

# Two Double-Blind Placebo Studies of Flower Essences

by Dr. Jeffrey R. Cram, PhD

## A Psychological and Metaphysical Study of Dr. Edward Bach's Flower Essence Stress Formula

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## Effects of Two Flower Essences on High Intensity Environmental Stimulation and EMF

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# **A Psychological and Metaphysical Study of Dr. Edward Bach's Flower Essences Stress Formula**

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The psychophysiological procedure utilized to study the emotional reactivity of the body is called stress profiling. Looking for correlates to emotions extends throughout the history of psychophysiology (Lacey & Lacey, 1958; Lader & Mathews, 1968 ; Malmö & Shagass, 1949), with the hope that we would be able to objectively determine the individual's emotional state without having to rely upon self report. And as investigations moved into applied clinical research, the questions were directed more at can we identify those individuals who are at risk for a particular disorder. For excellent reviews on these topics, see Haynes (1980) and Schwartz (1987). In this article, I will briefly review and explore some of the traditional conceptualizations for stress profiling, while introducing and demonstrating a unique perspective which reaches back to ancient Vedic writings.

On a purely mind-body level, a key attribute of muscles is that of emotional display. In addition we can conceptualize emotions as muscle activation patterns which lie at the foundation of intentional movement (e-motion). When the muscle activation associated with emotions occurs, more energy is sent out into the neuromuscular system, taking up the "slack" in the system and increasing the tonic or resting level. This emotional bracing (Jacobson, 1932; Whatmore, 1974) or increased tonus also effects the quality of movement. Professional athletes certainly know how emotional arousal can "unintentionally" alter their levels of exertion and change the timing associated with coordinated movement.

In addition, it is not uncommon for patients to react to stressful events in a "stereotypic" fashion. Individual Response Stereotypy (Engel, 1960) is the tendency for an individual to respond to a variety of stressors with a similar physiologic response. This tendency was first noted in the early 60's, where some individuals were observed to always respond to a stressful event by, say, speeding up their heart rate or by tensing their shoulder muscles. Within the neuromuscular system, emotional arousal and associated stereotypy have been studied for the facial muscles (Ekman & Frissen, 1972), the postural muscles (Goldstien, 1972) and the muscle spindle (McNulty, et al, 1974).

So, where do we search for these stereotypic patterns? We can look for signs of autonomic arousal through recordings from hand temperature and electrodermal activity (EDA). Recordings from the wide frontalis placement is very popular since is

provides an excellent barometer of the negative emotional displays found on the upper face. Or a simple visual observations of depressed patients usually indicates stooped shoulders and fallen chest, while the anxious patient may have their shoulders markedly elevated as if to protect their neck. Whatmore (Whatmore & Ellis, 1959; Whatmore and Kohli, 1962) has validated these phenomena using sEMG recordings. Reactivity in the trunk muscles may show a high level of specificity. Cram (1997) has presented a case example of sEMG recordings from the right and left trapezius muscle groups using the cervical trapezius placement on a patient who had injured their right upper quarter during a fall down some stairs resulting in headache and right upper quarter pain. For this patient, it was only the right cervical trapezius lead which responded to the stressor, followed by a very poor recovery pattern (return to baseline). The uninjured left aspect show only a small, insignificant response. Flor et al (Flor, et al, 1985) have also demonstrated the specific effects of emotions on the muscles of the low back. In their study of the right and left aspect of the erector spinae muscles were studied in a group of low back patients, a group of general pain patients (i.e., pain other than low back) and a group of healthy controls. Each group was presented with various types of stressors. The findings of their study clearly demonstrated that only the low back pain patients experienced an emotional response (activation pattern), primarily in the left erector spinae muscle set and only during stressors relevant to the patient's condition.

Thus, the literature on stress profiling demonstrates that predictable patterns of reactivity may be seen at traditional sites for emotional display, sites of injury or sites of reported of pain. While these perspectives have provided us with a wealth of information, they are limited by their pure psychophysiologic basis.

Stress Profiling, Flower Essences and A Matter Of Heart.

In a recent study on stress profiling, I was asked to investigate whether or not a Flower Essence could attenuate the stress response. The particular essence which was to be studied, The Five Flower Formula (Flower Essence Services) was first developed by Dr. Edward Bach in the 1930's and later refined by Julian and Martine Barnard for the treatment of physical trauma, emergencies and crisis situations. According to a long history of anecdotal case reports on its effectiveness, it seemed a likely candidate to influence the stress response system in some way. Yet no studies on the mechanisms of action of the flower essence had been performed to date.

If one is to study the effects of a subtle energy such as a flower essence, it might be necessary to embrace traditional recording sites, yet broaden the conceptual framework of stress profiling to include the possible metaphysical influences of flower essences. Thus, rather than routinely sticking to sEMG recording sites of the frontal, neck, shoulder or forearm, it was decided to study the biological energy at multiple sites along the human spine. These sites reflected the location of the chakras, while simultaneously recording from some of the more traditional sEMG placement sites. Two previous studies have demonstrated the sensitivity of sEMG recordings at these

chakra sites while studying the subtle influences of procedures such as Therapeutic Touch (Wirth and Cram, 1994) and Distant Prayer (Wirth and Cram, 1993). The chakras sites have specific locations in the human body, and are where the flow of pranic energy is purported to be the greatest. In addition, each of the chakras has its own psychophysical and metaphysical attributes. The sites which were studied may be described below in both traditional and metaphysical ways:

| Site Location              | Psychophysiological Meaning   | Metaphysical (chakra) meaning   |
|----------------------------|---|---|
| Wide Frontal               | Seat Of Negative Emotions.  | 3rd Eye: Divine Joy. Also Seat Of Knowledge / Enlightenment.                      |
| Mastoid to Mastoid Process | Muscle Tension Of Axis.<br>Postural: Head Position.                               | Medulla Oblongata: The Ego. Also The Entry Point of Prana Which Regulates Breath. |
| Bilateral C4 Paraspinals   | Muscle Tension Of Neck.<br>Postural: Anti-Gravity Muscles                         | Throat Chakra: Center of Will. Also Associated With Calmness.                     |
| Bilateral T6 Paraspinals   | Intrascapular Muscle Tension<br>Postural: Anti-Gravity Muscles                    | Heart Chakra: Divine Love. Also Desires and Attachments.                          |
| Bilateral T12 Paraspinals  | Muscle Tension at the Thoracic Lumbar Junction.<br>Postural: Anti-Gravity Muscles | Lumbar Chakra: Firely Self Control, Self Image.                                   |
| Bilateral L4 Paraspinals   | Muscle Tension of the Lumbar Sacral Area.<br>Postural: Anti-Gravity Muscles       | Sacral Chakra: Creativity, Power, Sexuality.                                      |

The procedure of the study followed the "standard of care" for stress profiling. Electrodes were connected to the above sites, along with hand temperature probe and EDA recording electrodes. A five minute baseline was recorded, followed by a pre-recorded three minute serial arithmetic task (Hartje's Flow Chart), followed by a five minute recovery period. The only nuance for the study was the administration of either a placebo or the five flower essence approximately five minutes prior to the initiation of the first baseline period.

The analysis of the data was conducted using a standard analysis of variance with repeated measures. Two post hoc analyses were conducted for each site. The first looked at the interaction of period (Baseline - Stress - Recovery) with Time (3 minutes of each period) to determine whether or not there had been a psychophysiological response. The response patterns and their significance is presented for Figures 1 - 8. As

can be seen, a significant response pattern is noted for all sites with the exception of the T6 / Heart and L4 paraspinal / Sacral site. The lack of responsivity for the T6 / Heart chakra site may be attributed to the effects of the flower essence (see below). Figure 9 shows the magnitude of the sEMG response from baseline to the stress period. As can be seen, the mastoid to mastoid / Medulla recording site shows the largest response pattern, nearly three times greater than any other site. Lastly, the influence of the Five Flower Formula Essence is shown for each site in Figures 10 -17. As can be seen, significant effects were noted only for the T6 / Heart and C4 / Throat chakra sites.

So, what can we learn from the observations of this study? First of all, it appears that the stress response occurs all along the spine, not only at our favorite electrode placement sites, such as the wide frontal placement all together. In fact, had we stuck to the traditional sites, we would have missed the clinical effects of the flower essence. I was very surprised and impressed by the magnitude of the stress response at the mastoid to mastoid / Medulla chakra site. This site has been pretty well ignored in the stress profiling literature, and currently is not commonly used in clinical practice. The only other notation for recordings from this site are found in the work by Mark Schwartz at the Mayo Clinic (Schwartz, 1985). He has utilized this site to study headaches for years, and a study by Hudzyski and Lawrence (1988) has validated its clinical utility for assessment purposes. One could interpret the increased of sEMG activity at this site to represent a locking of the head to the spine at a time of threat so as to minimize damage to this important junction if a struggle were to pursue. From a metaphysical point of view, it might suggest that the Ego was engaged or disengaged as the case might be. Or from a mechanical point of view, Body Work professionals have known about the importance of the axis / atlas relationships for years. Chiropractors and physical therapists frequently manipulate this site to alleviate headaches, the Alexander Technique has based the foundation of its work at this site and John Upledger uses it as the basis of cranial sacral therapy. Perhaps, we in the biofeedback arena should more completely explore the potential of this site for assessment and treatment purposes. Are we missing the possible etiology of headaches because we monitor only from frontalis and trapezius?

