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The *Energy* of Energy Psychology

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Abstract

The vague or controversial use of the term *energy* in the clinical subdiscipline known as "energy psychology" has been an obstacle to the field's acceptance. This paper discusses five forms of energy and explores the role of each in energy psychology treatments. While patterns in (a) electrical signaling, (b) brain waves, and (c) electromagnetic fields are presumably shifted in any form of effective psychotherapy, a strength of energy psychology interventions is shown to be in their ability to initiate such effects in a deliberate and targeted manner. This paper examines the roles of these three well-established energy forms in explaining the rapid and durable outcomes seen with a wide range of conditions following energy psychology treatments. A fourth form of energy, "subtle energy," is by definition too *subtle* for detection by conventional scientific instruments. These energies have, however, been recognized in at least 97 healing traditions around the world and are considered to be the infrastructure of the body's physiological processes. Skepticism about subtle energies has, nonetheless, caused many critics to reject an energy psychology approach entirely, ignoring the substantial evidence base supporting it. Even more speculative are quantum influences that occur within energy psychology treatments, yet preliminary evidence for these dynamics, such as healing from a distance, has been accumulating. Although the more speculative mechanisms associated with energy psychology remain controversial, the measurable

electromagnetic effects that have been shown to affect psychological states strongly support the use of the term "energy psychology."

Keywords
Brainwaves; electrical signals; electromagnetic fields; energy; energy psychology; psychotherapy; subtle energies

The *Energy* of Energy Psychology

David Feinstein

In every culture and in every medical tradition before ours,
healing was accomplished by moving energy.

– Albert Szent-Gyorgyi
Nobel Laureate in Medicine

1. Introduction

Energy psychology is a psychotherapeutic and self-help approach that has been shown in more than 120 clinical trials to impact a wide range of conditions, to deliver results with unusual speed, and to have durability on follow-up [1]. The approach has been utilized by psychotherapists as well as other health care professionals, athletic teams, performance coaches, business consultants, and disaster relief workers [2]. Psychological benefits demonstrated in clinical trials have included statistically significant declines in anxiety, depression, phobias, symptoms of post-traumatic stress disorder (PTSD), insomnia, pain, food cravings, and performance blocks [3]. Physiologic improvements have been documented in endocrine, cardiovascular, and immune function, including reduced cortisol levels, reduced resting heart rate, reduced systolic and diastolic blood pressure, and increases in immunoglobulin A (an antibody supportive of immune function) [4].

An obstacle to professional acceptance of the growing body of research supporting the efficacy of energy-oriented healing modalities has been the vague or controversial use of the term *energy* in the field's name and explanatory frameworks [5]. While all forms of psychotherapy presumably influence the body's electrical signaling, brain waves, and electromagnetic fields, the premise of this paper is that a strength of energy psychology is its ability to initiate these effects in a deliberate and targeted manner, such as by stimulating acupuncture points that send electrical impulses which activate or deactivate specific neural processes. Another focus within energy psychology is on "subtle energies," energies which have not yet been detected by conventional instruments but are believed to be involved in health and healing by time-honored healing traditions around the world. Finally, the increasing recognition of quantum dynamics as an influence on psychological processes are also applicable to energy psychology. While the existence of subtle energies and the nature of quantum dynamics remain areas of scientific controversy, evidence pertaining to each is examined in the final sections of the paper.

2. Physical and Psychological Energies

The source of the modern word *energy* is the Greek term "energeia," which traces to "ergon," the word for work [6]. Energy is often simply defined as the "power to do work." The capacity to generate light or heat has sometimes been added to this most rudimentary definition. Meanwhile, biological energy has been defined as the strength required for sustained physical or mental activity, with a recognition that an organism acquires energy from its environment. But the term energy has evolved so much as science has advanced that no single definition is adequate.

Aristotle (384-322 BC) used the term *energeia* to refer to the actualizing of a potential. A house, for instance, is built on the energeia of its building materials whereas pleasure is an energeia of the human body and mind. By the middle of the 16th century, energy was used to refer to "force" or "vigor of expression" [7]. The concept was quantified by Thomas Young, the first to use "energy" in a manner akin to its current use in physics [8]. In lectures to the Royal Society of London in 1802, Young described energy as the product of the mass of a body times the square of its velocity. The first law of thermodynamics was described in 1850, explaining how energy within a closed system cannot be created or destroyed, only modified from one form to another [9]. These modifications involve the energy's wavelength patterns. As wavelengths decrease in size and correspondingly increase in frequency, they are transformed within the electromagnetic spectrum, from radio waves (longest wavelength, lowest frequency) to visible light (middle of the spectrum) to gamma rays (shortest wavelength, highest frequency).

Meanwhile, the most famous formula in history, and perhaps also the most elegant, $E = mc^2$, expresses Einstein's counter-intuitive realization that energy and matter are different forms of the same underlying phenomenon. A colleague, Dr. Vicki Matthews, uses the molecular structure of water as an analogy for explaining how energy and matter might be the same phenomenon in different forms. Whether H_20 is in the form of ice, liquid, or steam, it is always water. The difference between water in a frozen state, a liquid state, or a gaseous state is the vibratory rate of the water molecule. The slower it vibrates, the denser the substance. The faster it vibrates, the less dense. This analogy draws upon everyday experience for approaching the premise that matter *is* energy, vibrating at a very slow rate.

The evolution of the concept of *psychological energies* has been traced by Livneh [7]. Whereas conceptions of energy derived from physics are primarily defined by magnitude (measured in joules), psychological energy is typically defined by its strength, direction, quality (positive or negative), and relationship to time. Freud (1856-1939) explained his theories using energetic concepts such as drives, motives, libido, repression, and catharsis. He saw human impulses as being constructive (Eros) or destructive (Thanatos). He conceived of the "id" as a reservoir of primary, instinctual energies and of the "ego" as involving attempts to consciously control the energies that fuel mental life. He viewed these psychological energies in terms of the physics of his time (Maxwell's thermodynamics) and thus as obeying the principle of the conservation of energy. A second historical figure that Livneh identifies as having made a substantial contribution to the concept of psychological energy is Kurt Lewin (1890-1947). Lewin borrowed the concept of "energy fields" from physics in explaining "force fields" from the environment that influence human behavior. Hans Selye, the third historical figure Livneh highlights, equated an organism's finite amount of "adaptational energy" with its ability to cope with stressful events.

Livneh goes on to identify six contemporary approaches that have advanced the concept of psychological energy. These include the energization and motivation theory of Brehm and others [10], Baumeister's self-regulation theory [11], Deci and Ryan's self-determination theory [12], Greenglass' vitality theory [13], Hobfoll's conservation of resources theory [14], and Lazarus' theory of emotion and stress [15]. Livneh also notes that the concept of psychological energy can be found in various widely used psychological constructs, such as Seligman's positive psychology [16].

Energy psychology interventions impact both physical and psychological energies. In regard to *psychological* energies, changes in the strength, direction and quality of affect, motivations, and corresponding behaviors have all been observed in clinical outcome studies. On the temporal dimension of psychological energies, these changes may occur in relation to the mental activation of past experiences, present challenges, or future anticipations. None of this, however, is unique to energy psychology. What is within the special domain of energy psychology and other energy-oriented healing approaches is a studied attentiveness to the body's *physical* energies. Interventions that directly target the body's physical energies, as discussed below, may explain why energy psychology protocols have been so effective in shifting psychological energies. Five areas involving the physical energies mentioned earlier—electrical signaling, brain waves, electromagnetic fields, subtle energies, and quantum dynamics—are each discussed, and ways that energy psychology interventions interact with each area are suggested.

3. Electrochemical Signals

Electrochemical signals, passing from neuron to neuron, are believed to control the entire spectrum of human behavioral and metabolic activities, including breathing, walking, speaking, swallowing, digesting, sleeping, thinking, wound healing, fighting invading microbes, or reacting to other threats [17]. The human brain is an unimaginably complex energy network operating through the wiring of the body's 100 billion neurons, each connected to up to 10,000 other neurons [18]. Nerve cells may be directly stimulated by light, sound, or pressure, but in most cases they are triggered by signals sent from other neurons. Once a neuron's dendrites are stimulated by the synapses connecting it with the axons of other neurons, a wave of "action potential" is generated that travels down the length of the neuron to its axon terminals. This is the "electro" part of "electrochemical." When the impulse reaches the axon terminal, it triggers the release of chemical messengers (neurotransmitters) in *chemical* synapses (the "chemical" part of "electrochemical") or the further transmission of electrical signals through *electrical* synapses. Electrical synapses are able to conduct the signal to neighboring neurons without first translating them into a chemical message. Although they are fewer in number than chemical synapses, they are found throughout the nervous system and serve important and unique functions.

3.1 Electrical Signals Following Acupoint Stimulation

Studies of the stimulation of acupuncture points reveal another way, different from neuron to neuron, that electrical signals may be transmitted through the body. A 10-year research program at Harvard Medical School using fMRI and other imaging devices to investigate the effects of stimulating acupuncture points found that certain points send signals to the amygdala and other parts of the limbic system which reduce threat arousal almost instantly [19, 20]. This finding holds enormous implications for understanding energy psychology because one of the primary

procedures used in energy psychology protocols involves stimulating acupuncture points (acupoints) by tapping on them. Acupuncture and energy psychology are two very different approaches, however traditional needling on an acupoint and its manual stimulation have similar benefits. For example, a double-blind study comparing acupuncture needle penetration with non-penetrating pressure (that simulated the feeling of penetration) found equivalent clinical improvements for both interventions [21].

