of PTSD in the prior month. Items were scored using a 5-point Likert scale, ranging from 1 (*not at all*) to 5 (*extremely*). A total PTSD score was derived from the summation of the two items, with scores ranging from 2 to 10. Higher scores

indicated potential clinical levels of psychological distress, with a score of 4 indicating a probable PTSD diagnosis. The PCL-2 has high sensitivity and provides a reliable indicator of significant clinical change (Lang et al., 2012).

Happiness

The 1-point Happiness Scale was used to assess participants' general happiness. Scores range from 0 (*not at all*) to 10 (*very*). Though brief, it has been found to correlate with extensive happiness instruments (Abdel-Khalek, 2006).

Pain

The 1-point Numeric Pain Rating Scale was used to measure the intensity of the current, best, and worst pain levels experienced in the past 24 h, ranging from 0 (*not at all*) to 10 (*worst pain imaginable*; McCaffery and Beebe, 1989).

Flow states and transcendent experiences

Ten items from the Flow Short Scale measure components of the flow experience to assess participants' most recent level of flow (Rheinberg et al., 2008). Items are scored using a 7-point Likert scale, ranging from 1 (*not at all*) to 7 (*very much*). A total flow state score was obtained from the summation of the 10-items (10–70), with higher scores indicating an increased flow state. The 5-item Universal Experiences Scale (Church and Stapleton, 2022) is based on the 5 characteristics of transcendent experiences reported by Newberg in a sample of 2,000 online surveys (Newberg and Waldman, 2017). It is designed to be a short instrument, in contrast to longer assessments such as the Mystical Experiences Questionnaire (MEQ) which has 30 items (Hood, 1975). Items are scored using an 11-point Likert scale, where scores range from 0 (*completely untrue*) to 10 *(completely true*). A total score was obtained from the summation of the 5-items (0–50), with higher scores indicating an increased level of transcendent experiences.

EcoMeditation training and practice

EcoMeditation consists of stress-reduction skills, specifically mindfulness, heart coherence, EFT, and neurofeedback. Participants attended a full-day virtual workshop and completed assessments before and immediately after the session. In the workshop, participants were provided with information regarding research into meditation followed by the practice of EcoMeditation and group feedback. The workshop consisted of four 90-min modules, with breaks in between. Each module reviewed a component of meditation research, such as the physiology of stress, the brain regions active in meditation, and the brainwave profiles of various moods.

Each presentation was followed by a guided EcoMeditation of about 30 min duration. Participants closed their eyes and performed each of the evidence-based techniques referenced above. These included EFT, the Quick Coherence Technique, and mindful interoceptive awareness. Emotionally neutral music was played virtually in the background. The first author, the developer of EcoMeditation, administered the six-hour virtual training workshop alongside other trained practitioners, and provided EcoMeditation instruction and guidance to participants in their home environment. To close, participants were provided with handouts and instructions to practice EcoMeditation at home following the workshop.

Results

The data was analysed using Statistical Package for Social Sciences Version 28 (SPSS; IBM, Armonk, NY, 2014). An alpha level of.05 was used for all statistical analyses unless otherwise specified.

Psychological markers

A priori analysis using the program G*Power 3.1 indicated that the sample ($N = 151$) was sufficient to ensure adequate power (80% statistical power, $f2 = 0.25$). Prior to main analyses, the data was screened. While the visual inspection of box plots indicated several univariate outliers, the values revealed to be genuinely unusual scores were retained for further analyses (see Figure 3). Several participants reported higher pain levels posttest. The Shapiro–Wilk test results indicated violations to the assumption of normality, and therefore pretest and posttest scores were compared using Wilcoxon Signed Rank Tests for paired samples.

The overall results indicated a significant reduction in anxiety, depression, PTSD, and pain scores from pretest to posttest. Following EcoMeditation training, there was also a significant increase in happiness scores (see Table 2).