Secondly, I was duly impressed by the psychophysiological effects of the flower essence studied. The flower essence therapy administered just prior to the stress profiling procedure significantly reduced the level of reactivity at the C4 / Throat and T6 / Heart chakras sites. Why did it effect these two sites and not the frontal site or other sites? From a strictly emotional model, the reduction in cervical sEMG might have been predicted, but certainly not the T6 paraspinals. Next, it doesn't make sense to place the effects of a flower essence into a strict mechanical model. That is unless we begin to think of gravity as the basis of the unified field theory. Perhaps the clinical effects came about because of the homeopathic similarities between the attributes of flower essences and those of the chakras. According to Kaminski (1995), the five flower essence was specifically designed to "bring about stabilization and calmness (Rock Rose), to "draw one back into present time" (Clematis), to "balance and soothe away impulsiveness and

irritability" (Impatiens), to "bring about inner peace and stillness which allows us to ease the contraction felt in the body" (Cherry Plum), and to "help us regain our composure" and "for learning and mastery of our lives" (Star of Bethlehem). The empirical data clearly suggests that the flower essence works primarily on the centers for calmness (C4/Throat) and love (T6/Heart). It appears to assist us in letting go of our attachments and desires, while promoting a sense of calmness. Biofeedback practitioners may want to learn more about how to use these adjunctive tools may assist their patients in mastering the stress in their lives.

To conclude, psychophysiology provides a viable tool by which to investigate subtle energies, especially when guided by the metaphysical wisdom of the ages. This represents a blending of the old and new, East and West. For what is the basis of science but to describe what is all ready known with the latest tools of our culture.

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Figure 1  
Effect Of Stress On EDA

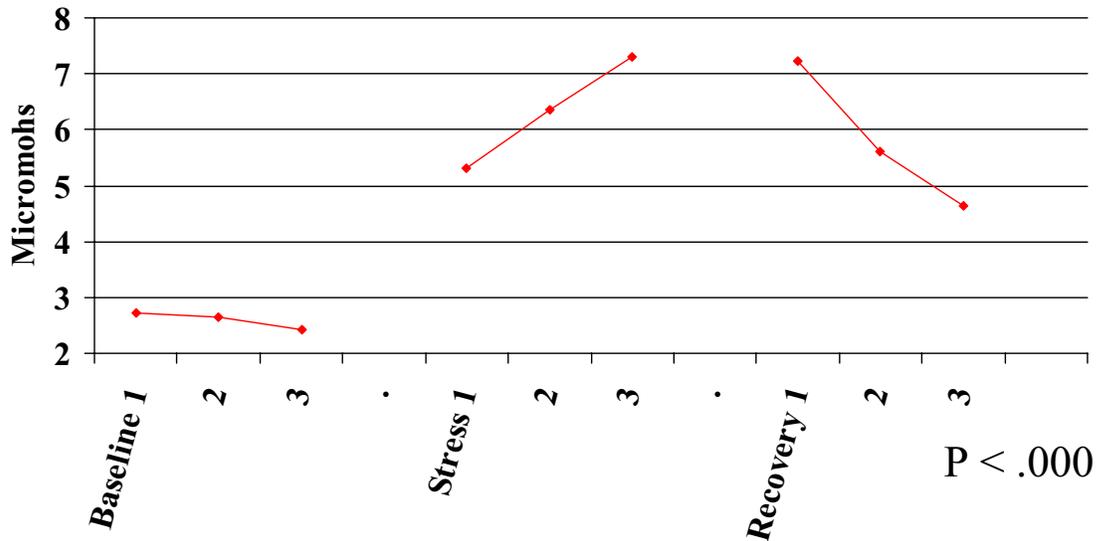


FIGURE 2.  
Effect Of Stress On Hand Temperature

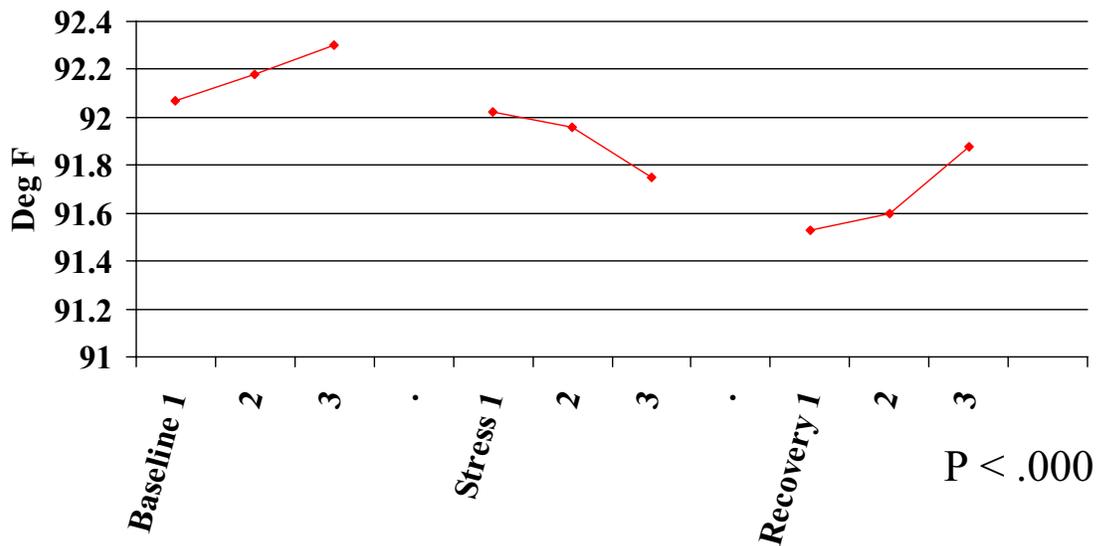


FIGURE 3.