Traditional Chinese medicine recognizes at least 361 points on the skin's surface as having distinctive features compared to nearby portions of the skin [22], including better electrical conductivity and a proportionately lower amount of electrical resistance [23-25]. Acupoints are situated along energy pathways called meridians, and they are also usually located in areas with a high concentration of free nerve endings [20]. Because the meridian lines, as mapped on acupuncture charts, do not correspond with blood vessels, nerve pathways, or the lymphatic system, the anatomical basis of the meridians has been questioned. A 2002 study, using ultrasound images, found an 80% correspondence between the sites of acupoints and the body's connective tissue, suggesting that "the anatomical relationship of acupuncture points and meridians to connective tissue planes is relevant to acupuncture's mechanism of action" ([26], p. 257). In a 2021 study, tracer dyes, injected at acupuncture points, generated linear migrations closely aligned with the meridian charts, supporting both an anatomical basis for the meridians and previous evidence that they operate within the connective tissue [27]. This study also corroborated the seminal but controversial findings of Bong-Han Kim in North Korea in the 1960s [28].

In a review of the "scientific basis of Chinese medicine" as it pertains to cancer care, Sager and Wong emphasized the "modification of biological response to improve therapeutic gain" ([29], p. 10). In energy psychology protocols that utilize acupoint tapping, the following sequence occurs:

1. *Tapping on an acupuncture point generates an electrical signal*. This process is regulated by the well-established principle that certain large proteins within cells can transform a mechanical stimulus, such as needling or pressure on the skin (i.e., tapping), into electricity. Called "mechanosensory transduction," the signal produced is a form of "piezoelectricity" or "electricity generated by pressure" [30]. The spark generated to ignite a butane stove or a cigarette lighter is a form of piezoelectricity.
2. *The signal produced may be transmitted to parts of the body that are not in the proximity of the site being stimulated*. For instance, stimulation of an acupoint in the foot, used to treat eye conditions, has been shown to increase blood flow in the blood vessels as well as in tissues of the eye [31]. Most acupoints are found above the fascia, a type of connective tissue made primarily of collagen. Because collagen is a semi-conductor, signals can swiftly reach specific areas of the body rather than needing to travel synapse to synapse through the nervous system [32]. This provides a tenable explanation for the reported speed and precision of acupoint tapping techniques.
3. *The signal generated by the tapping may reach brain regions where they can activate or deactivate neural activity in therapeutically beneficial ways,* as discussed below.

Early objections to reports of the efficacy and proposed mechanisms of acupoint tapping focused on placebo effects and the influences of non-tapping therapeutic ingredients within tapping protocols, such as expectation, the therapist's caring attention, or the mental activation in a safe

environment of troubling scenes (imaginal exposure). In response to these reasonable concerns, six studies have been conducted to determine the specific impact of acupoint tapping on treatment outcomes. Each study compared an energy psychology procedure to a virtually identical protocol, with the exception that acupoint tapping was substituted with a different intervention in the control group. Diaphragmatic breathing, mindful breathing, and tapping on non-acupuncture points, also known as "sham points," were among the alternatives. A review and a meta-analysis of the six investigations indicated that, in addition to other therapeutic factors, acupoint tapping is an active and necessary ingredient for the strong outcomes found in the clinical trials [33]. The pre-test vs. post-test EFT treatment showed a large effect size, Cohen's d = 1.28 (95% confidence interval [CI], 0.56 to 2.00). In comparison with the active controls, the tapping treatments showed a moderate effect size advantage of d = −0.47 (95% CI, −0.94 to 0.0).

3.2 Activating and Deactivating Signals

The Harvard researchers referred to earlier were able to deduce that acupuncture sends signals directly to the brain because the fMRI images showed that activity in the limbic system associated with threat was reduced almost instantly when needles were inserted into certain acupoints. Other imaging studies have shown increases in activity in areas of the brain associated with reasoning and stress management following acupoint tapping [34, 35]. These activating and deactivating effects of acupuncture may occur anywhere throughout the body, including neural pathways. At the level of brain function, some of these stimuli are excitatory, initiating or sustaining nerve activity. Other stimuli are inhibitory, reducing nervous system activity. Within acupuncture, points that increase arousal are called “strengthening points” and points that decrease arousal are called “sedating points” [36].

Acupoint tapping protocols are able to activate or deactivate brain regions to facilitate desired clinical outcomes [3]. Clinical experience, backed by preliminary brain imaging studies [34, 35, 37], suggests that electrical signals generated by acupoint tapping are directed to brain regions which have been stimulated by memories, images, or thoughts. Evoking a fearful memory or threatening image activates the amygdala. Tapping while in that mental state sends deactivating signals to the amygdala’s lateral nucleus, the structure that initiates the threat response [38]. Thus by guiding where the client’s attention is focused while doing the tapping, the therapist is in effect directing the regulating signals produced by the tapping to targeted brain regions with unusual precision.

Because emotional dysregulation and hyperarousal are the neurologic substrates of many trauma-based disorders such as PTSD, interventions that reduce hyperarousal in pertinent brain areas are therapeutic for them [39]. Energy psychology protocols rapidly downregulate the fight-or-flight response associated with hyperarousal by sending deactivating signals directly to the limbic system.

3.3 Do Benefits Last After a Tapping Session?

Virtually every study that has examined pre- to post-treatment changes in stress-related symptoms following an acupoint tapping session has found statistically significant reductions [1]. For instance, in the very first peer-reviewed randomized clinical trial (RCT) to examine the outcome of a tapping protocol, published in 2003, 18 subjects with a fear of small animals were provided a 30-minute session [40]. Their fears were reduced at a high level of statistical significance and to a

much greater degree than in control subjects who used diaphragmatic breathing. This finding has been replicated [41] and is consistent with subsequent clinical trials investigating other irrational fears as well as more serious conditions such as PTSD. An example of these immediate effects with a height phobia can be viewed at http://phobiacase.EnergyPsychEd.com (accessed January 27, 2022). The rapid elimination of the phobia makes sense if the tapping is indeed sending deactivating signals directly to the amygdala during the interval that it is in a state of hyperarousal provoked by the imaginal exposure.

However, even if this is the case, a question remains: Why would fear not re-emerge the next time a height is encountered? Even after brief therapy, follow-up investigations of energy psychology treatments have consistently shown the clinical benefits to be long-lasting. A review of 115 clinical trials of acupoint tapping treatments found that 79 did follow-up investigations [3]. In 77 of them, benefits were sustained. In each, follow-up testing showed improvement between pre-treatment measures and assessments at the end of the follow-up period to be statistically significant in at least one of the major change categories being tracked. Follow-up periods ranged from 1 month to 2 years, with a mean of 7 months.

3.4 Mechanisms That Make Tapping Outcomes Durable

In a ground-breaking study of the neurological effects of tapping protocols, Stapleton et al [37] used pre- and post-treatment fMRI imaging to investigate a program that applied acupoint tapping for managing food cravings in individuals being treated for obesity. While complex responses to food are not controlled by a single part of the brain, fMRI scans acquired while images of high-caloric "junk" foods showed to the study participants revealed activation in the superior temporal gyrus (related with cognition) and the lateral orbito-frontal cortex (associated with reward). The same images, provided in random sequences, exhibited significantly decreased or even no activity in these areas after 4 weeks of 2 hour per week group acupoint tapping sessions, as demonstrated in the brain scans of one of the individuals in Figure 1.

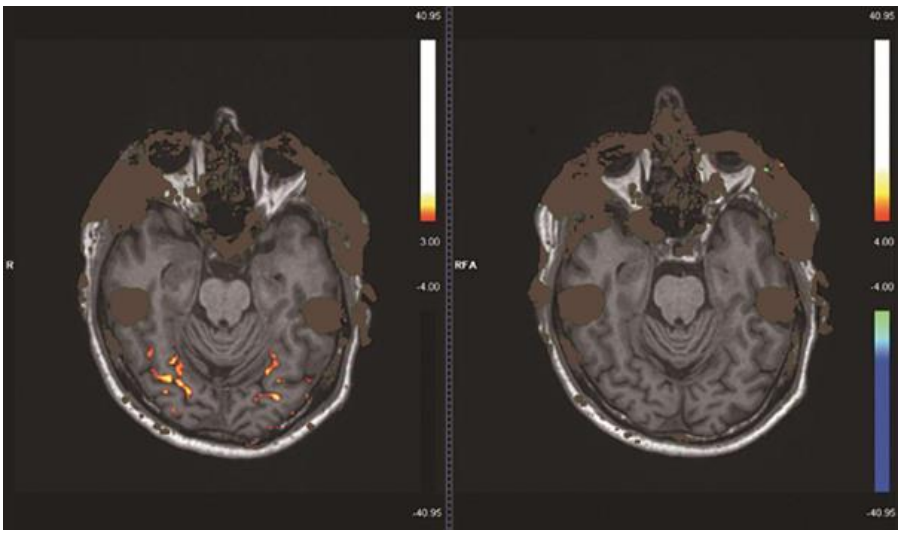

Figure 1 Pre- and post-treatment fMRI scans for subject in the tapping treatment of food cravings while high-caloric food images were presented. Colored areas activated during the pre-scan (left) were not activated during the post-scan (right). From Stapleton et al, 2019, with permission [37].

These findings show that functional changes in neurological activity persisted after the end of the treatment program. While this study didn't do long-term follow-up, studies of a similar program found continued improvements in food craving, dieting mentality, and "power over food" choices at 12-month follow-up [42]. Similar changes in brain activity that correspond with the fMRI images can be inferred.

3.5 Prediction Errors Destabilize Longstanding Emotional Learnings

The essential question for understanding the mechanisms in any serious personal development effort is this: *How do emotionally-embedded learnings change?* Neurologists have, hand-in-hand with psychotherapists, been actively pursuing answers to this question dating back at least to Freud. A finding that summarizes decades of recent research is the importance of what are called "prediction errors." Prediction errors are experiences in which what the person's existing explanatory framework predicts or expects is different from what occurs [43]. Prediction errors are the underlying mechanism in one of the most widely recognized processes in psychotherapy, the "corrective emotional experience." Named by Alexander and French in 1946, a corrective emotional experience occurs when an old, unsettled conflict is re-experienced, "but with a new ending" [44]. The new ending constitutes a prediction error.