In addition, a series of one-way repeated measures ANOVAs were performed to determine whether there were significant differences in anxiety, depression, PTSD, happiness, and pain across time. The sample consisted of 57 participants who had completed the assessments at all three timepoints including pre-workshop, post-workshop, and 3-months follow-up. *A priori* power analysis indicated that the sample ($N = 57$) was sufficient to ensure adequate power (80% statistical power, $f2 = 0.25$). The Shapiro–Wilk test indicated a violation to the assumption of normality; However, a slight skew has minimal influence on ANOVA analyses due to its robust nature. Assumptions of homogeneity of variance were met. A Hunynh-Feldt correction was applied where Mauchly's test of sphericity was violated.

Anxiety

A significant difference between anxiety scores was found between the pretest ($M = 1.11$, $SD = 0.83$), posttest ($M = 0.68$, $SD = 0.58$), and follow-up timepoints ($M = 0.68$, $SD = 0.64$), $F(1.64, 92) = 21.33$, $p < 0.001$, partial $\eta^2 = 0.28$. *Post hoc* analysis with a

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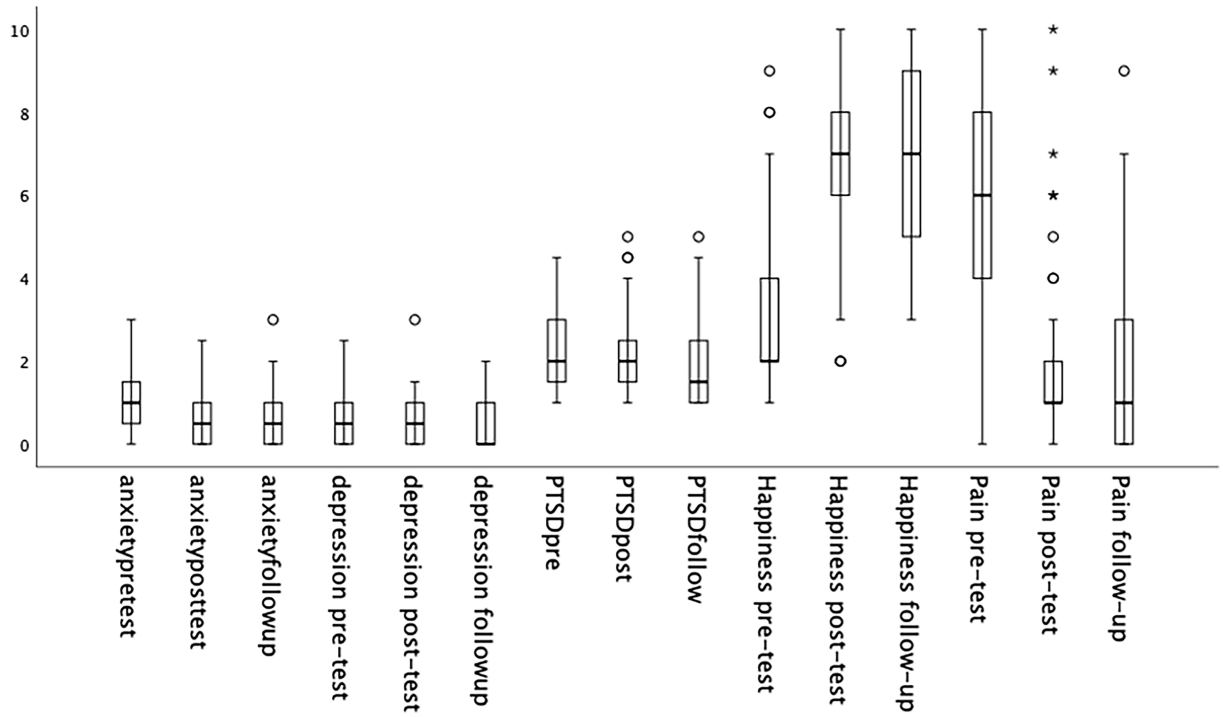

FIGURE 3
The distribution of data and outliers present across psychological markers across time (*N*=151).