## Effect Of Stress On 3rd Eye Frontal sEMG

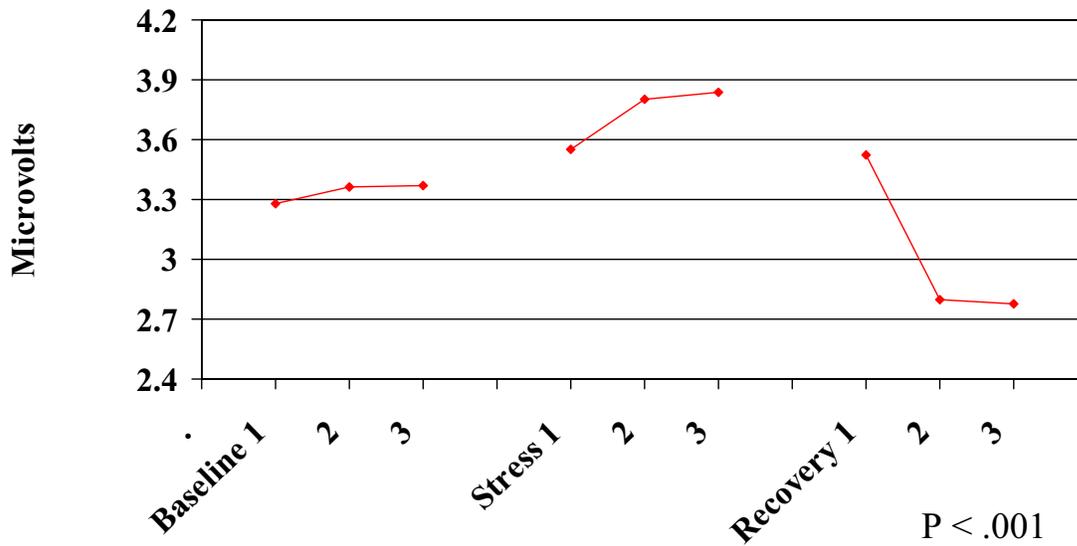


FIGURE 4

## Effect Of Stress On Medulla Capitus sEMG

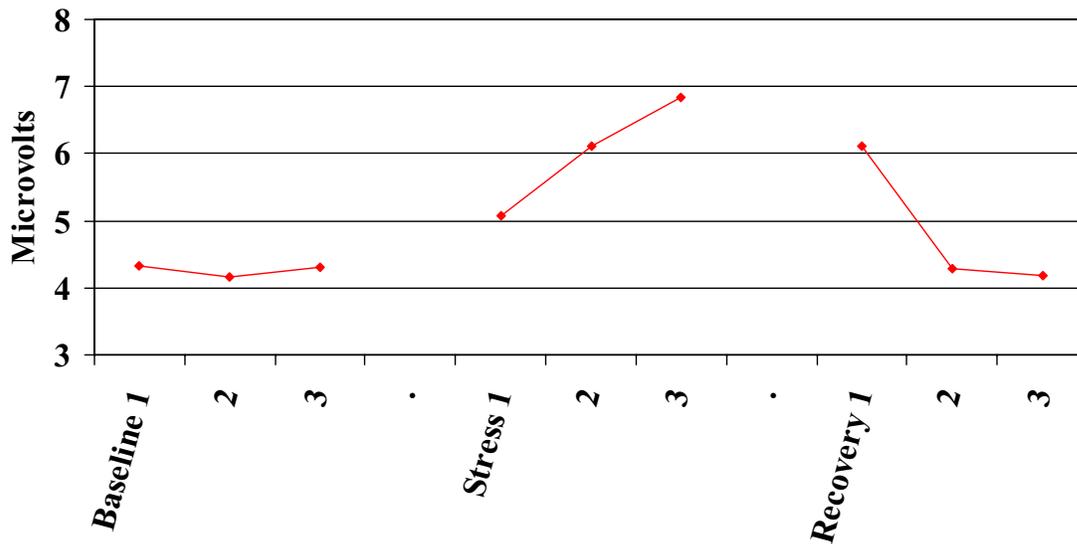


FIGURE 5.  
 Effect Of Stress On Throat Chakra  
 Cervical sEMG

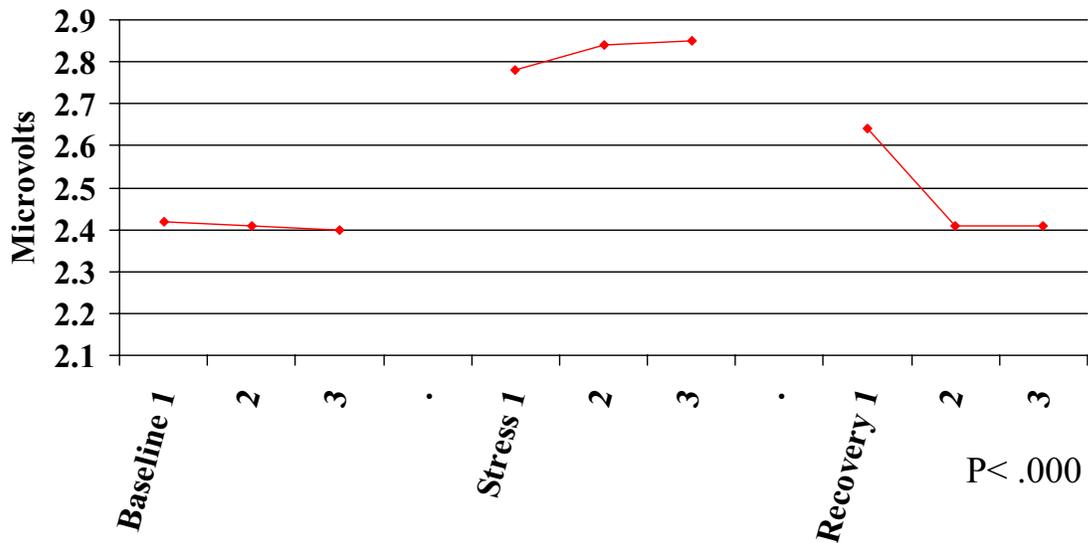


FIGURE 6.  
 Effect Of Stress On Heart Chakra  
 Intrascapular sEMG

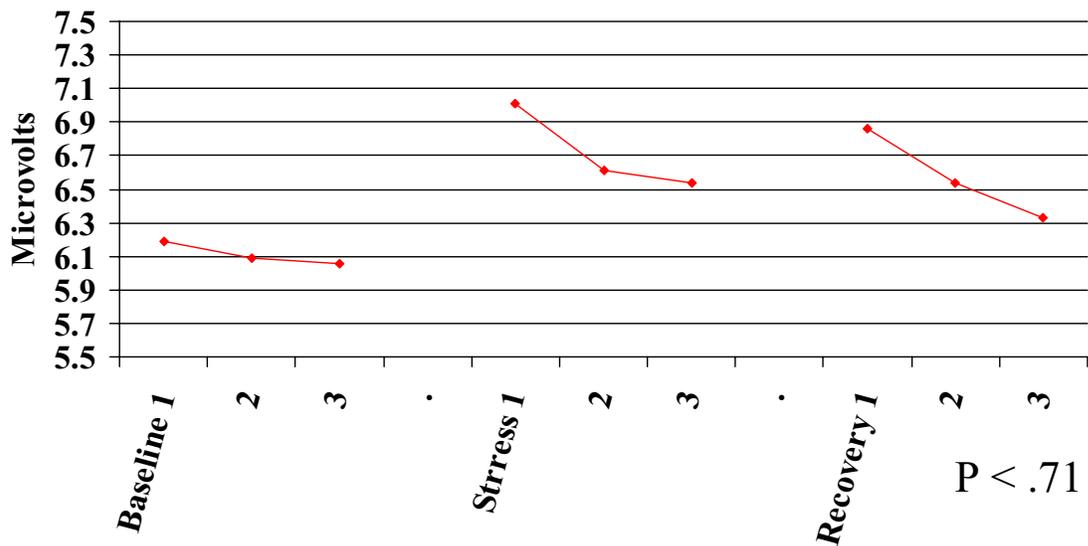


FIGURE 7.

# Effect Of Stress On Lumbar Chakra

## Thoracic Lumbar Paraspinal sEMG

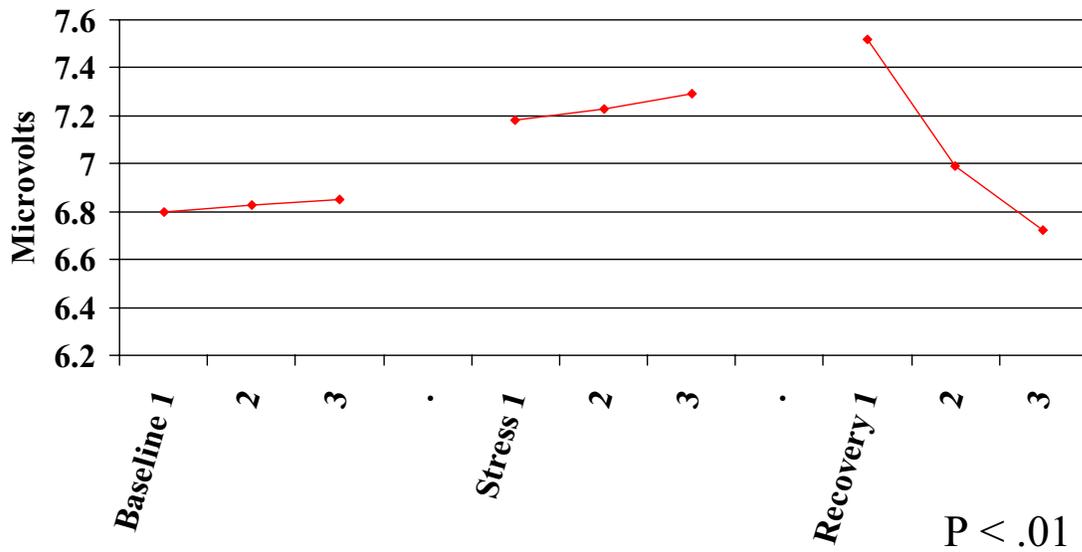


FIGURE 8.

# Effect Of Stress On Sacral Chakra

## Lumbar Sacral Paraspinal sEMG

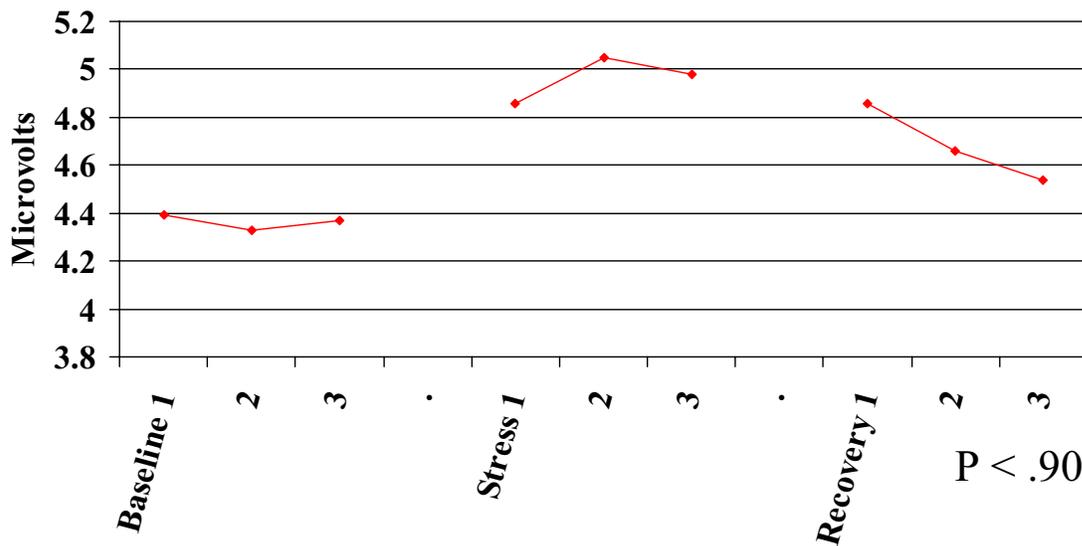


FIGURE 9.