A prediction error in a situation that has a strong emotional charge can quickly revise a longstanding learning. The brain is designed to update itself [45]. If the subjects in the food craving program tap on acupoints that send deactivating signals to the parts of the brain that are stimulated by a food image, and the person then experiences no craving for that food, a prediction error has occurred and is viscerally registered. With a few repetitions, the food image no longer becomes a stimulus for the craving. If a combat survivor with PTSD taps to send deactivating signals to the areas of the brain that are aroused when recalling a battle explosion, and has no physiological reaction to the memory, a prediction error has occurred. After a few repetitions in various imagined contexts, unexpected loud sounds will no longer trigger panic reactions.

3.6 Targeting Brain Areas That Maintain Outdated Learnings

Emotional learnings that have been consolidated into the person's memory system do not change easily, but when prediction errors become involved, they can be rapidly transformed and reconsolidated based on the more recent experiences. This means that the neural pathways coding the old learning have literally been eradicated, rather than simply over-written, as occurs in conventional exposure therapy. A more detailed explanation of this reconsolidation process is available elsewhere [38], but for the purposes of understanding how electrical signals are involved in the outcomes following energy psychology sessions, the key concepts are:

1. Tapping on acupoints while mentally accessing an outmoded emotional learning sends activating or deactivating signals that target the areas of the brain associated with that emotional learning.
2. When the mental state that is predicted by the old learning is not experienced because the tapping has changed arousal patterns, the mental state that *is experienced* becomes the expected response in a new learning that replaces the old learning.

3. The clinical significance of this sequence is that by directing the client to bring to mind a situation that evokes a maladaptive emotional or behavioral response while tapping on selected acupoints, the therapist is using the tapping to generate deactivating signals which will disrupt the neural pathways that encode the old learning.

4. Brain Waves

Electrical signals are a primary way the body communicates with itself as it adapts to the ongoing stream of new experiences. *Brain waves*, on the other hand, are oscillating electrical voltages that are produced by masses of interacting neurons and correspond with the brain's activity [46]. They measure just a few millionths of a volt and vary by frequency (speed or cycles per second, measured in hertz) and amplitude (height). Five categories of brain waves are referred to as the delta, theta, alpha, beta, and gamma bands. Each is associated with a different frequency and a different type of human activity, as shown in Figure 2.

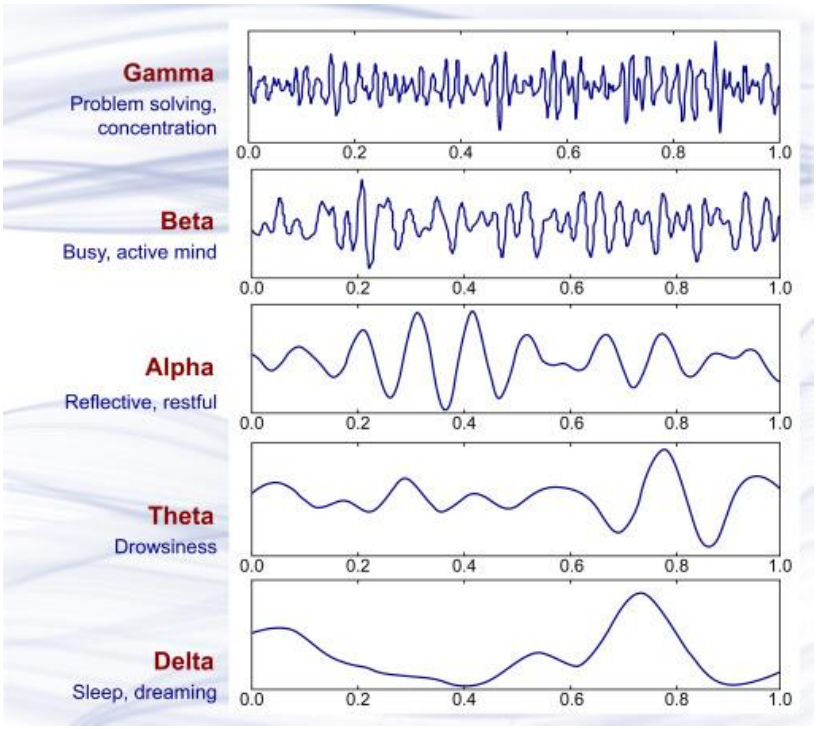

Figure 2 Brain Wave Frequencies, Amplitudes, and Associated Activities. From Abhang et al. [46].

While different brain wave frequencies are dominant depending on the person's activity, all five may be present in different parts of the brain at any given moment. Specific brain wave ratios in specific brain regions constitute the signature of specific disorders. For instance, children diagnosed with attention deficit/hyperactivity disorder (ADHD) have higher delta and theta waves in the frontal and parietal brain regions [47]. Slow wave activity can make it difficult to control attention or behavior and are associated with conditions such as learning disabilities, impulsive disorders, chronic fatigue syndrome, and fibromyalgia. The complexity of the brain's shifting wave patterns in different brain regions make definitive relationships difficult, but alterations in alpha and theta

rhythms appear to be associated with major depressive disorders [48] while configurations for anxiety and PTSD are still being explored.

Neurofeedback training uses electroencephalogram (EEG) technology to project brain wave patterns onto a computer screen, making it possible for individuals to influence and change their brain waves by consciously interacting with their own physiological and mental states. The method has been used to treat "a wide variety of psychiatric illnesses, to treat sub-clinical symptoms, and even to enhance performance in healthy populations" with encouraging results ([49], para 1).

Early EEG studies of acupoint tapping protocols indicated that they normalized brain wave patterns [50, 51]. Digitized EEG equipment makes it possible to view shifts in brain waves during tapping sessions. Neurofeedback researchers Gary Groesbeck and Donna Bach, who have conducted hundreds of EEG readings during acupoint tapping sessions, are able to project the readings onto a screen and explain to observers what is occurring. In the demonstration shown in Figure 3, Groesbeck and Bach explained to a conference audience that when the demonstration client focused on stressful thoughts, the initial brainwave patterns revealed distress and problems with left-right hemisphere synchronization. As the session progressed, however, the readings showed an optimizing of the brainwave patterns, even as the client focused on the same stressful thoughts.

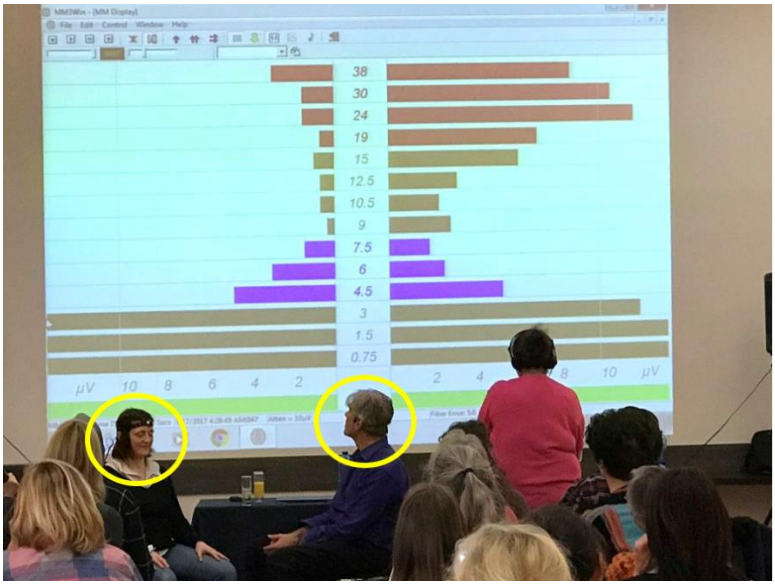

Figure 3 A demonstration subject (left) wearing EEG sensors as the author (right) conducts a tapping session with real-time EEG changes projected for a conference audience.

The first large-scale investigation of energy psychology treatments was an informal pilot study that was conducted at 11 allied clinics involving more than 5,000 patients in Argentina and Uruguay (described in a book [52], but too preliminary, in the investigator's view, for journal consideration). As part of this study, several patients were given digitized EEG scans prior to treatment, at various points during treatment, and again following treatment. Graphic summaries of the readings for a patient being treated for generalized anxiety disorder are depicted in Figure 4. The colors represent the mathematical *ratios* of three brain wave frequencies (alpha, beta, and theta) within given areas of the brain as compared with a database of non-clinical subjects.

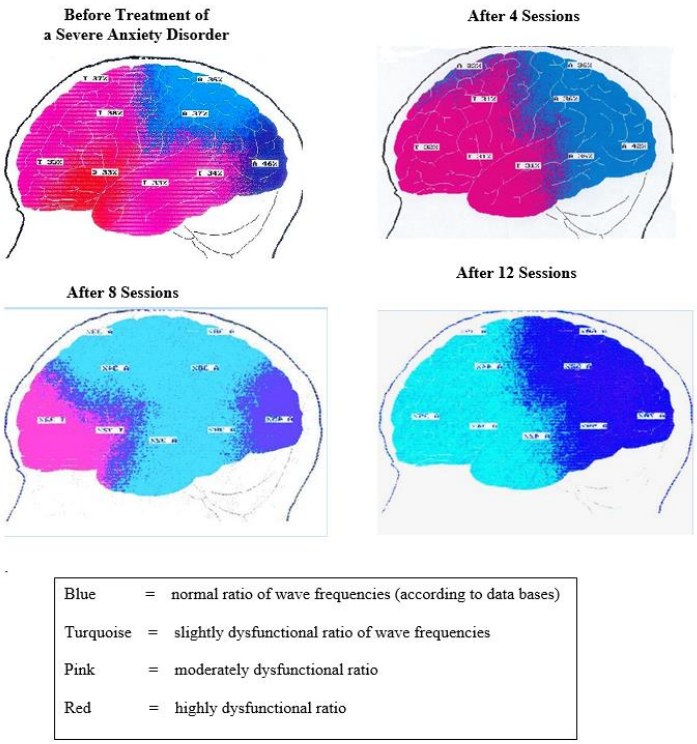

Figure 4 Brain scans over 12 energy psychology sessions treating generalized anxiety disorder. Images generously provided by Joaquín Andrade, M.D.