TABLE 2 Measures outcomes pre- and post-EcoMeditation training (*N*=111).

Scale	Pre-test Mean ± SD	Post-test Mean ± SD	Change in mean	*t statistic*	*p* value
Anxiety	1.04 ± 0.85	0.60 ± 0.58	−0.44	6.54	< 0.001
Depression	0.72 ± 0.74	0.45 ± 0.59	−0.27	4.56	<0.001
PTSD	2.30 ± 0.96	2.0 ± 0.92	−0.30	4.13	<0.001
Happiness	3.34 ± 2.31	7.05 ± 1.90	+3.71	−13.51	<0.001
Pain	5.57 ± 2.76	2.06 ± 2.18	−3.52	10.93	<0.001

Bonferroni adjustment indicated a significant decrease in anxiety scores from pretest to posttest ($M=0.44$, 95% CI [0.22, 0.66], $p<0.001$) and pretest to follow-up ($M=0.44$, 95% CI [0.24, 0.64], $p<0.001$). There were no significant changes in anxiety between posttest and follow-up ($M=0.95$% CI [−0.14, 0.14], $p=1.00$), indicating that participants maintained the gains they had made during the workshop over time.

Depression

There were a significant difference in depression scores from pretest ($M=0.65$, $SD=0.63$), posttest ($M=0.45$, $SD=0.59$), and follow-up ($M=0.40$, $SD=0.53$), $F(1.73, 106.92)=7.49$, $p=0.002$, partial $\eta^2=0.11$. *Post hoc* analysis with Bonferroni adjustment indicated significant decrease in depression scores from pretest to posttest ($M=-0.20$, 95% CI [0.01, 0.39], $p=0.038$) and pretest to follow-up ($M=-0.25$, 95% CI [0.07, 0.44], $p=0.004$). There were no significant changes in depression scores from posttest to follow up ($M=0.06$, 95% CI [−0.07, 0.18], $p=0.868$), again indicating durable maintenance of participant gains.

Posttraumatic stress

Mean PTSD scores significantly decreased over time, $F(2, 112)=7.21$, $p=0.001$, partial $\eta^2=0.11$, from pretest ($M=2.30$, $SD=0.93$), posttest ($M=2.06$, $SD=0.95$), and follow-up ($M=1.92$, $SD=0.94$). *Post hoc* analysis with Bonferroni adjustment revealed a significant decrease in PTSD mean scores from pretest to follow-up, ($M=-0.38$, 95% CI [0.12, 0.64], $p=0.002$), but not from pretest to posttest, ($M=-0.24$, 95% CI [−0.02, 0.49], $p=0.080$) and posttest to follow-up ($M=-0.14$, 95% CI [−0.08, 0.37], $p=0.385$).

Happiness

There were significant differences in happiness means scores from pretest ($M=3.29$, $SD=2.14$), posttest ($M=7.00$, $SD=1.91$), and follow-up ($M=7.17$, $SD=1.94$), $F(2, 116)=84.26$, $p<0.001$, partial $\eta^2=0.59$. *Post hoc* analysis with Bonferroni adjustment revealed a significant increase in happiness from pretest to posttest

($M = -3.71$, 95% CI [−4.70, −2.73], $p < 0.001$) and pretest to follow-up ($M = -3.88$, 95% CI [−4.83, −2.93], $p = < 0.001$). There were no significant changes in happiness scores from posttest to follow-up ($M = -0.17$, 95% CI [−0.64, 0.30], $p = 1.00$), indicating a maintenance of participant gains.