# Magnitude Of Stress Response By Recording Site

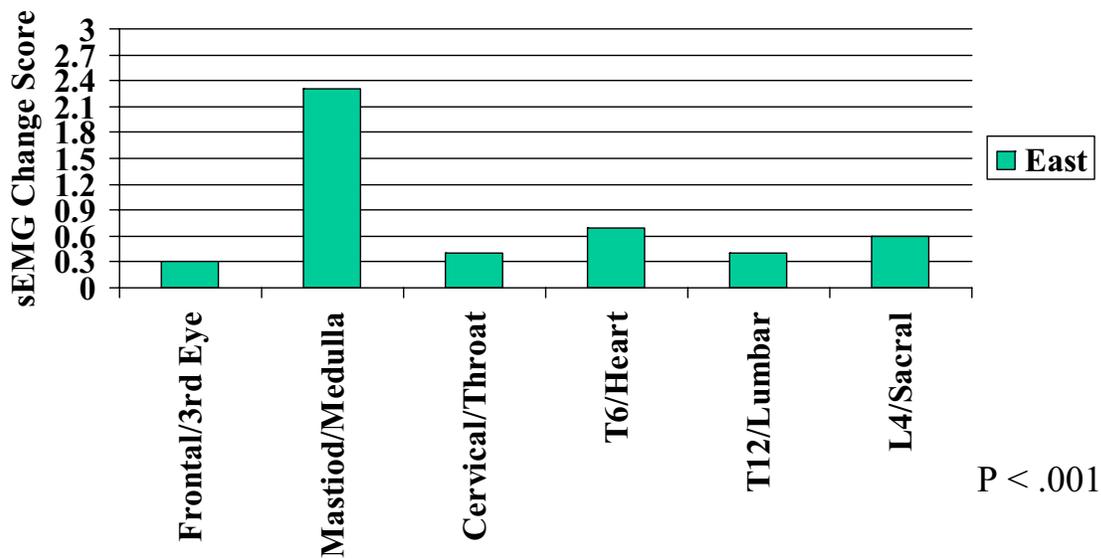


FIGURE 10

# Modification of Stress Response Effect Of Flower Essence On EDA

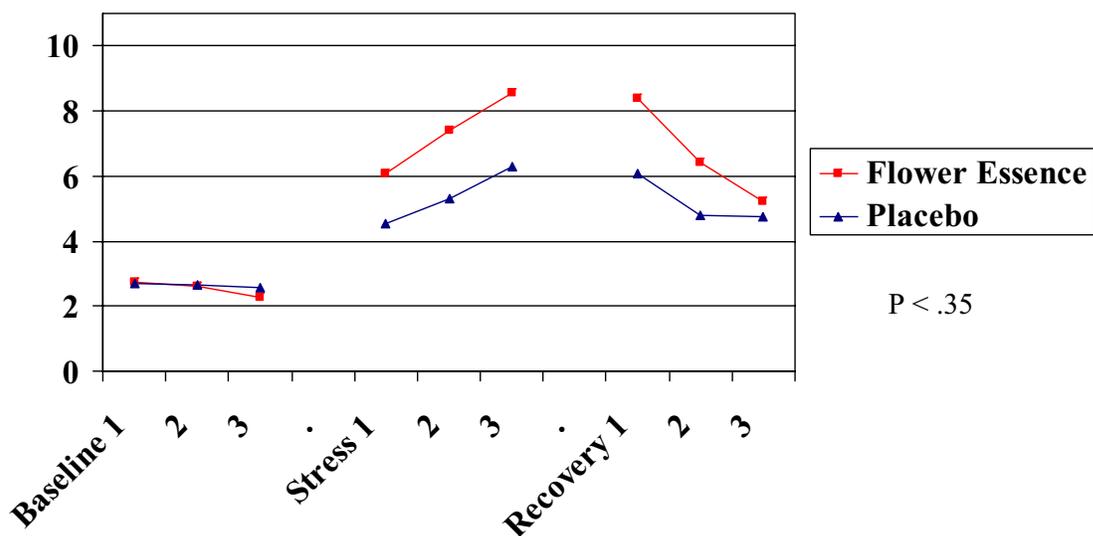


FIGURE 11.

# Modification Of Stress Response

## Flower Essence Effects On Hand Temperature

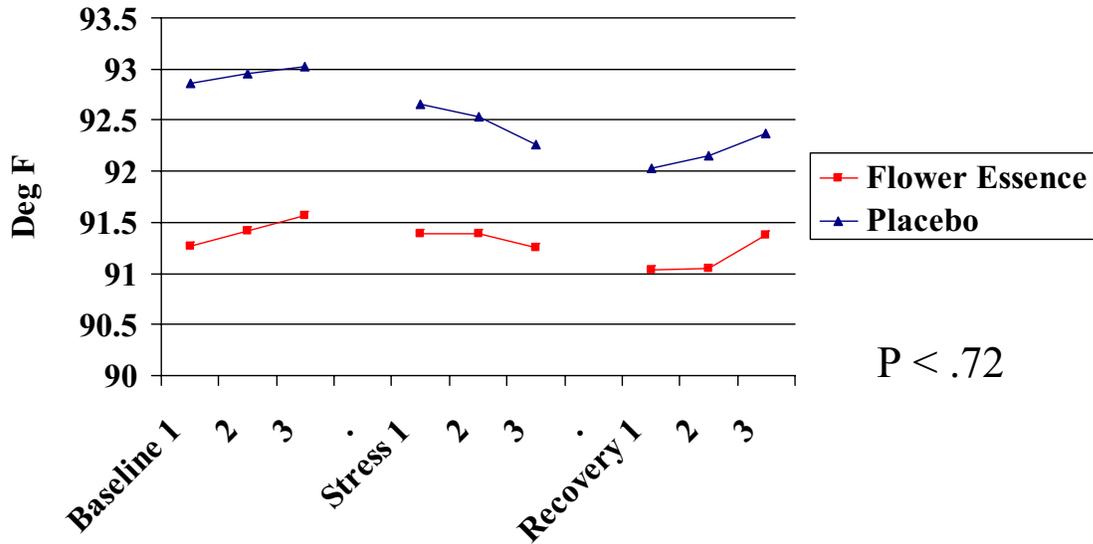


FIGURE 12.

# Modification Of Stress Response

## Flower Essence Effects On 3rd Eye

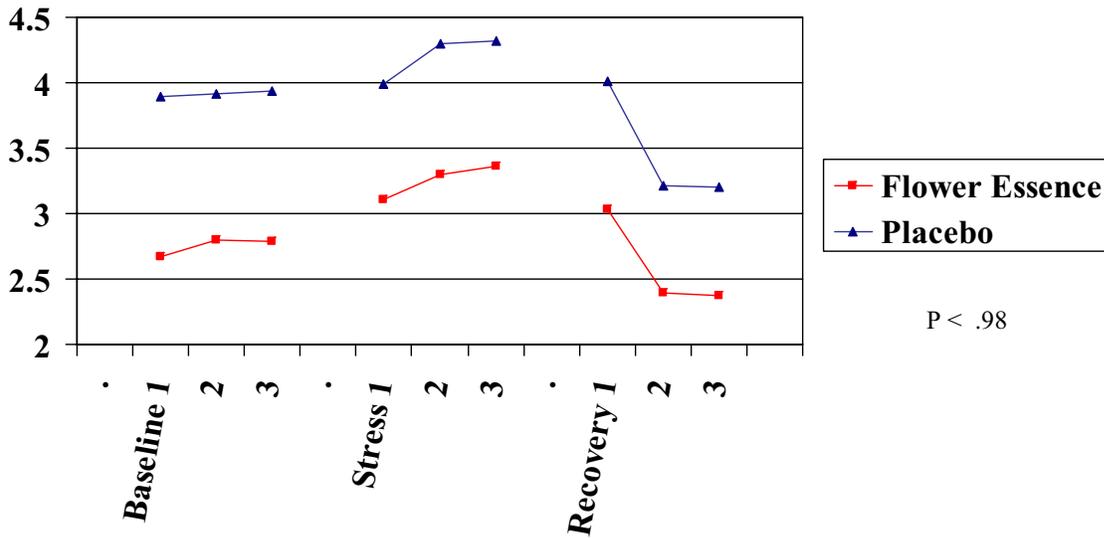


FIGURE 13.

# Modification Of Stress Response

## Flower Essence Effects On Medulla

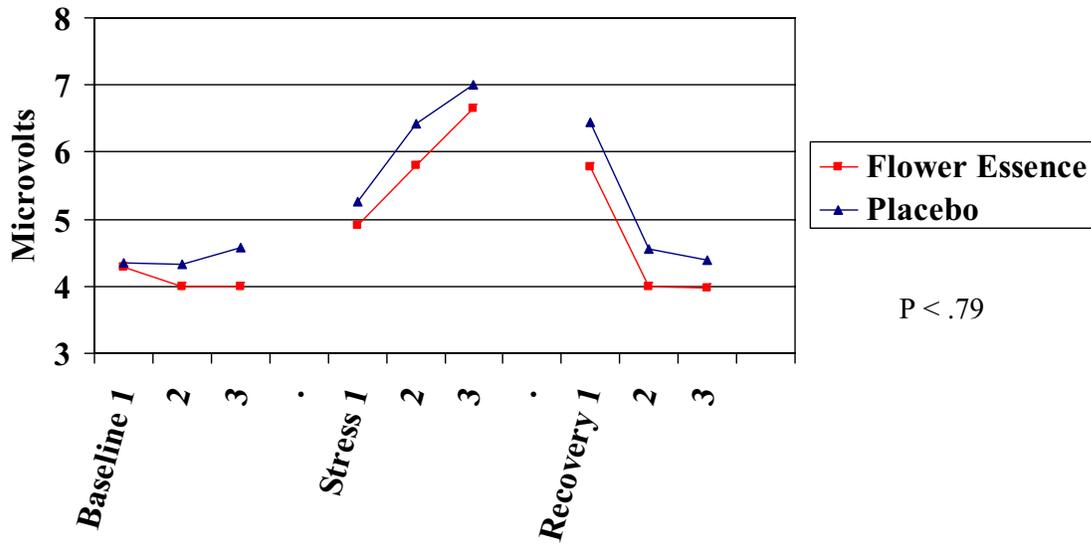


FIGURE 14.

# Modification Of Stress Response

## Flower Essence Effects On Throat Chakra

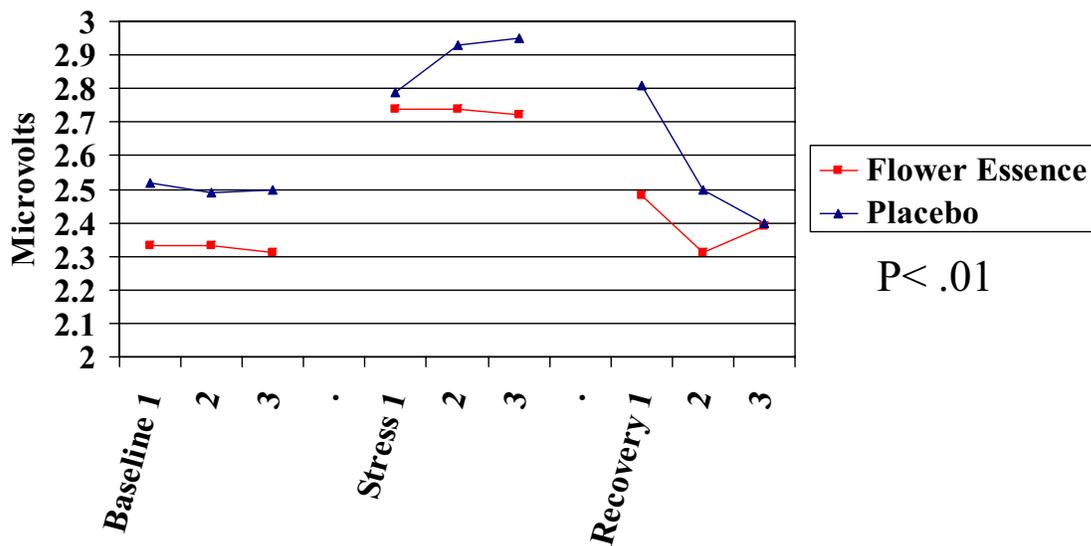


FIGURE 15.