While the Andrade images didn't track delta waves, which are usually associated with deep sleep, increases in delta activity have been shown by Harper to disrupt activated memory networks, reminiscent of the "natural memory editing system" found in delta-wave sleep ([53], p. 63). Harper's EEG readings showed that repetitive sensory stimulation on the upper parts of the body, such as occurs with acupoint tapping, causes significant increases in delta wave activity in regions of the brain involved in fear memories. After continued stimulation, the amplified delta waves reorganized the activated memory network, allowing the subject to recall a fearful memory without viscerally reliving it, a condition required for the successful treatment of a variety of disorders ranging from phobias to PTSD. Glutamate receptors on synapses that mediate fear memory were "depotentiated by these powerful waves of neuronal firing" (p. 61). When the neural circuits in the amygdala maintaining the threat response are deactivated in this way, "the material basis of the fear memory has been removed" (p. 64).

Ruden [54] has built on these findings by developing a model that views the mind, body, and brain as an electrical system whose dysfunctional circuitry can be treated with psychosensory therapies—such as acupoint tapping, EMDR, and Havening—that generate delta waves to change the coding of traumatic memories.

5. Electromagnetic Fields

Sending *electrical signals* that activate or deactivate targeted brain areas is one way that acupoint tapping appears to marshal energies which impact brain activity in therapeutic ways. Normalizing *brain wave ratios* while also generating delta waves that disrupt activated memory networks is another. A third is by influencing the *electromagnetic fields* that govern mental models.

5.1 The "Thought Fields" of Thought Field Therapy

The original form of energy psychology is, in fact, known as "Thought Field Therapy," though the early publications of the method's founder, Roger Callahan, were roundly criticized for combining "concepts drawn from prescientific Chinese folk medicine (e.g., meridians) and concepts misappropriated from physics (e.g., energy fields)" ([55], p. 1172). The impact of energy psychology treatments on the brain's electromagnetic fields has, nonetheless, been established.

5.2 Energy Fields in Biology

In physics, a field is a region in which each point is affected by a specified force. In biology, electromagnetic fields surround and interpenetrate each organ, with electrocardiograms (EKGs) and electroencephalograms (EEGs) showing electrical activity in and around the tissue of the heart and brain, respectively. Electromagnetic fields can also be found at the cellular level, and they can be spontaneously generated. After a wound is sustained, for example, an electromagnetic field develops and organizes cellular activity in the healing process, acting on the body to stimulate growth and repair [56]. According to Oschman, the electrical field created at the site of a wound persists until the repair is complete, attracting mobile skin cells, fibroblasts, and white blood cells that close and heal the wounds. Finally, as healing progresses, the current fluctuates and "feeds back information on the progress of repair to surrounding tissues" [57]. The proposed impact of the biofield on physiological processes such as cell division has been gaining increasing attention [58] (see Figure 5).

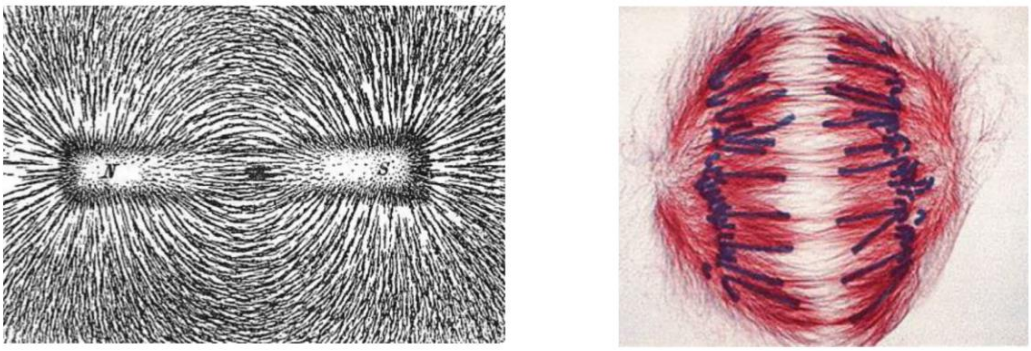

Figure 5 Correspondences between the configuration of iron filings aligning with the invisible lines of force in the magnetic field of a bar magnet and spindles, the structures that segregate chromosomes into the daughter cells during mitosis [5]. Spindles are believed in conventional biology to be self-organizing structures, but others believe they are influenced by the organism's surrounding biofield. Images used with permission.

In the early 1900s, the concept of an energy field first appeared in embryology as a primary template for explaining the developmental process [59]. Energy fields appear to direct physiological development in a manner analogous to the way an energy field coordinates cell activity in the healing of a wound. Harold Burr, a neuroanatomist in the Yale School of Medicine, vividly demonstrated this in the 1930s [60]. To detect microvolt differentials, Burr developed vacuum-tube voltmeters with exceptionally sensitive, non-distorting silver/silver chloride electrodes. After reviewing Burr's scientific publications, Ron Matthews, an electrical engineer for a large American

corporation, wrote in a peer-reviewed journal that these devices were both reliable and "remarkable for their time" [61], p. 55. Because assessments could be done without electrodes actually touching the skin, Burr reasoned that he was detecting a field phenomena.

Burr discovered that the electrical field surrounding an unfertilized salamander egg was shaped like a mature salamander, as though the blueprint for the adult was already within the energy field of the egg. The unfertilized egg already possessed the electrical axis that would later be aligned with the brain and spinal cord. Burr went on to discover energy fields around a variety of organisms, including molds, plants, frogs, and humans, and he was able to describe electrical patterns that differentiated health from disease. He discovered, for example, that when cancer-associated electromagnetic patterns were observed in mice that showed no physiological symptoms of malignancy, the mice eventually developed cancer.

To further test his hypothesis, Burr undertook a ground-breaking hospital-based study in the 1940s [62]. He found that voltage irregularities surrounding the cervix were able to predict malignancies with 85% accuracy in more than 1000 women presenting with gynecological symptoms but no cancer diagnosis to that point. He also discovered correlations not only between specific pathologies and electrical characteristics of corresponding organs, but also that physical illness is *preceded* by changes in an organism's energy field [63], a potentially pivotal finding for preventive medicine and a central principle of energy healing modalities. Summarizing the implications of Burr's findings, Church noted that "cancer was showing up in the *of energy* before it showed up in the *cells*. . . . Energy fields form the templates around which matter condenses. Change the field and you change matter" ([64], p. 44).

5.3 Mental Models

Mental models are internal representations of self, world, and the relationship between the two. They are, with varying names and conceptual formulations, the essential units of change in many therapeutic frameworks. The relationship between mental models and organizing fields is discussed below after a brief overview of mental models in psychotherapy. Different schools conceptualize mental models in different ways, but these differing formulations generally share some common features, as summarized by Jones et al:

> Mental models are personal, internal representations of external reality that people use to interact with the world around them. They are constructed by individuals based on their unique life experiences, perceptions, and understandings of the world. Mental models are used to reason and make decisions and can be the basis of individual behaviors. They provide the mechanism through which new information is filtered and stored ([65], para 1).

Mental models are known variously as cognitive structures, cognitive schema, cognitive maps, internal representations, private constructs, knowledge structures, life scripts, personal mythologies, interpretive frameworks, mindsets, or inner theories of reality. Changing a mental model can shift perceptions, thought patterns, emotions, and behavior.

5.3.1 Therapeutic Units of Change

The term *mental model* can, however, be a misleading oversimplification, though a useful one since it provides a single construct for tracking psychological change. At the core of many mental models is a set of formative emotional learnings that have been embedded in the brain's deep biological structures. Other components may, depending on the scope of the mental model, include concepts, beliefs, images, sensations, emotions, values, intentions, biographical memories, muscle memories, perceptual filters, and programs for behavior.

Such models are, of course, not stored in a single area of the brain. They are, rather, distributed over many areas. The dynamic is similar to the way that memories are stored in multiple locations. For instance, the context of a memory, such as the location where an event took place, is stored in the cells of the hippocampus while the emotions that are linked to that memory are stored in the amygdala. How all the parts of a memory, or of a mental model, are integrated into a single cohesive cognitive map is still a scientific mystery.

5.3.2 The "Binding Problem" for Memories and Mental Models

In addressing this mystery, Feldman explains:

One of the most famous continuing questions in computational neuroscience is called "The Binding Problem." In its most general form, "The Binding Problem" concerns how items that are encoded by distinct brain circuits can be combined for perception, decision, and action. . . . There is now overwhelming biological and behavioral evidence that the brain contains no stable, high-resolution, full representation of a visual scene, even though that is what we subjectively experience ([66], para 2).

Various brain structures work in concert in forming memories, which are dispersed over numerous regions of the brain. A visual image can be saved in one location. A tactile experience from the event might be stored in another. A remark about the experience in yet another. After decades of attempts to determine how and where memory is stored, neuroscientists are still stumped by a fascinating discovery made by the French physiologist Jean Pierre Flourens in the early 1800s, revisited in the 1940s by the American psychologist Karl Lashley [67]. Lashley, like Flourens before him, surgically removed various portions of laboratory animals' brains and observed how their behavior changed. For example, after teaching a rat to complete an elaborate task, Lashley would remove a portion of its cerebral cortex, the section of the mammalian brain involved in higher nervous system processes, to see if the rat could still perform the activity.

The most baffling aspect was that not only could up to half of the cortex be removed without affecting the animal's performance, it did not matter *which* regions of the cortex were removed. The rat could still complete the task regardless of the regions of the cortex that were left intact as long as at least half of the cortex was preserved. Following the discovery by different researchers of the same phenomenon in different animals, one of them famously stated in *Scientific American* the puzzling observation that "memory is both everywhere and nowhere in particular" ([68], p. 48).