Pain

Mean pain scores significantly decreased from pretest ($M = 5.69$, $SD = 2.69$), posttest ($M = 1.97$, $SD = 2.27$), and follow-up ($M = 1.97$, $SD = 2.25$), $F(2, 116) = 54.59$, $p < 0.001$, partial $\eta^2 = 0.49$. *Post hoc* analysis with Bonferroni adjustment revealed a significant decrease in pain scores from pretest to posttest ($M = 3.73$, 95% CI [2.58, 4.88], $p < 0.001$) and pretest to follow-up ($M = 3.73$, 95% CI [2.52, 4.93], $p < 0.001$). There were no significant changes in pain scores from posttest to follow-up ($M = 0$, 95% CI [−0.58, 0.58], $p = 1.00$), again indicating the durability of the results obtained by participants in the workshop.

Flow states and transcendent experiences

Prior to main analyses, the distribution of scores were roughly symmetrical and no extreme univariate outliers were detected (see Figure 4). The Shapiro–Wilk test indicated a violation to normality, therefore, Wilcoxon Signed Rank Tests for paired samples were used.

The results indicated a significant increase in flow state scores from pretest ($M = 4.32$, $SD = 1.06$) to posttest ($M = 5.07$, $SD = 0.91$), $t = -8.18$, $p < 0.001$. Also found was a significant increase in experiences typical of transcendence from pretest ($M = 5.61$, $SD = 2.16$) to posttest ($M = 6.65$, $SD = 1.94$), $t = -6.46$, $p < 0.001$.

In addition, one-way repeated measures ANOVAs were performed to determine whether there were significant differences in flow states and transcendent experiences across time. Although a violation to normality was detected by the Shapiro–Wilk test, no transformations were conducted due to ANOVAs robust nature. Assumptions of homogeneity of variance were met. If Mauchly's test of sphericity was not met, a Hunynh-Feldt correction was applied.

Flow states

A significant difference in flow state scores was found between pretest ($M = 4.37$, $SD = 1.10$), posttest ($M = 5.12$, $SD = 0.90$), and follow-up ($M = 4.99$, $SD = 0.94$), $F(2, 116) = 25.35$, $p < 0.001$, partial $\eta^2 = 0.30$. *Post hoc* analysis with a Bonferroni adjustment indicated a significant increase in flow state from pretest to posttest ($M = -0.76$, 95% CI [−1.06, −0.45], $p < 0.001$) and pretest to follow-up ($M = -0.63$, 95% CI [−0.91, −0.34], $p < 0.001$). There were no significant changes in flow state between posttest and