# Modification Of Stress Response

## Flower Essence Effects On Heart Chakra

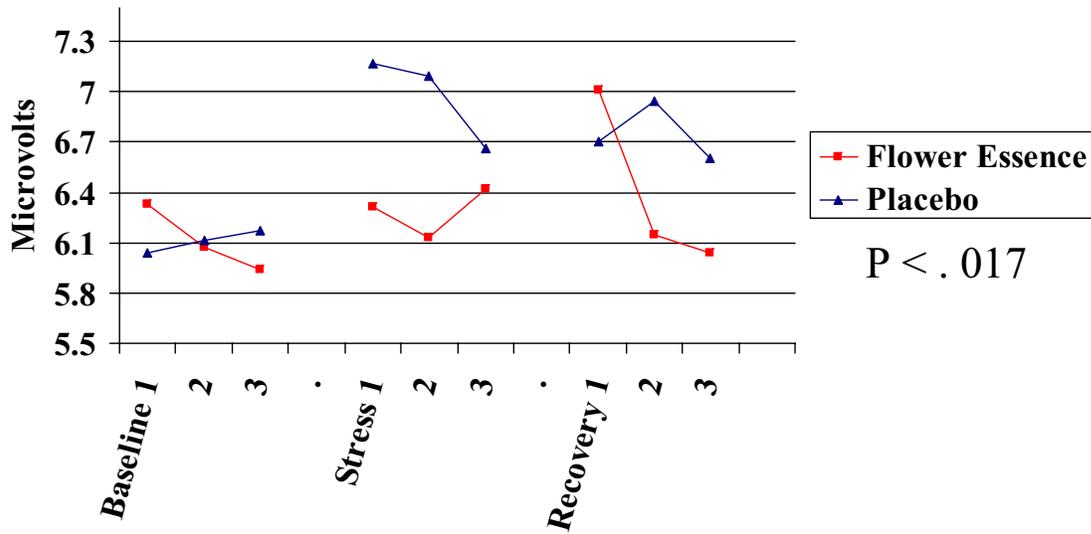


FIGURE 16.

# Modification Of Stress Response

## Flower Essence Effects On Lumbar Chakra

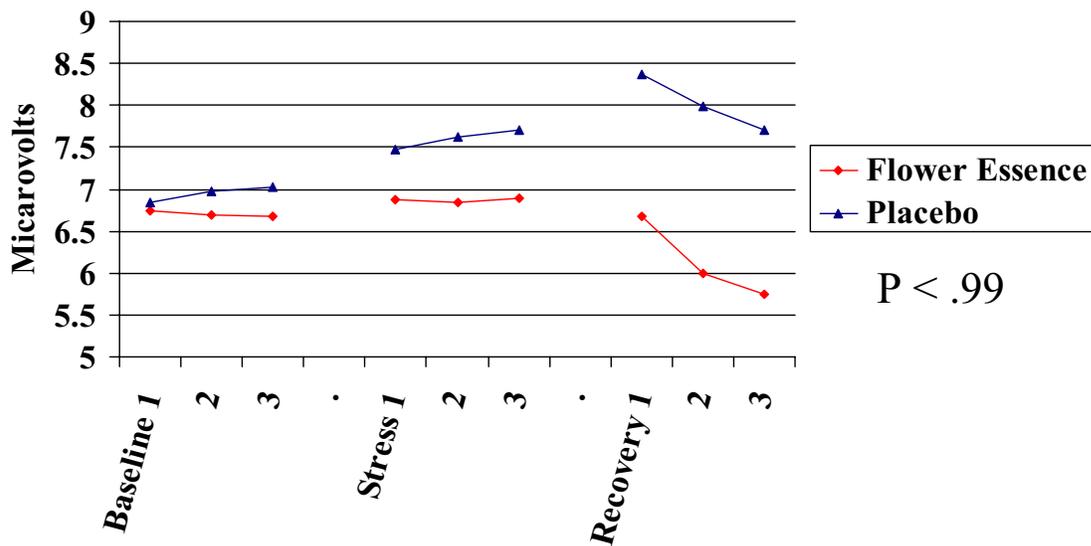
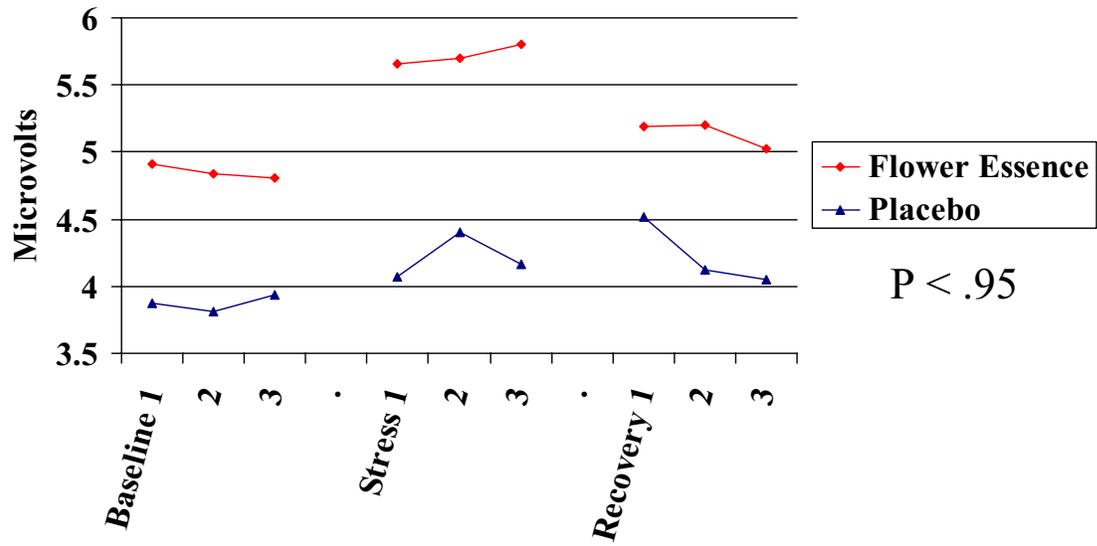


FIGURE 17.

# Modification Of Stress Response

## Flower Essence Effects On Sacral Chakra





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# **Effects of Two Flower Essences on High Intensity Environmental Stimulation and EMF: A Matter of Head and Chest**

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## Abstract

Certain flower essences are thought to have an antadoting effect on the impact of high levels of environmental stimulation. Using a randomized double blind experimental design, this study explored the effects of two flower essence formulas (Yarrow Special Formula and Five Flower Formula) on the intense environmental stimulation of fluorescent lights and its concomitant electromagnetic fields (EMF). Twenty four subjects (N=8 per cell) were monitored using a 19 channel qEEG system, along with the activity of six sEMG sites (Frontal, C2 (mastoid to mastoid), Cervical (C4 paraspinals), Thoracic (T6 Paraspinals), Lumbar (T12 paraspinals) and Sacral (L1 Paraspinals)). A 12 minute study was conducted which assessed baseline activity; reaction to the flower essence or placebo; reaction to the high intensity light stimulation; and concluded with a recovery period. The artifacted qEEG and sEMG data were submitted to standard statistical analysis (ANOVA). The results of the study show EEG activation of the frontal lobes area to the photic stimulation, but only for those individuals who received the Placebo preparation. Concurrent activation of the T6 paraspinals was also noted for only the Placebo control group as well. This demonstrates that the stress response was seen only in the Placebo group. Here the executive and premotor functions of the frontal lobes activate to determine the course of action to the perceived threat, while the subject concurrently extended their chest in preparation for fight or flight. The two flower essence groups showed no similar stress response. Thus flower essences are demonstrated to antidote environmental stressors.

## **Introduction**

We live in a society in which our bodies are continuously bombarded by man made and natural energies. In his book The Body Electric, Robert O. Becker <sup>1</sup> reviews a myriad of studies which strongly suggest that the Electromagnetic Field (EMF) associated with electricity in general, and other man made sources (e.g.; microwaves, radio waves, etc) may have deleterious effects on our health <sup>2 3 4 5</sup>. Many studies have focused upon Extremely Low Frequencies (ELFs), such as the 60 cycle that emanates from our power lines, while others have focused on the Electromagnetic Radiation (EMR) which are associated with Video Data Terminals (VDT), microwaves and cell phones. These studies conclude that chronic low grade exposure to these energy fields may over excite the nervous system, promote fatigue, increase cancer risk, stimulate spontaneous miscarriages, provoke allergic reactions, just to mention a few untoward effects. If you are an environmentally sensitive individual, you will want to find various ways to antidote these energies.

Certain flower essences are thought to have an antidoting effect on the impact of high levels of environmental stimulation. During the 1980s, the Flower Essence Society (FES) introduced a flower essence therapy <sup>6</sup> based on the observations of Dr Aubrey Westlake of England, a well-known homeopathic researcher., Westlake had been experimenting with a combination of English flower remedies in sea salt water as an antidote to the effects of radiation on the human energy field. In response to the 1986 Chernobyl nuclear power disaster , FES developed the Yarrow flower essence in a sea salt base. The feedback from the field work and case studies showed this to be helpful in those individuals exposed not only to nuclear radiation, but also other forms of environmental stress such as X-rays, CRT monitors and fluorescent lights. . Approximately a decade later (1995) the formulation was broadened to include the flower essences of Echinacea and Arnica as well as the herbal tinctures of Yarrow . The use of these three essences in salt water is called the Yarrow Special Formula, and it is used widely to protect individuals from a variety of adverse environmental stimulations.