5.3.3 The Brain and the Organizing Field That Surrounds and Permeates It

"Some type of resonance among a very vast number of neurons," Lashley theorized, must be involved in memory ([67], p. 479). In 2015, Thomas Insel, then-Director of the National Institute of Mental Health, cited mounting evidence suggesting that when "large scale electrical oscillations" across distant brain areas gets synchronized, the transmission of information with a specific and defined content is enabled ([69], p. 1). While this is a paradigm-challenging concept, a 2001 publication that introduced the concept of a "brainweb" was still a decade later the most often cited article published in *Nature*'s distinguished specialized journal on neuroscience [70]. The researchers proposed that "frequency bands" (think of how a radio tunes into a specific frequency) synchronize cognitive activities throughout the brain to explain how "scattered mosaics" of information across numerous brain regions are coordinated into a cohesive experience. Stanford neurologists had previously devised a "neural broadcasting theory" to explain how, on a small scale, neurons appear to affect neighboring neurons even when there is no electrochemical link via axon and dendrite [71]. Laboratory experiments have since shown that individual neurons in the prefrontal cortex are synchronized by oscillations in the brain's electromagnetic fields, and this has a demonstrable impact on thought and behavior [72].

One of the most elaborate though controversial models of an organizing field was proposed in 1981 by the British biologist Rupert Sheldrake [73]. Sheldrake collected evidence that morphic (form-generating) fields orchestrate the actions of neurons in forming cognition as well as biological processes. Fields are "lines of force," as first described in Michael Faraday's investigations of electromagnetism in the 1830s (think of the patterns formed by iron filings in the presence of a magnet, as shown in the left image of Figure 5). Sheldrake's morphic field hypothesis was based on the way quantum fields affect subatomic particles, but he expanded the concept to include atoms, molecules, cells, and more complicated structures, to entire organisms and even group behavior. The morphic field of the brain, according to this concept, arranges memory-related neurons into a cohesive system. Sheldrake believes that the field's lines of force function by "resonance" (as suggested by Lashley) rather than a direct exchange of energy. For instance, the electrical field of a person's brain has been shown to resonate with the electromagnetic field of the heart of a person in the same proximity [74].

In all three theories—brainweb, neural broadcasting, and morphic fields—the neurons resonate to a field or a frequency that coordinates their activities. Two clinically vital qualities that distinguish energy from chemistry are speed and responsiveness. Bruce Lipton, a cell biologist who did pioneering work on stem cells and on gene expression, points out that hundreds of scientific studies conducted over decades have "consistently revealed that 'invisible forces' of the electromagnetic spectrum profoundly impact every facet of biological regulation" ([75], p. 111). Lipton emphasizes that "the speed of electromagnetic signals is 186,000 miles per second, while the speed of a diffusible chemical is considerably less than 1 centimeter per second" (p. 112), with much of the signal's energy lost in the heat generated by thermo-chemical coupling. He comes to the dramatic conclusion that "energy signals are 100 times more efficient and infinitely faster than chemical signaling" (p. 112).

The brain's electromagnetic field can be detected and measured by various devices, with magneto-encephalography (MEG) being among the most frequently used. Electromagnetic fields have been shown to exist throughout the body. Standing voltage gradients, electrical fields in the

spaces between the cells, influence cell division, migration, and differentiation in addition to the flow of electrical impulses traveling from neuron to neuron [76]. These micro electrical fields contribute to the greater electromagnetic field of the brain. In the way that an electromagnetic field directs cellular activity in wound healing, the brain's electromagnetic field is believed to govern enormously complex biological processes as well as influencing emotions, mental models, and behavior [77]. The mechanistic "lock-and-dock" model, on the other hand, is inadequate to explain high speed communications through the nervous system.

In a guest editorial introducing a special issue on energy medicine (which includes energy psychology) for the journal, *Explore*, Dean Radin noted that a weakness in many of the terms used to characterize energy medicine—such as "field," "vibration," and "frequency"—is that they are used by energy healing practitioners in very different ways than they are used in physics [78]. He suggests that a "leading candidate proposed to explain energy medicine is information" (p. 9). This raises the question of how it might be possible for precise elaborate information to be carried within an electromagnetic field or if other constructs, such as subtle energies or quantum fields, must be considered.

Research from the HeartMath Institute in California has shown that electromagnetic fields encode information through *the language of patterns* [74]. Nuanced information can be encoded and transmitted through signal frequency, wavelength, and amplitude as well as by the time intervals in the patterns of electrical activity. The extraordinary sensitivity and responsiveness of organisms to tiny signals in the environment include an ability to detect extremely weak electromagnetic fields and discriminate them from background "noise" involving much stronger signals [56]. Lohmann et al. note that "the idea that animals use Earth's magnetic field as a kind of map has gone from a contentious hypothesis to a well-established tenet of animal navigation ([79], para 1)." These relationships are most striking in migratory birds but have also been found in sea turtles, lobsters, and salmon. Evidence is also accumulating that brain waves respond to changes in the Earth's magnetic fields [80] and that human behavior is influenced by solar activity [81]. Recognizing this sensitivity to subtle gradients of electromagnetic information points the way for future research in the relationships among the brain's electromagnetic field and mental processes, with sophisticated though highly speculative models appearing [82, 83].

While instruments that interact with human intention were developed in the 1990s in William Tiller's lab in the Stanford Department of Materials Science and Engineering [84], we still don't have instruments that are sensitive enough to track how therapeutic changes in a person's mental models correspond with changes in the brain's electromagnetic field. Nonetheless, all effective therapies presumably bring about such changes. Where energy psychology protocols may be particularly useful in accomplishing such changes is in their facility for intentionally and directly influencing so-called "subtle energies."

6. Subtle Energies

Energies that cannot be detected by conventional scientific instruments—yet which are believed to be the infrastructure of the body's electromagnetic and physiological systems—are referred to as "subtle energies" [85]. Conceptions of such energies have played a central role in the worldviews of many societies throughout history. At least 97 cultures have been identified whose healing systems, often extending back thousands of years, refer to a "human energy field" [86].

Examples include *Prana* in Sanskrit, *qi* (also spelled *chi*) in China, *ki* in Japan, *barakah* in Islam, *wakan* in Lakota Sioux, *ruah* in Hebrew, *orenda* in Iroquois, and *pneuma* in ancient Greece. Despite the fact that these terms are frequently interpreted as "energy" in the West, each refers to a larger construct than electromagnetic energy. For example, the notion of *qi* serves as the principal theoretical foundation for traditional Chinese medicine, philosophy, culture, and natural science. Jonas has pointed out that while Chinese medicine recognizes the observable "characteristics of energy, such as the ability to work and to be accumulated, stored, discharged, and projected from the body, qi also has characteristics of intelligence and information" ([87], p. 103).

This underlying life force energy, which is at the heart of energy healing, has never been directly imaged by scientific instruments, but neither has gravity. The effects of both, however, can be plainly shown. A blade of grass pushing through concrete is the life force in motion. A body right after death is the life force departed.

The primary subtle energy systems targeted by energy psychology interventions, according to the international Association for Comprehensive Energy Psychology (https://www.energypsych.org/, accessed January 27, 2022), are the chakras from the Indian Vedas, dating back some 3,500 years; the meridians from ancient Chinese medicine; and the aura that is described in various religious traditions and scientifically studied as the "biofield" [88, 89]. While many tomes have been written on each of these topics, the key features for understanding the actions of energy psychology interventions is that each carries nuanced information and exhibits intelligence beyond that of any existing conceptions of electromagnetic fields. While these energies cannot be seen by the human eye, they have been seen, felt, and sensed by healers and sensitives from many different traditions throughout history whose descriptions corroborate one another [36].

6.1 Chakras

For instance, the chakras are described as swirling vortexes of energy along the body that appear at the sites of major organs and nerve centers [36]. While these subtle energies have largely eluded attempts to measure them using standard electromagnetic devices, eight individuals who were highly attuned to the body's energies gave descriptions of an individual's chakras that corroborated one another and also corresponded with electromyograph (EMG) wave patterns detected by electrodes on the skin over the spot being observed [90]. A practitioner who claims to be able to "see" the body's subtle energies described her work with a depressed 36-year-old woman's heart chakra [91]. The practitioner informed the client that she felt like she was staring out at the world like a girl of about 7 years old who just lost someone she adored. It didn't feel like a parent, but it was someone very close and she felt deeply the client's sorrow, like her heart was about to stop beating. The woman replied in tears that when she was 7, her older brother Robert was unintentionally shot by a neighbor youngster who was playing with his father's rifle. He passed away two days later. The practitioner stated that the information she was receiving resided in the energy of the woman's heart chakra. The woman experienced a large increase in her ability for intimacy within her marriage after this session, which included interventions to heal the long-buried, unresolved grief held in her heart chakra.

Seven major chakras are situated along the spine, positioned from the base of the spine to the crown of the head, extending from the back to the front of the body and out to both sides. Each

chakra reportedly has its own theme [36]. Memories and understanding about survival are believed to be stored not only in the brain but also in the "root chakra" at the base of the spine. Those regarding power and identity are stored in the chakra that sits at the solar plexus. Those concerning expression are in the throat chakra; perceptions and extra-sensory perceptions are the domain of the sixth chakra (also known as the "third eye"); connections to larger spiritual forces in the universe are attributed to the crown chakra, at the top of the head. The idea that memories are stored in the body has been gaining interest, particularly in the treatment of trauma [92].

6.2 Meridians

Working with the body's acupoints is another primary procedure used in energy psychology. The acupoints are situated along energy pathways known as meridians. We have explored the ways that stimulating selected points on the skin sends activating and deactivating signals along the meridian lines to specified brain regions. But acupuncture points are also associated with qualities that far exceed any known properties of electromagnetic signals or fields [22]. Table 1 shows the effects that are believed to be produced by 11 acupoints that are commonly used in energy psychology protocols.

Table 1 Purported effects of acupuncture points commonly used in energy psychology protocols.