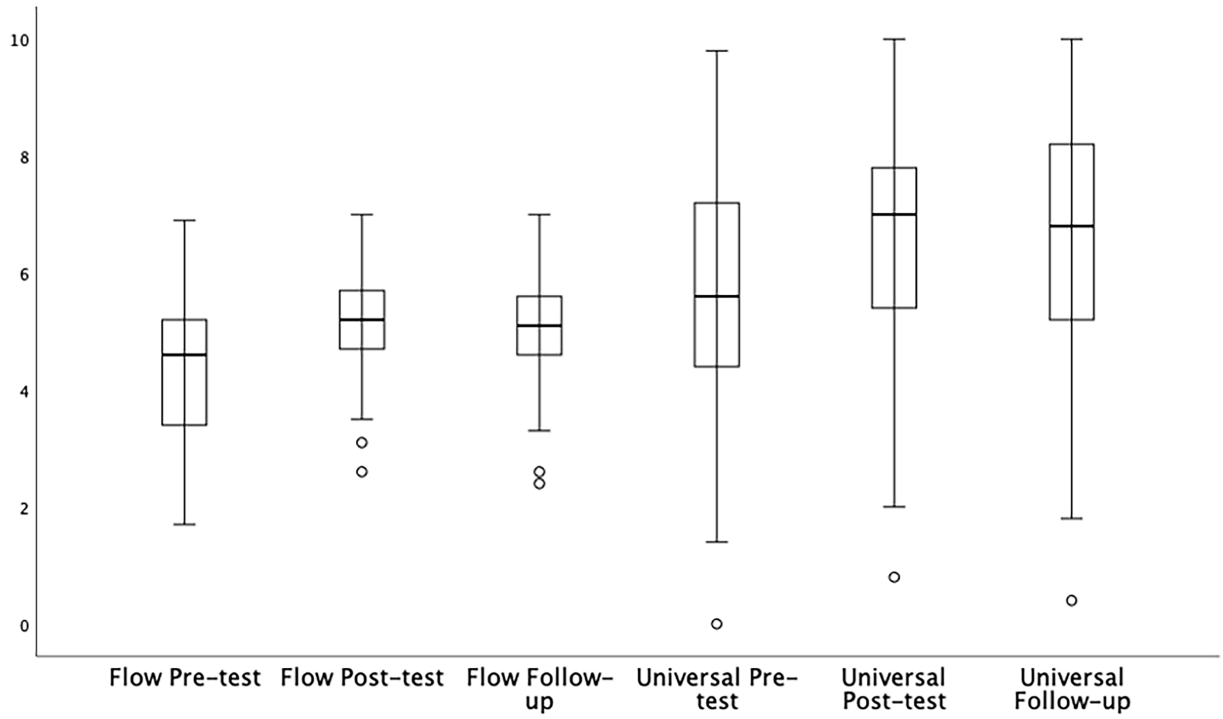

FIGURE 4
The distribution and outliers of flow states and transcendent experiences over time (N=151).

follow-up ($M = 0.13$, 95% CI [−0.12, 0.38], $p = 0.623$), indicating the durability of participant gains over time.

Transcendent experiences

A significant difference in transcendent experience scores was found between pretest ($M = 5.66$, $SD = 2.27$), posttest ($M = 6.66$, $SD = 1.98$), and follow-up ($M = 6.61$, $SD = 2.15$), $F(2, 116) = 13.89$, $p < 0.001$, partial $\eta^2 = 0.19$. *Post hoc* analysis with a Bonferroni adjustment indicated a significant increase in transcendent experience from pretest to posttest ($M = -0.99$, 95% CI [−1.57, −0.42], $p < 0.001$), and pretest to follow-up ($M = -0.95$, 95% CI [−1.38, −0.52], $p < 0.001$). There were no significant changes in transcendence between posttest and follow-up ($M = 0.04$, 95% CI [−0.51, 0.60], $p = 1.00$), again indicating that participant gains were durable.

Clinical significance of happiness, transcendent experiences, and flow state scores

To report the size of the effect of treatment in standardized terms, Cohen's conventions for modest, moderate, and large differences (respectively, $d = 0.2$, $d = 0.5$, $d = 0.8+$) were employed (Cohen, 1988). If the mean difference in pre-post scores changed by at least 2 Likert points, a clinically significant improvement was identified (Ranganathan et al., 2015; Martin et al., 2021). For happiness, 77.5% ($N = 86$) of participants reported a significant improvement from pre-test ($M = 3.34$, $SD = 2.31$) to posttest ($M = 7.05$, $SD = 1.90$) which produced a large treatment effect size ($M = +3.70$, $d = 1.28$). For flow states and transcendent experiences, 78.4% ($N = 87$) and 71.2% ($N = 79$) of participants reported significant change, respectively. A moderate effect size was identified for flow state mean scores from pretest ($M = 4.32$, $SD = 1.06$) to posttest ($M = 5.07$, $SD = 0.91$; $M = +0.75$, $d = 0.78$) and transcendent experiences from pretest ($M = 5.61$, $SD = 2.16$) to posttest ($M = 6.65$, $SD = 1.94$; $M = +1.04$, $d = 0.61$).

Discussion

The current study measured the psychological benefits, flow states, and transcendent experiences associated with EcoMeditation, a method combining four evidence-based stress-reduction techniques. After a one-day EcoMeditation workshop, results indicated that participants ($N = 151$) experienced a significant reduction in anxiety, depression, PTSD, and pain, along with an increase in happiness, flow states and transcendent experiences. At 3-months follow-up, one-way repeated measures ANOVAs ($N = 57$) indicated a significant decrease in anxiety, depression, and pain between pretest and posttest, as well as pretest and follow-up. The results also revealed a significant increase in flow states, happiness, and transcendent experiences between pretest and posttest, as well as pretest and follow-up. Decreased PTSD symptoms were evident over the 3-month period between pretest and follow-up.