The knowledge of flower essence properties is derived from study of the physical and energetic properties of the source plants. For an excellent review of these properties, please refer to The Twelve Windows of Plant Perception by Katz and Kaminski <sup>7</sup>. These properties are then refined and verified by extensive anecdotal reports of their effects in clinical practice and home care. Table 1 below shows the essences and their healing/protective properties for those found in the Yarrow Special Formula.

**Table 1.** The healing / protective qualities of Yarrow Special Formula.

| Essence   | Quality or Attribute   |
|-----------|--|
| Yarrow    | Works on vulnerability to the influence of others or the environment. It is felt to encourages a sense of self, integrity and stronger ego function. |
| Arnica    | Mollifies physical or psychic trauma by allowing the integration the psyche and the soul with the body.  |
| Echinacea | Awakens the true inner self, and restores the soul's self identity and essential wholeness in relationship to the earth and the human family.        |

*Extracted from Katz and Kaminski, Yarrow Special Formula, Flower Essence Service, Nevada City, CA, 1995.*

In addition to the Yarrow Special Formula, the current study also investigated the impact of the Five Flower Formula (based on Bach's Rescue Remedy) on the impact of intense environmental stimulation. Along with a 70 year history of anecdotal case reports on the effectiveness of Dr. Bach's formula in ameliorating the effects of stress and trauma, previous research by Cram <sup>8</sup> has scientifically documented that the Five Flower Formula was effective in reducing the physiological arousal induced by a mental stressor. It therefore seemed a likely candidate to reduce the physiological response to an environmental stressor in some way.

The Five Flower Formula is prepared by Julian Barnard in Herefordshire, England. Barnard follows Dr. Edward Bach's original method and formula, which he developed in the 1930's as "Rescue Remedy." The primary use of Five-Flower Formula is for the treatment of physical and psychological trauma, emergencies and crisis situations. It contains the flower essence combination described in Table 2.

**Table 2.** The Flower Essences found in the Five Flower Formula<sup>9</sup>.

| Flower Essence                                      | Quality   |
|---|---|
| Cherry Plum<br><i>Prunus cerasifera</i>             | For tension and fear of losing control. Helps create a sense of inner peace and stillness.                          |
| Clematis<br><i>Clematis vitalba</i>                 | For lack of clarity and consciousness. Helps to draw one's consciousness back into the body, and into present time. |
| Impatiens<br><i>Impatiens glandulifera</i>          | For irritability, impulsiveness and hastiness. Allows one to flow with outer events.                                |
| Rock Rose<br><i>Helianthemum nummularium</i>        | For conditions of fear. Provides a calming, stabilizing force to the situation.                                     |
| Star Of Bethlehem<br><i>Ornithogalum umbellatum</i> | For shock and trauma. Helps one to accept and understand the deeper meaning of ones experience.                     |

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To give the reader some general background on flower essence therapy, it should be noted that it was introduced by the English physician Dr. Edward Bach in the 1930's<sup>10 11 12</sup>. Bach was a bacteriologist and homeopathic doctor before turning to his flower essence research. He was one of the pioneers of psychosomatic medicine, recognizing before Dr. Hans Selye<sup>13</sup> (1956), the impact of stress reactions and other states of mind on physical health. Bach observed the effects of worry, anxiety, fear, confusion, indecision, depression, despair, jealousy, resentment and the like on the health of his patients. The 38 flower remedies that he developed each address specific emotional states.

Flower essences should not be confused with aromatic essential oils that are used for aromatherapy. Rather, flower essences are prepared by creating a very dilute infusion of the fresh blossoms of a particularly plant species. The preparation takes place *in situ*, where the wildflower or garden flower is in full bloom. Dew-filled blossoms are collected in the early morning, and are placed into a clear glass bowl of fresh water<sup>14</sup>. After exposure to direct sun for approximately three hours, the flower-infused water is collected and preserved with brandy alcohol in a one-to-one ratio. This "mother essence" is then further diluted, at an approximately 0.2% ratio, in an alcohol solution for the Five Flower Essence, and into a "normal saline" and alcohol solution for the Yarrow Special Formula, to form flower essence "stock." Flower essences are typically taken orally (under the tongue) from a dropper bottle. In the case of environmental stimulation issues, the essence is typically taken four times a day. They may be used in more an acute fashion and may be taken just prior to, during, or just after an exposure.

As noted above, flower essences are extremely physically dilute substances. As such, there is no plausible biological or biomechanical mechanism of action that can be explained by their bio-chemical composition. Flower essence therapy presupposes that living beings are comprised of more than their physical bodies. There are also "bodies" of subtle energies, including the "etheric body" which acts as a field of "formative forces" that give shape and direction to the growth of physical body, and the "astral body" or soul, which is the seat of our thoughts, feelings and experiences <sup>15</sup>. The ideas of "vital force" in homeopathy and "chi" in acupuncture are examples of the concept of subtle energy. This study assumes that the Yarrow and Five Flower Formulas used will strengthen the "vital force" or subtle energies of the individual using it and this will assist in mollifying the effects of noxious environmental stimulation.

In this study, we conducted a randomized double blind study to assess the effects two flower essence remedies (Yarrow Special Formula and Five Flower Formula) on the physiological impact of electromagnetic (photic) stimulation. The psychophysiological procedure utilized in this study examines the emotional reactivity of the physical / emotional body, and is called "stress profiling". Psychophysiology is aimed at being able to objectively determine the individual's emotional state without having to rely upon self report <sup>16 17 18 19</sup>. In the current study, both brainwave activity (qEEG) and muscle activity (sEMG) from the forehead and along the spine were measured. The 19 channel qEEG allowed us to examine the cortical arousal patterns evoked by the high intensity photic stimulation and EMF. The 6 sEMG sites allowed us to examine the effects of photic stimulation on muscle tone in general, as well as its impact on posture <sup>20 21 22 23</sup>. In addition, the sEMG sites paralleled the locations for the chakras <sup>24 25 26 27 28</sup>, thus allowing us to examine the psychophysiology in a more metaphysical fashion describe in an earlier publication by Cram <sup>29</sup>.

## **Methods**

Subjects. Twenty four subjects participated in the study. They were solicited from a local newspaper ad which called for participation in a flower essence study. There were 10 males and 14 females, with a mean age of 40.04 ( 11.3) years old. There were 8 subjects per group.

Procedure. . A randomized double blind control group procedure was utilized. The nature of the study was explained to the subjects and consent forms were signed.

Electrodes were then placed on the subject. A standard qEEG cap which utilized the 10/20 system and 19 site montage was placed on the subject. All EEG sites were impedance tested, and were found to be below 10,000 ohms. Surface EMG measurements were conducted at six sites. The sEMG sites were located bilaterally at the forehead (frontal), C2 (mastoid to mastoid), Cervical (C4 paraspinal), Thoracic (T6 Paraspinal), Lumbar (T12 paraspinal) and Sacral (L1 Paraspinal) areas. Standard pre-jelled electrode pads with an inter-electrode distance of 3 cm (Norotrode 30) were placed bilaterally at each site with the exception of the C2 site. Here the electrode pad was cut in half, and each active electrode was placed on the Mastoid Processes. The EEG recording was conducted utilizing a Lexicor Neurosearch 24 computerized EEG system. The EEG was artifacted prior to any data analysis. The sEMG was monitored utilizing a J&J I-330 computer interface with the sEMG amplifiers (M-501) having their filters set in the 100-200 range. This filter selection was chosen to minimize heart rate artifact contaminating the quantitated sEMG data.

Once the electrodes were in place, a vertical florescent light panel was positioned approximately 3 feet in front of the subject, and tested for EMF levels. The light panel consisted of 4 standard 4 foot florescent bulbs which emitted 75 foot candles of light at 3 feet as measured by a Weston Master II light meter. During a calibration procedure, the subjects were asked to close their eyes while the light panel was turned on for approximately 10 seconds. The light panel was then positioned such that each subject was exposed to 3 milligauss per meter of Electro Magnetic Fields (EMF) as indicated by a TriField Meter placed on the middle of the thigh of the subject. There was a minimum of a 5 minute break between the positioning of the light panel and the initiation of the data collection period.

The subject was asked to keep their eyes closed for the rest of the study. The study consisted of the following conditions: A three (3) minute baseline; a one (1) minute period in which the subject was administered either a sublingual flower essence or placebo preparation; a three (3) minute period to observe the physiological response to the essence or placebo; a three (3) minutes period where the subject was exposed to high intensity photic stimulation; and a three (3) minute post stimulation/recovery period.

The administration of the sublingual preparation given to the subject was as follows. The manufacturer retained the experimental code and provided bottles for the study each marked with a subject number. The bottles contained one of three substances: A brandy and salt water Placebo (in the same proportion as the Yarrow Special Formula); or The

Five Flower Remedy; or The Yarrow Special Formula. A half of a dropper full of the substance was placed under the subject's tongue. At the appropriate time, the subject was simply asked to open their mouth and lift their tongue while the substance was squirted under the tongue. They were asked to wait a brief time and then to swallow. Both the subject and the experimenter were blind as to the actual substance administered.

## **Results**

The EEG data was artifacted before the qEEG values for each of the four experimental periods were calculated. A separate analysis was done for each of the four brain wave states (Beta, Alpha, Theta and Delta) for each qEEG site. The sEMG data was artifacted, as well, before the averages for each of the three minutes of each experimental period were calculated. A separate analysis was conducted for each of the sEMG sites. The quantified data for each modality were submitted to an Analysis of Variance (ANOVA) with repeated measures. The between variable was that of SUBSTANCE (Yarrow, Five Flower or Placebo), and the within variable was CONDITION (Baseline, Response, Lights and Recovery) for the qEEG data, and CONDITION and TIME (minute 1-3) for the sEMG data. The interaction terms were of greatest interest.