Meridian & Point #	Location	Translation of Chinese Name	Helps With:
Bladder 2	Beginning of Eyebrow	Collect Bamboo	Refreshes Body and Mind; Calms Nervous System, Releases Trauma; Promotes Peace; Manages Fear
Gall Bladder 1	Side of Eye	Pupil Crevice	Helps with Clarity, Vision, & Decision-Making; Releases Resentment; Strengthens Resolve
Stomach 1	Under Eye	Weeping Support	Grounding; Digesting Feelings; Releases Fear; Promotes Calmness; Moving on When Stuck
Governing Vessel 26	Under Nose	Ghost Palace	Regulates Mood Swings; Maintains Yin/Yang Balance; Releases Shame; Promotes Acceptance
Conception Vessel 24	Under Lower Lip	Heavenly Pond	Releases Confusion: Promotes Confidence; Coordinates Mind, Body, and Spirit
Kidney 27	Collar Bone Points	Treasury	Restores Physical, Mental, and Spiritual Reserves; Promotes Ease in Moving Forward
Conception Vessel 17	Middle of Chest	Central Hall	Brings Support and Vitality to the Heart and Lungs; Promotes Clarity and Self-Acceptance
Spleen 21	Under Arms	Great Enveloping	Brings Care and Harmony to all the Body's Energies; Promotes Relaxation and Compassion
Gall Bladder 32	Side of Leg	Central River	Promotes Purity; Improves Judgement; Releases Anger
Small Intestine 3	Side of Hand	Back Stream	Invigorates Mental Faculties; Decision-Making; Letting Go; Counters Emotional Instability

Triple Warmer 3	On Ridge Beneath Ring & Little Finger	Central Islet	Fights Destructive Forces; Reduces Stress; Maintains Balance and Harmony; Releases Worry

6.3 The Biofield

The third subtle energy system that falls within the domain of energy psychology is the aura or biofield. A field is a region of influence impacting physical or biological structures. The term "biofield" was created during a US National Institutes of Health Conference in 1992, which defined it as "a massless, not necessarily electromagnetic field, that surrounds and permeates living bodies and affects the body" ([89], para 6). Jain et al have expanded this definition, describing biofields as internally generated fields which "may play a significant role in information transfer processes that contribute to an individual's state of mental, emotional, physical, and spiritual wellbeing" [93], p. 58. While questions about the nature of biofields or other "subtle energies"—if they are not electromagnetic—remain open, Jain et al note that biofield therapies are included in the Nursing Intervention Classification Code and are recognized by some state licensure boards as being within the scope of nursing practice. They also present emerging evidence for the effectiveness of biofield therapies in treating arthritis, dementia, cardiovascular dysfunction, and as an adjunct in cancer care that has been shown to reduce symptoms of pain, fatigue, anxiety, and depression.

The notion of a "green thumb"—that some people have an "energy" (a biofield) that promotes plant growth—has been backed by numerous studies [94-96]. Even having a healthy person do a "laying on of hands" over the water used to irrigate a plant has resulted in more robust growth in comparison with the use of water handled by a depressed person [97]. An energy psychology experiment recently corroborated this earlier finding. Okra seeds were surreptitiously attached to the back of a clipboard given to a 42-year-old woman diagnosed with a major depressive disorder who was taking the Beck Depression Inventory [98]. The proportion of seeds that germinated and the amount of root hair growth 72 hours later was significantly less than for a control group of seeds that had not been in her presence. The woman was then given a two-hour treatment session using an energy psychology protocol to focus on her depression. At that point she was again given the depression inventory, with another batch of okra seeds attached to the clipboard. The growth of these seeds was significantly greater than for the seeds that had been in her presence prior to the treatment or for the control seeds. Meanwhile, her depression score dropped from 20 (indicating moderate depression) to 3 (minimal depression) after the single session. The conclusion the investigator drew from this finding is that changes in the woman's biofield during the treatment session affected the okra seed germination rates.

6.4 Energy Fields Encode Physical and Psychological Potentials

While the clinical benefits of utilizing subtle energies, and even the existence of subtle energies, are still matters of scientific debate, energy psychology practitioners generally believe they are working with energies that operate beyond the descriptions found in conventional clinical paradigms [99]. Perhaps the most important quality of these energies is that they seem to activate a person's potentials. The term *entelechy*, introduced by Aristotle, involves the call toward completion, toward possibility. Human capacities researcher Jean Houston speaks of Jung's concept

of archetypes as "symbolic projections of higher consciousness [that are] mediated by your entelechy" ([100], p. 30-31). The electrical field surrounding Harold Burr's salamander eggs encoded the development of the mature salamander. The egg's energy held the entelechy for the adult.

The reason this is important for psychotherapy is that the best therapists are able to evoke a client's highest possibilities, and entelechy is the dynamic by which potential becomes manifest. An analogy can be seen in humanity's history, where latent capacities long predated their emergence in individuals or societies. As Ervin Laszlo reflects:

> Cutting-edge research suggests that for nearly two hundred thousand years, the human genome has been essentially the same as it is today. The genes responsible for the functioning of our organism, coding such advanced faculties as articulated speech and a self-reflective mind, are being identified. These genes have been part of our genetic make-up for two hundred thousand years or more. They were present in our genome before the faculties they code would have been expressed in our phenome (our biological organism). How come they were part of our genome? Their presence could not have been due to the interaction of many generations with the world around them: they predate such interactions. Their presence is also unlikely to be due to a serendipitous series of chance interactions, since the probability of their being constituted by random interactions is negligible ([101], para 5).

The notion that a person's highest possibilities are pre-programmed suggests that they can also be accessed and reinforced. Mechanistic paradigms have not been able to adequately explain advanced human faculties such as the self-reflective mind. A concept is needed for a medium which carries information and potentials in a manner that hasn't been fully mapped. While their nature remains elusive, subtle energies have been proposed as that medium. Attuning to such energies may be a way of approaching what all effective psychotherapists try to accomplish: catalyzing a client's inner sources of wisdom, resilience, and growth.

6.5 Six Qualities of Subtle Energies

The role of subtle energies in clinical outcomes (if any) remains an area of controversy [102]. While it is beyond the scope of this paper to explore all of the ways that energy psychology practitioners claim to mindfully interact with and utilize subtle energies, we will close this section with a listing of qualities that are commonly attributed to subtle energies. Six characteristics, which cannot be explained by current understanding of the electromagnetic spectrum, have been postulated and presented with empirical evidence supporting each of them [91]:

1. Subtle energies can persist independently of the biological structures they support.
2. Human thought and intention can impact physical structures and events.
3. Subtle energies can carry memories and nuanced information.
4. Subtle energies appear to behave in intelligent ways.
5. Subtle energies act as invisible templates guiding physiological development.
6. Health conditions can be diagnosed and treated over a distance.
7. This sixth postulate invites speculation about quantum influences on mental processes.

7. Quantum Influences

A number of investigations employing EEG equipment have demonstrated that healers can affect other people's brain waves from afar [95]. Individuals known as "medical intuitives" claim to be able to identify health problems without being physically close to the person. Neurosurgeon Norman Shealy gave medical intuitive Carolyn Myss the names and birthdates of patients he had diagnosed so that the phenomenon might be studied more thoroughly. Myss had no interaction with the patients and no other information about them. In 93% of the cases, Myss' clairvoyant findings matched Shealy's medical diagnoses. Myss' findings were very specific, such as *left testicle malignant, spread to left kidney*; *venereal herpes*; and *schizophrenia* [103].

Medical qigong, an ancient Chinese practice that involves controlling and directing energy for healing purposes, has been shown to be able to, from a distance, impact cell growth and increase survival time of tumor-embedded animals [104]. Jixing Li, a qigong master, was able to selectively kill human cancer cells kept in a laboratory that was 3,000 miles away. While in California, Li concentrated on the cells, which were placed in a growing medium in an incubator at Pennsylvania State University. The cells that were the object of Li's focused intention died. Another set of cancer cells, just inches away from the targeted ones, were not affected and continued to proliferate quickly [105].

At-a-distant phenomena, from intercessory prayer to distant healing, are well documented [106, 107]]. Because quantum physics is the only scientific discipline that has demonstrated non-local effects (Einstein's "spooky action at a distance"), speculation on ways that quantum phenomena, usually confined to subatomic realms, might affect larger systems has led to substantial discussion on how "quantum ideas work to model cognition" [108], p. 3. Schwartz et al note:

> Contemporary basic physical theory differs profoundly from classic physics on the important matter of how the consciousness of human agents enters into the structure of empirical phenomena. The new principles contradict the older idea that local mechanical processes alone can account for the structure of all observed empirical data ([109], p. 1309).

Many physicists have been highly skeptical about non-locality, which was was demonstrated only within laboratory conditions. Experiments beginning in 1997, however, demonstrated such effects at a distance of over 10 kilometers, and subsequent experiments have strengthened the evidence for this counter-intuitive phenomenon [110]. Reports of at-a-distance effects of energy psychology are generally referred to as "surrogate tapping." In surrogate tapping, tapping on oneself is done with the intention of benefitting another. Based on a literature search and a request to the energy psychology community via e-letters and e-lists for case descriptions of surrogate tapping, 193 unique cases were identified. All reported positive outcomes [111]. Exactly 100 of them met the following criteria:

1. A "sender" had applied an energy psychology protocol to him/herself with the intention of being helpful to a "receiver."
2. The sender did not physically tap on the receiver but may have been in the same room (as is often the case with infants or animals) or the two may have been isolated by distance. While the influence when the "sender" and "receiver" were in close proximity might be explained

by visual cues, mirror neurons, or other factors, in more than a third of the cases, the two were isolated by distance.
3. The receiver did not apply the protocol to him/herself.
4. The positive outcome was attributed by the sender and the receiver to the surrogate tapping.

Such non-local effects or "quantum entanglement" cannot be explained by the laws of classical physics [112]. Oxford physicist Vlatko Vedral notes that quantum entanglement can be found in large systems. It is not just an anomaly between two photons or electrons as originally believed. He explains that traditionally "entanglement was considered to be a quirk of microscopic objects that defied a common-sense explanation. Now, however, entanglement is recognized to be ubiquitous and robust [even] in macroscopic systems" ([112], p. 1004). Whether an invisible medium or some form of resonance is involved in at-a-distance effects is unknown, but the early evidence suggests that acupoint tapping is able to exert a clinically beneficial influence from a distance. Meanwhile, the influences of quantum effects in the therapist-client in-person relationship during energy psychology sessions is an area awaiting preliminary research.