The current study provided a differentiated examination of EcoMeditation by using a virtual group delivery format. It extended previous literature by including measures of flow states and transcendent experiences. Overall, the empirical findings support those of previous studies demonstrating that EcoMeditation yields improvements in psychological outcome measures of anxiety, depression, pain, happiness, and PTSD (Groesbeck et al., 2018; Pennington et al., 2019; Church et al., 2020, 2022). EcoMeditation was also associated with the benefits of increased flow and transcendent experiences, with over 71% of participants experiencing clinically significant improvements after the workshop. This indicates that EcoMeditation does more than ameliorate dysphoric psychological symptoms; it catalyses peak experiences.

There are several possible reasons why the virtual EcoMeditation workshop yielded greater efficacy for reducing PTSD and depression over the 3 months of the follow-up period. Participants were encouraged to practice EcoMeditation after the workshop, and were provided with resources to promote daily practice. At the end of the workshop, virtually all participants made a commitment to a consistent daily practice. Regular meditation might have enhanced therapeutic outcomes. In addition, participants practicing in their familiar environments might have felt more comfortable than in a public setting.

The study had several limitations. Vieten et al. (2018) proposed that the psychological improvements found in group meditative experiences may be attributed to a supportive group dynamic, demand characteristics, or the stress-reducing effects of meditation rather than the practice itself. In addition, investigator allegiance might have contributed to the results, since the first author, the developer of EcoMeditation, administered the intervention. The absence of a control group meant that the contribution of the non-specific effects of any therapeutic intervention was likely to have played a part in the results obtained. EcoMeditation was not compared to a known efficacious therapy or a control group during the study. Therefore, there was no measure obtained on how the population may have responded to other forms of treatment or no treatment. EcoMeditation combines multiple techniques, and therefore, the contribution of each technique to its therapeutic effects is unknown.

In addition, the sample only consisted of self-selected participants with presumed high levels of motivation, which limits the generalisability of the study's findings to a heterogenous population. The study also did not control for participants' previous experience using EcoMeditation and other forms of meditation. Further, the sample size at follow-up was approximately one third of the size of the initial sample due to participant attrition. It is possible that non-responders did not experience any psychological benefits. Mitigating this limitation is the finding that high participant attrition rates are typical of

online studies and that non-response rates (<85%) do not tend to bias reported outcomes (Couper et al., 2007; Church and Brooks, 2010; Tabachnick and Fidell, 2014). A further limitation is the large gender disparity between participants. This sample, in which 85% were female, might have skewed the results. Lastly, the frequency and duration of participant use of EcoMeditation between the workshop and the follow-up point was not measured. The results noted in the follow-up might have been due to participant use of EcoMeditation between these two points, rather than the effects of the workshop itself.

Despite these limitations, the results of the study are noteworthy. These findings support the use of virtual EcoMeditation workshops in clinical settings, such as group therapy clinics, hospitals, outpatient support groups, employee meetings, training centers, veterans' organisations, drug rehabilitation centers, prisons, and other settings that promote stress management. EcoMeditation may be of benefit to outpatient services, as clinical experience has shown that simple and efficient techniques are more likely to be practiced than complicated protocols.

The results of this study suggest recommendations for future research. Dismantling and component studies can determine the contribution made by each modality of EcoMeditation. The method should be examined in randomly selected samples and compared to other known efficacious methods such as mindfulness-based stress reduction (MBSR), EFT, and cognitive behaviour therapy (CBT). Additional studies using randomisation and active control groups will illuminate its effectiveness when measured against these established therapies. Further exploration using larger samples and the assessment of previous meditation experience will provide greater insight into any effects unique to EcoMeditation.