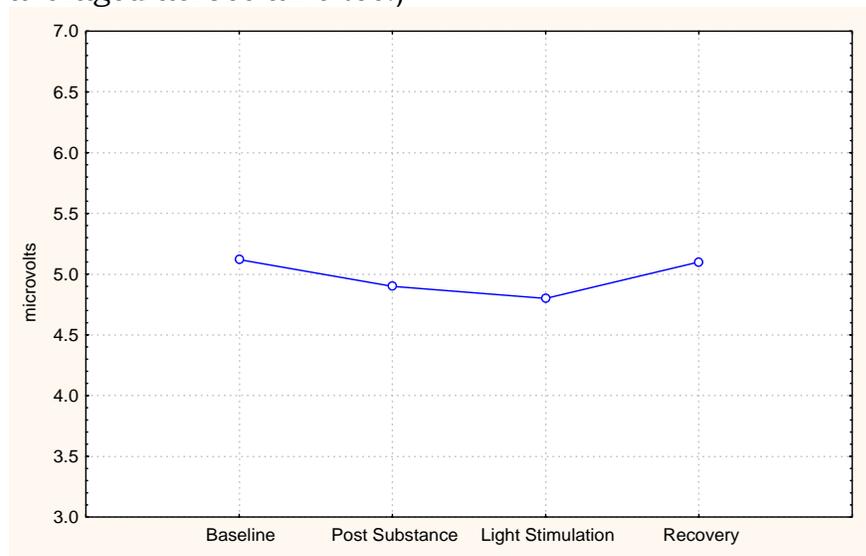
### **qEEG Results.**

The results of the CONDITION EFFECT on the qEEG data are reflected in Tables 3, and Figures 1-4 below. Table 3 shows the probability statements for the analyses of the Condition Effect for each site. As can be seen, there is a strong and pervasive Condition Effect for both the Alpha and Theta states. Here, the light stimulation attenuated alpha and theta activity. This effect is commonly seen in EEG studies, and can be seen in Figures 1-4.

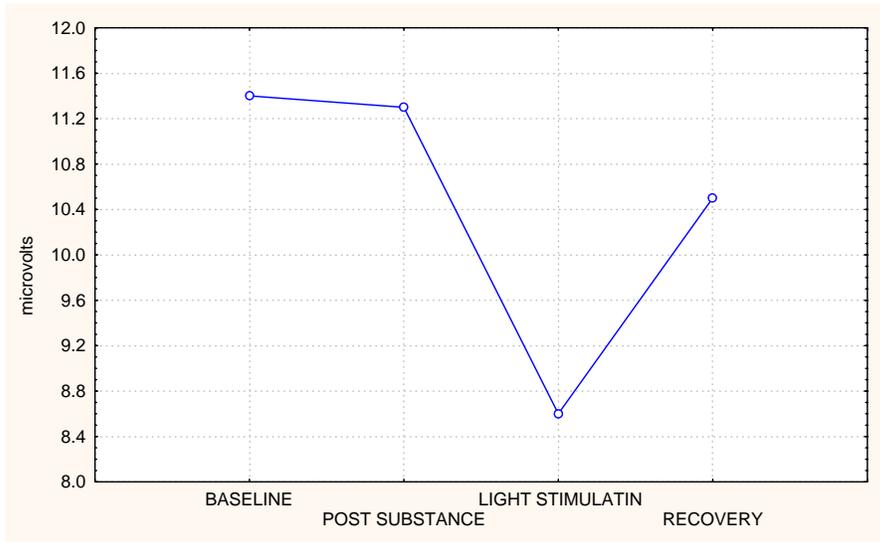
**Table 3.** The Condition Effects for the qEEG data. (The probability statement is noted for the analysis of each site and each brainwave state. The significant effects are bolded.)

| Site       | Beta | Alpha       | Theta       | Delta | Site       | Beta | Alpha       | Theta       | Delta |
|------------|------|-------------|-------------|-------|------------|------|-------------|-------------|-------|
| <i>FP1</i> | 0.49 | <b>0.01</b> | <b>0.01</b> | 0.95  | <i>FP2</i> | 0.47 | <b>0.01</b> | <b>0.01</b> | 0.13  |
| <i>F3</i>  | 0.90 | <b>0.02</b> | <b>0.00</b> | 0.44  | <i>F4</i>  | 0.66 | <b>0.02</b> | <b>0.00</b> | 0.30  |
| <i>F7</i>  | 0.23 | 0.46        | 0.28        | 0.19  | <i>F8</i>  | 0.63 | 0.10        | <b>0.02</b> | 0.22  |
| <i>FZ</i>  | 0.57 | <b>0.02</b> | <b>0.06</b> | 0.34  |            |      |             |             |       |
| <i>T3</i>  | 0.18 | <b>0.01</b> | 0.21        | 0.22  | <i>T4</i>  | 0.46 | 0.13        | 0.30        | 0.11  |
| <i>C3</i>  | 0.50 | <b>0.00</b> | <b>0.01</b> | 0.24  | <i>C4</i>  | 0.94 | <b>0.00</b> | <b>0.00</b> | 0.11  |
| <i>CZ</i>  | 0.97 | <b>0.01</b> | 0.12        | 0.53  |            |      |             |             |       |
| <i>T5</i>  | 0.63 | <b>0.00</b> | 1.00        | 0.21  | <i>T6</i>  | 0.23 | <b>0.03</b> | <b>0.00</b> | 0.15  |
| <i>P3</i>  | 0.64 | <b>0.00</b> | <b>0.00</b> | 0.44  | <i>P4</i>  | 0.59 | 0.10        | <b>0.00</b> | 0.25  |
| <i>PZ</i>  | 0.69 | <b>0.00</b> | <b>0.00</b> | 0.21  |            |      |             |             |       |
| <i>O1</i>  | 0.31 | <b>0.03</b> | <b>0.00</b> | 0.64  | <i>O2</i>  | 0.18 | <b>0.09</b> | <b>0.00</b> | 0.58  |

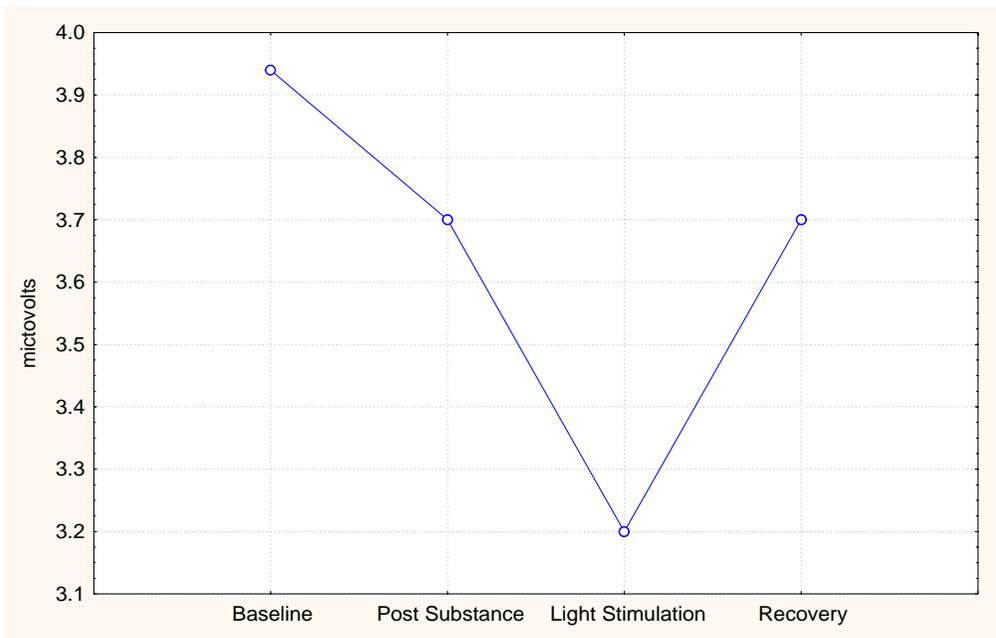
**Figure 1.** Beta Activity as a function of Condition. (qEEG activity is averaged across all sites.)



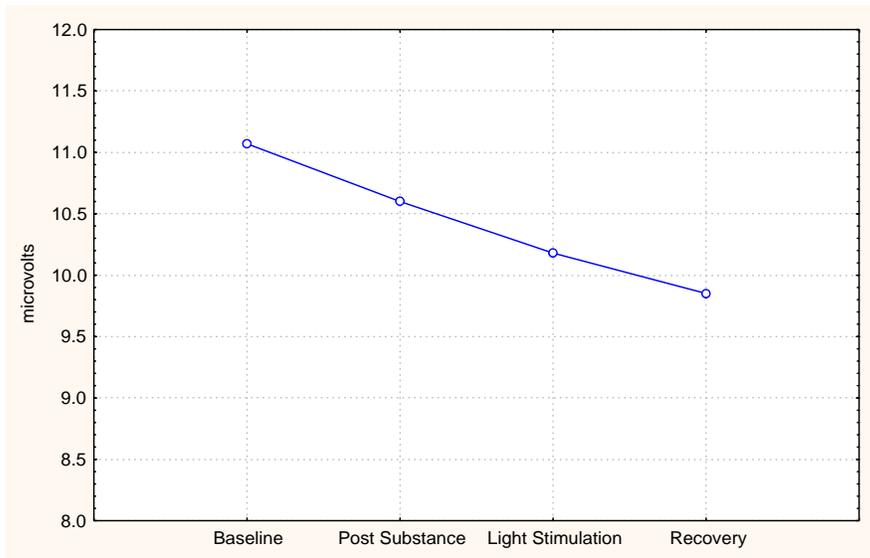
**Figure 2.** Alpha activity as a function of Condition. (qEEG activity is averaged across all sites.)