8. Conclusion

The place of *energy* in energy psychology has been shown to involve well-established principles involving electrical signals, brain waves, and electromagnetic fields. These principles have been applied in explaining the rapid and durable outcomes seen with a wide range of conditions following energy psychology treatments. More speculative mechanisms, such as *subtle* energies and quantum influences, have also been proposed. While their role in the demonstrated clinical outcomes remains an area of controversy, they suggest ways that an energy psychology framework may be useful for addressing deeper though more subtle realms of human experience and potential. Further investigation into the nature of subtle energy and the relationships among subtle energy, consciousness, and the brain will provide additional context for understanding these possibilities.

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Author Contributions

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

Competing Interests

The author conducts trainings, provides clinical services, and has written books related to the approach examined in this paper.

References

1. Feinstein D. Integrating the manual stimulation of acupuncture points into psychotherapy: A systematic review with clinical recommendations. Journal of Psychotherapy Integration. In press.
2. Feinstein, D. Uses of energy psychology following catastrophic events. Frontiers in Psychologyl In press.
3. Feinstein D. Six empirically-supported premises about energy psychology: Mounting evidence for a controversial therapy. Adv Mind Body Med. 2021; 35: 17-32.
4. Bach D, Groesbeck G, Stapleton P, Sims R, Blickheuser K, Church D. Clinical EFT (Emotional Freedom Techniques) improves multiple physiological markers of health. J Evid Based Integr Med. 2019; 24: 2515690X18823691.
5. Leskowitz E. A cartography of energy medicine: From subtle anatomy to energy physiology. Explore. 2020; 18: 152-164.
6. Lindsay RB. The concept of energy and its early historical development. Found Phys. 1971; 1: 383-393.
7. Livneh H. Can the concepts of energy and psychological energy enrich our understanding of psychosocial adaptation to traumatic experiences, chronic illnesses and disabilities? Front Psychol. 2022; 13: 768664.
8. Smith C. The science of energy: A cultural history of energy physics in Victorian Britain. Chicago: University of Chicago Press; 1998.
9. Atkins P. Four laws that drive the universe. New York: Oxford University Press; 2007.
10. Brehm JW, Wright RA, Solomon S, Silka L, Greenberg J. Perceived difficulty, energization, and the magnitude of goal valence. J Exp Soc Psychol. 1983; 19: 21-48.
11. Baumeister RF, Vohs KD. Self-Regulation, ego depletion, and motivation. Soc Personal Psychol Compass. 2007; 1: 115-128.
12. Deci EL, Ryan RM. The "what" and" why" of goal pursuits: Human needs and the self-determination of behavior. Psychol Inq. 2000; 11: 227-268.
13. Greenglass ER. Vitality and vigor: Implications for healthy functioning. In: Stress and anxiety: Application to health, workplace, community, and education. Newcastle: Cambridge Scholars Press; 2006. pp.65-86.
14. Hobfoll SE. Conservation of resources: A new attempt at conceptualizing stress. Am Psychol. 1989; 44: 513-524.
15. Lazarus RS. From psychological stress to the emotions: A history of changing outlooks. Annu Rev Psychol. 1993; 44: 1-22.
16. Seligman MEP. Flourish. New York: Free Press; 2011.
17. Sanes DH, Reh TA, Harris WA, Landgraf M. Development of the nervous system. 4th ed. San Diego: Academic Press; 2019.
18. Herculano-Houzel S. The remarkable, yet not extraordinary, human brain as a scaled-up primate brain and its associated cost. Proc Natl Acad Sci USA. 2012; 109: 10661-10668.
19. Hui KK, Liu J, Marina O, Napadow V, Haselgrove C, Kwong KK, et al. The integrated response of the human cerebro-cerebellar and limbic systems to acupuncture stimulation at ST 36 as evidenced by fMRI. Neuroimage. 2005; 27: 479-496.
20. Zhang ZJ, Wang XM, McAlonan GM. Neural acupuncture unit: A new concept for interpreting

effects and mechanisms of acupuncture. Evid Based Complementary Altern Med. 2012; 2012: 429412.
21. Takakura N, Yajima H. Analgesic effect of acupuncture needle penetration: A double-blind crossover study. Open Med. 2009; 3: e54.
22. Lightbody ST. 361 classical acupuncture points: The names, functions, descriptions and locations. Hackensack: World Scientific; 2020.
23. Ahn AC, Colbert AP, Anderson BJ, Martinsen ØG, Hammerschlag R, Cina S, et al. Electrical properties of acupuncture points and meridians: A systematic review. Bioelectromagnetics. 2008; 29: 245-256.
24. Li J, Wang Q, Liang H, Dong H, Li Y, Ng EH, et al. Biophysical characteristics of meridians and acupoints: A systematic review. Evid Based Complementary Altern Med. 2012; 2012: 793841.
25. Reichmanis M, Marino AA, Becker RO. D.C. skin conductance variation at acupuncture loci. Am J Chinese Med. 1976; 4: 69-72.
26. Langevin HM, Yandow JA. Relationship of acupuncture points and meridians to connective tissue planes. Anat Rec. 2002; 269: 257-265.
27. Li T, Tang BQ, Zhang WB, Zhao M, Hu Q, Ahn A. In vivo visualization of the pericardium meridian with fluorescent dyes. Evid Based Complementary Altern Med. 2021; 2021: 5581227.
28. Soh KS, Kang KA, Ryu YH. 50 years of Bong-Han theory and 10 years of primo vascular system. Evid Based Complementary Altern Med. 2013; 2013: 587827.
29. Sagar SM, Wong R. The scientific basis of Chinese medicine and cancer care: A western medicine perspective. In: Alternative treatment for cancer. Hackensack: World Scientific; 2007. pp.1-54.
30. Bagriantsev SN, Gracheva EO, Gallagher PG. Piezo proteins: Regulators of mechanosensation and other cellular processes. J Biol Chem. 2014; 289: 31673-31681.
31. Nishinaka A, Nitta K, Seki T, Hara H, Shimazawa M. The changes in blood flow seen in the eye after foot acupuncture treatment in mice. Evid Based Complementary Altern Med. 2020; 2020: 6405471.
32. Oschman JL. Energy medicine in therapeutics and human performance. New York: Elsevier; 2003.
33. Church D, Stapleton P, Yang A, Gallo F. Is tapping on acupuncture points an active ingredient in emotional freedom techniques? A systematic review and meta-analysis of comparative studies. J Nerv Ment Dis. 2018; 206: 783-793.
34. Di Rienzo F, Saruco E, Church D, Daligault S, Delpuech C, Gurret JM, et al. Neuropsychological correlates of an energy psychology intervention on flight phobia: A MEG single-case study. 2019. Doi: 10.31234/osf.io/s3hce.
35. König N, Stever S, Seebacher J, von Prittwitz Q, Bliem H, Rossi S. How therapeutic tapping can alter neural correlates of emotional prosody processing in anxiety. Brain Sci. 2019; 9: 206.
36. Eden D. Energy medicine. New York: Tarcher Penguin Random House; 2008.
37. Stapleton P, Buchan C, Mitchell I, McGrath Y, Gorton P, Carter B. An initial investigation of neural changes in overweight adults with food cravings after emotional freedom techniques. OBM Integr Complementary Med. 2019; 4. Doi: 10.21926/obm.icm.1901010.
38. Feinstein D. Energy psychology: Efficacy, speed, mechanisms. Explore. 2019; 15: 340-351.
39. Frewen PA, Lanius RA. Toward a psychobiology of posttraumatic self-dysregulation: Reexperiencing, hyperarousal, dissociation, and emotional numbing. Ann N Y Acad Sci. 2006; 1071: 110-124.

40. Wells S, Polglase K, Andrews HB, Carrington P, Baker AH. Evaluation of a meridian-based intervention, emotional freedom techniques (EFT), for reducing specific phobias of small animals. J Clin Psychol. 2003; 59: 943-966.
41. Baker AH, Siegel MA. Emotional freedom techniques (EFT) reduces intense fears: A partial replication and extension of Wells et al. Energy Psychol Theory Res Treat. 2010; 2: 13-30.
42. Stapleton P, Bannatyne A, Chatwin H, Urzi KC, Porter B, Sheldon T. Secondary psychological outcomes in a controlled trial of emotional freedom techniques and cognitive behaviour therapy in the treatment of food cravings. Complement Ther Clin Pract. 2017; 28: 136-145.
43. Exton-McGuinness MT, Lee JL, Reichelt AC. Updating memories-the role of prediction errors in memory reconsolidation. Behav Brain Res. 2015; 278: 375-384.
44. Bridges MR. Activating the corrective emotional experience. J Clin Psychol. 2006; 62: 551-568.
45. Price RB, Duman R. Neuroplasticity in cognitive and psychological mechanisms of depression: An integrative model. Mol Psychiatry. 2020; 25: 530-543.
46. Abhang PA, Gawali B, Mehrotra SC. Introduction to EEG- and speech-based emotion recognition. Cambridge: Academic Press; 2016.
47. Kamida A, Shimabayashi K, Oguri M, Takamori T, Ueda N, Koyanagi Y, et al. EEG power spectrum analysis in children with ADHD. Yonago Acta Med. 2016; 59: 169-173.
48. Fernández-Palleiro P, Rivera-Baltanás T, Rodrigues-Amorim D, Fernández-Gil S, del Carmen Vallejo-Curto M, Álvarez-Ariza M, et al. Brainwaves oscillations as a potential biomarker for major depression disorder risk. Clin EEG Neurosci. 2020; 51: 3-9.
49. Orndorff-Plunkett F, Singh F, Aragón OR, Pineda JA. Assessing the effectiveness of neurofeedback training in the context of clinical and social neuroscience. Brain Sci. 2017; 7: 95.
50. Lambrou PT, Pratt GJ, Chevalier G. Physiological and psychological effects of a mind/body therapy on claustrophobia. Subtle Energ Energy Med. 2003; 14: 239-251.
51. Swingle P. Emotional freedom techniques (EFT) as an effective adjunctive treatment in the neurotherapeutic treatment of seizure disorders. Energy Psychol Theory Res Treat. 2010; 2: 29-38.
52. Andrade J, Feinstein D. Energy psychology: Theory, indications, evidence. In: Energy psychology interactive. Ashland: Innersource; 2004. pp.199-214.
53. Harper M. Taming the amygdala: An EEG analysis of exposure therapy for the traumatized. Traumatology. 2012; 18: 61-74.
54. Ruden RA. Harnessing electroceuticals to treat disorders arising from traumatic stress: Theoretical considerations using a psychosensory model. Explore. 2019; 15: 222-229.
55. McNally R. Tertullian's motto and Callahan's method. J Clin Psychol. 2001; 57: 1171-1174.
56. Liboff AR. Toward an electromagnetic paradigm for biology and medicine. J Altern Complement Med. 2004; 10: 41-47.
57. Oschman JL. Energy medicine: The scientific basis. New York: Harcourt; 2000.
58. Hammerschlag R, Levin M, McCraty R, Bat N, Ives JA, Lutgendorf SK, et al. Biofield physiology: A framework for an emerging discipline. Glob Adv Health Med. 2015; 4: 35-41.
59. Opitz JM. The developmental field concept in clinical genetics. J Pediatr. 1982; 101: 805-809.
60. Burr HS. The fields of life. New York: Ballantine; 1972.
61. Matthews RE. Harold Burr's bios: Measuring the electromagnetics of life. Subtle Energ Energy Med. 2007; 18: 55-61.
62. Langman L, Burr HS. Electrometric studies in women with malignancy of cervix uteri. Science.