The results obtained at 3-months follow-up reveal that most participant gains were durable. Measures of whether participants practiced EcoMeditation and how frequently, will provide insight into this question. Delivery by instructors other than the developer will illuminate whether EcoMeditation is as effective when offered by others. Objective data independent of participants' self-reports should also be obtained, extending the findings of the one existing study that used physiological markers (Groesbeck et al., 2018). As psychological stress is concomitant with physiological markers, assessments such as cortisol, immunoglobulins, C-reactive protein, gene expression, microRNAs and interleukins will further illuminate the physiological dimensions of change (Thrall et al., 2007; Ruwaard et al., 2013). In the fMRI study summarised above (Church et al., 2022), participants listened to a 22-min recorded audio tape rather than live training; nonetheless significant improvements in psychological and neurological function were identified. Live training in EcoMeditation should be contrasted with recorded EcoMeditation tracks, and in-person with virtual workshops.

Conclusion

The results of this study are consistent with those of other studies (Groesbeck et al., 2018; Pennington et al., 2019; Church et al., 2020, 2022). EcoMeditation produces robust improvements in a range of psychological symptoms, including anxiety, depression, pain and PTSD. This study extended those investigations, and found that transcendent experiences and flow states were enhanced by EcoMeditation. Participant gains persisted 3-months after the EcoMeditation workshop. The four evidence-based techniques combined in EcoMeditation are associated with durable psychological benefits. Future research using randomised controlled trials is needed to establish whether the psychological gains identified in extant EcoMeditation studies can be replicated using more rigorous experimental designs, including the use of control and comparison studies.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by National Institute for Integrative Healthcare Ethics Committee (NIIH20181101). The patients/participants provided their written informed consent to participate in this study.

Author contributions

DC and PS designed the study, established scales, and recruited participants. DC facilitated the EcoMeditation workshops and collected participant data. DG performed statistical analyses and drafted the manuscript. TO'K assisted with forming final draft of manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: DC receives income from EcoMeditation publications and presentations. DC shall declare he is the NIIH's president/CEO, and Topic Editor for the Research Topic where this manuscript was submitted: The Future of Psychology: Approaches to Enhance

Therapeutic Outcomes. Stapleton shall declare she is a NIIH Board member and Topic Editor for the Research Topic where this manuscript was PS: The Future of Psychology: Approaches to Enhance Therapeutic Outcomes.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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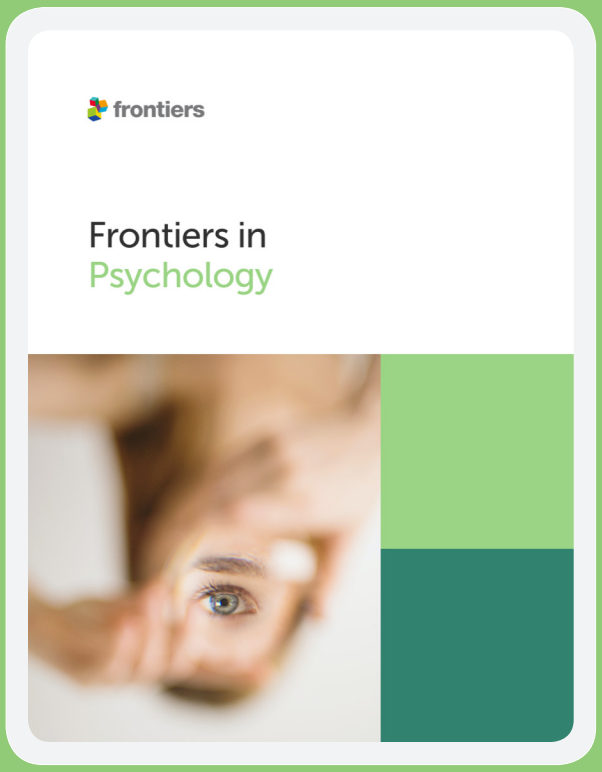

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