1947; 105: 209-210.
63. Burr HS, Northrop FS. The electro-dynamic theory of life. Q Rev Biol. 1935; 10: 322-333.
64. Church D. Mind to matter. Carlsbad: Hay House; 2018.
65. Jones NA, Ross H, Lynam T, Perez P, Leitch A. Mental models: An interdisciplinary synthesis of theory and methods. Ecol Soc. 2011; 16: 46.
66. Feldman J. The neural binding problem(s). Cogn Neurodyn. 2013; 7: 1-11.
67. Lashley KS. In search of the engram. In: Society for experimental biology, physiological mechanisms in animal behavior (society's symposium IV). Oxford: Academic Press; 1950. pp.454-482.
68. Boycott BB. Learning in the octopus. Sci Am. 1965; 212: 42-51.
69. National Institutes of Health. Large scale electrical oscillations across distant brain regions (news release) [Internet]. Bethesda: National Institutes of Health; 2012. Available from: https://www.nih.gov/news-events/news-releases/sync-brain-waves-hold-memory-objects-just-seen.
70. Luo L, Rodriguez E, Jerbi K, Lachaux J-P, Martinerie J, Corbetta M, et al. Ten years of nature reviews neuroscience: Insights from the highly cited. Nat Rev Neurosci. 2010; 11: 718-726.
71. Schuman EM, Madison DV. Locally distributed synaptic potentiation in the hippocampus. Science. 1994; 263: 532-536.
72. Buschman TJ, Denovellis EL, Diogo C, Bullock D, Miller EK. Synchronous oscillatory neural ensembles for rules in the prefrontal cortex. Neuron. 2012; 76: 838-846.
73. Sheldrake, R. A new science of life: The hypothesis of morphic resonance. Rochester: Park Street Press; 1981.
74. McCraty R. Science of the heart: Exploring the role of the heart in human performance. Boulder Creek: HeartMath Institute; 2015.
75. Lipton BH. The biology of belief. Santa Rosa: Elite; 2005.
76. McCaig CD, Song B, Rajnicek AM. Electrical dimensions in cell science. J Cell Sci. 2009; 122: 4267-4276.
77. Kreitzer MJ, Saper R. Exploring the bio. Glob Adv Health Med. 2015; 4: 3-4.
78. Radin D. Special issue on energy medicine. Explore. 2021; 17: 9-10.
79. Lohmann KJ, Goforth KM, Mackiewicz AG, Lim DS, Lohmann CM. Magnetic maps in animal navigation. J Comp Physiol A. 2022; 208: 41-67.
80. Wang CX, Hilburn IA, Wu DA, Mizuhara Y, Cousté CP, Abrahams JNH, et al. Transduction of the geomagnetic as evidenced from alpha-band activity in the human brain. eNeuro. 2019; 6: ENEURO.0483-18.
81. Vares DAE, Persinger MA. Correlations between a new daily global indicator of human behavior, threshold seismicity, and solar activity: Congruence of energy and implications [Internet]. Framingham: Global Journals Inc.; 2015..
82. McFadden J. Integrating information in the brain's EM field: The cemi theory of consciousness. Neurosci Conscious. 2020; 2020: niaa016.
83. Idris Z. Quantum physics perspective on electromagnetic and quantum fields inside the brain. Malaysian J Med Health Sci. 2020; 27: 1-5.
84. Tiller WA, Dibble WF, Kohane MJ. Exploring robust interactions between human intention and inanimate/animate systems! Subtle Energ Energy Med. 2001; 11: 265-291.
85. Swanson C. Life force: The scientific basis. Tucson: Poseidia; 2010.

86. White J, Krippner S. Future science: Life energies and the physics of paranormal phenomena. New York: Anchor; 1977.
87. Jonas WB. Qigong: Basic science studies in biology. In: Healing intention and energy medicine: Science, research methods and clinical implications. Philadelphia: Elsevier; 2003. pp. 103.
88. Rubik B, Pavek R, Greene E, Laurence D, Ward R, Al E. Manual healing methods. In: Alternative medicine: Expanding medical horizons: A report to the National Institutes of Health on alternative medical systems and practices in the United States. Washington: US Government Printing Office; 1995. pp.113-157.
89. Rubik B, Muehsam D, Hammerschlag R, Jain S. Biofield science and healing: History, terminology, and concepts. Glob Adv Health Med. 2015; 4: 8-14.
90. Hunt V. Electronic evidence of auras, chakras in UCLA study. Brain Mind Bull. 1978; 3: 1-2.
91. Eden D, Feinstein D. Development of a healthcare approach focusing on subtle energies: The case of Eden energy medicine. Adv Mind Body Med. 2020; 34: 25-36.
92. Van der Kolk, B. The body keeps the score: Brain, mind, and body in the healing of trauma. New York: Penguin; 2015.
93. Jain S, Hammerschlag R, Mills P, Cohen L, Krieger R, Vieten C, et al. Clinical studies of biofield therapies: Summary, methodological challenges, and recommendations. Glob Adv Health Med. 2015; 4: 58-66.
94. Tompkins P, Bird C. The secret life of plants: A fascinating account of the physical, emotional, and spiritual relations between plants and man. New York: Harper & Row; 1973.
95. McTaggart L. The intention experiment: Using your thoughts to change your life and the world. New York: Free Press; 2007.
96. Shiah YJ, Hsieh HL, Chen HJ, Radin DI. Effects of intentionally treated water and seeds on the growth of Arabidopsis thaliana. Explore. 2021; 17: 55-59.
97. Grad B. The "laying on of hands": Implications for psychotherapy, gentling, and the placebo effect. J Am Soc Psych Res. 1967; 61: 286-305.
98. Church D. The effect of Emotional Freedom Techniques (EFT) treatment for depression using a seed bioassay: A randomized controlled trial. Explore.
99. Feinstein D. Perceptions, reflections, and guidelines for using energy psychology: A distillation of 800+ surveys and interviews with practitioners and clients. Energy Psychol Theory Res Treat. 2021; 13: 13-46.
100. Houston, J. Consciousness is the quantum of the cosmos. In: What is consciousness? New York: Select Books; 2016. pp.3-32.
101. Laszlo E. Evolution–"the force" that is with us [Internet]. Petaluma: Institute of Noetic Science; 2022. Available from: https://noetic.org/blog/evolution-the-force-that-is-with-us/.
102. Leskowitz E. How tapping into "energy" can trigger a paradigm shift in biomedicine. J Altern Complement Med. 2018; 24: 525-527.
103. Shealy CN. Clairvoyant diagnosis. In: Energy medicine around the world. Phoenix: Gabriel Press; 1988. pp.291-303.
104. Yan X, Lu PY, Kiang JG. Qigong: Basic science studies in biology. In: Healing intention and energy medicine: Science, research methods and clinical implications. Philadelphia: Elsevier;2003. pp.103-137.
105. Swanson C. Lifeforce: The scientific basis. Tucson: Poseidia Press; 2011.
106. Radin D. Entangled minds: Extrasensory experiences in a quantum reality. New York: Paraview;

2006.
107. Matos LC, Machado JP, Monteiro FJ, Greten HJ. Perspectives, measurability and effects of non-contact bio-based practices: A narrative review of quantitative research. Int J Environ Res Public Health. 2021; 18: 6397.
108. Pylkkänen P. Fundamental physics and the mind–is there a connection? In: H Atmanspacher, C Bergomi, T Filk, K Kitto, (eds) Quantum Interaction. 8th International Conference, QI 2014, Filzbach, Switzerland, June 30 - July 3, 2014, pp 3-11.
109. Schwartz JM, Stapp HP, Beauregard. Quantum physics in neuroscience and psychology: A neurophysical model of mind-brain interaction. Philos Trans R Soc. 2005; 360: 1309-1327.
110. Salart D, Baas A, Branciard C, Gisin N, Zbinden H. Testing the speed of "spooky action at a distance." Nature. 2008; 454: 861-864.
111. Feinstein D. Energy psychology treatments over a distance: The curious phenomenon of "surrogate tapping". Energy Psychol. 2013; 5: 42-53.
112. Vedral V. Quantifying entanglement in macroscopic systems. Nature. 2008; 453: 1004-1007.