**Figure 3.** Theta Activity as a function of Condition. (qEEG data averaged across all sites.)



**Figure 4.** Delta activity as a function of Condition. (qEEG data averaged across all sites.)



The direct effects of the Substance on the qEEG was inconsequential. Only three of the sites show an effect, which is approximately chance variation. This may be seen in Table 4.

**Table 4.** The Substance Effect for the qEEG data. (The probability statement is noted for the analysis of each site and each brainwave state. The significant effects are bolded.)

| Site        | Beta | Alpha | Theta | Delta       | Site        | Beta | Alpha | Theta | Delta       |
|-------------|------|-------|-------|-------------|-------------|------|-------|-------|-------------|
| <i>FP1-</i> | 0.37 | 0.97  | 0.89  | 0.64        | <i>FP2-</i> | 0.38 | 0.98  | 0.97  | 0.50        |
| <i>F3-</i>  | 0.36 | 0.97  | 0.58  | <b>0.06</b> | <i>F4-</i>  | 0.32 | 0.91  | 0.42  | 0.38        |
| <i>F7-</i>  | 0.24 | 0.96  | 0.73  | <b>0.08</b> | <i>F8-</i>  | 0.28 | 0.81  | 0.65  | <b>0.09</b> |
| <i>FZ-</i>  | 0.35 | 0.97  | 0.54  | 0.33        |             |      |       |       |             |
| <i>T3-</i>  | 0.30 | 0.22  | 0.11  | 0.20        | <i>T4-</i>  | 0.34 | 0.26  | 0.19  | 0.40        |
| <i>C3-</i>  | 0.42 | 0.88  | 0.67  | 0.52        | <i>C4-</i>  | 0.46 | 0.82  | 0.54  | 0.56        |
| <i>CZ-</i>  | 0.39 | 0.97  | 0.65  | 0.75        |             |      |       |       |             |
| <i>T5-</i>  | 0.26 | 0.84  | 0.43  | 0.35        | <i>T6-</i>  | 0.22 | 0.68  | 0.70  | 0.46        |
| <i>P3-</i>  | 0.37 | 0.92  | 0.64  | 0.42        | <i>P4-</i>  | 0.35 | 0.76  | 0.86  | 0.69        |
| <i>PZ-</i>  | 0.33 | 0.98  | 0.93  | 0.37        |             |      |       |       |             |
| <i>O1-</i>  | 0.27 | 0.74  | 0.94  | 0.39        | <i>O2-</i>  | 0.17 | 0.60  | 0.97  | 0.48        |

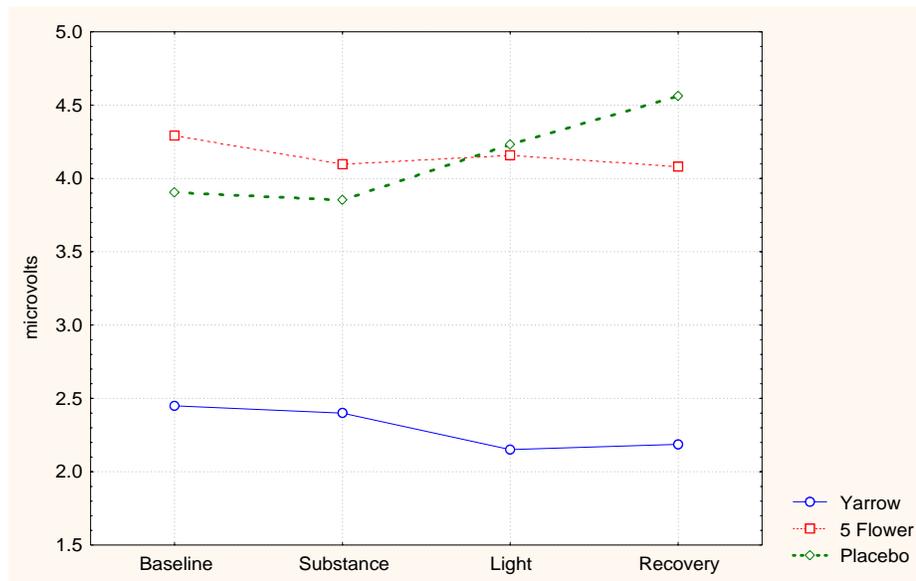
The Interaction term (Substance x Event) is of the great interest in that here we can see how the flower essences and placebo interact with the experimental conditions. As may be seen in Table 5, there is a very

strong trend which presents itself. This trend does not randomly scatter itself across the potential sites or brainwave states. Instead, eight of the 10 "trendy sites" (0.15 and below), are found in the Beta state, and seven of these are located on the prefrontal, premotor and central region. When this effect is examined in greater detail, what is seen is an increase in Beta activity for the Placebo Group only. In addition, the essence most strongly touted for the amelioration of environmental effects, Yarrow, shows a slight decrease in beta activity. These may be seen in Figure 5.

**Table 5.** The Interaction Effect (Condition x Substance) for the qEEG data. (The probability statement is noted for the analysis of each site and each brainwave state. The significant effects and trends are bolded.)

| Site | Beta        | Alpha       | Theta | Delta | Site | Beta        | Alpha       | Theta | Delta |
|------|-------------|-------------|-------|-------|------|-------------|-------------|-------|-------|
| FP1- | 0.36        | 0.50        | 0.69  | 0.61  | FP2- | 0.27        | 0.55        | 0.86  | 0.52  |
| F3-  | <b>0.08</b> | 0.48        | 0.93  | 0.30  | F4-  | <b>0.11</b> | 0.64        | 0.93  | 0.67  |
| F7-  | <b>0.09</b> | 0.46        | 0.60  | 0.38  | F8-  | 0.48        | 0.79        | 0.46  | 0.25  |
| FZ-  | <b>0.09</b> | 0.56        | 0.98  | 0.67  |      |             |             |       |       |
| T3-  | <b>0.15</b> | <b>0.06</b> | 0.73  | 0.40  | T4-  | 0.45        | 0.45        | 0.86  | 0.76  |
| C3-  | <b>0.07</b> | 0.41        | 0.67  | 0.22  | C4-  | <b>0.12</b> | 0.22        | 0.68  | 0.54  |
| CZ-  | <b>0.07</b> | 0.25        | 0.97  | 0.62  |      |             |             |       |       |
| T5-  | 0.38        | 0.94        | 0.86  | 0.40  | T6-  | 0.71        | 0.38        | 0.53  | 0.47  |
| P3-  | 0.38        | 0.93        | 0.68  | 0.32  | P4-  | 0.35        | <b>0.12</b> | 0.55  | 0.47  |
| PZ-  | 0.26        | 0.60        | 0.54  | 0.73  |      |             |             |       |       |
| O1-  | 0.34        | 0.69        | 0.35  | 0.55  | O2-  | 0.73        | 0.62        | 0.42  | 0.61  |

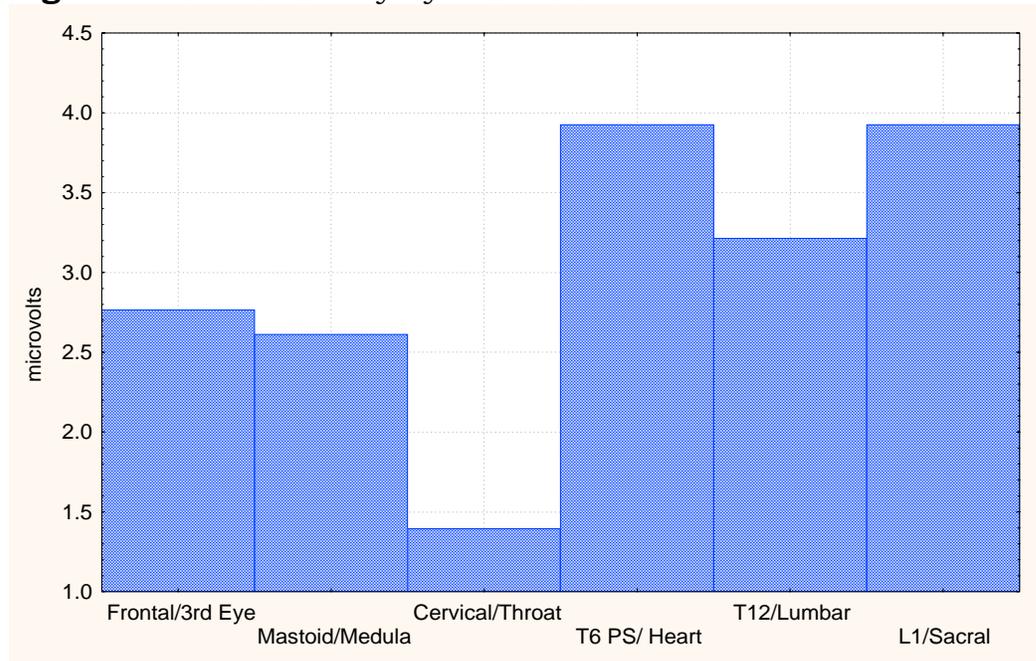
**Figure 5.** Beta activity. The interaction between Substance and Event. (Only the 8 sites which were significant are included in the graphic).



### **sEMG Results**

When the entire sEMG data array is submitted for statistical analysis, significance is seen for the MUSCLE variable ( $F(5,105)=4.41$ ;  $p<.0011$ ). As can be seen in Figure 6, the cervical site is the lowest of all sites.

**Figure 6.** sEMG activity by muscle site.



The individual analysis of the sEMG for each site shows a fairly low level of significance. This is shown in Table 4.

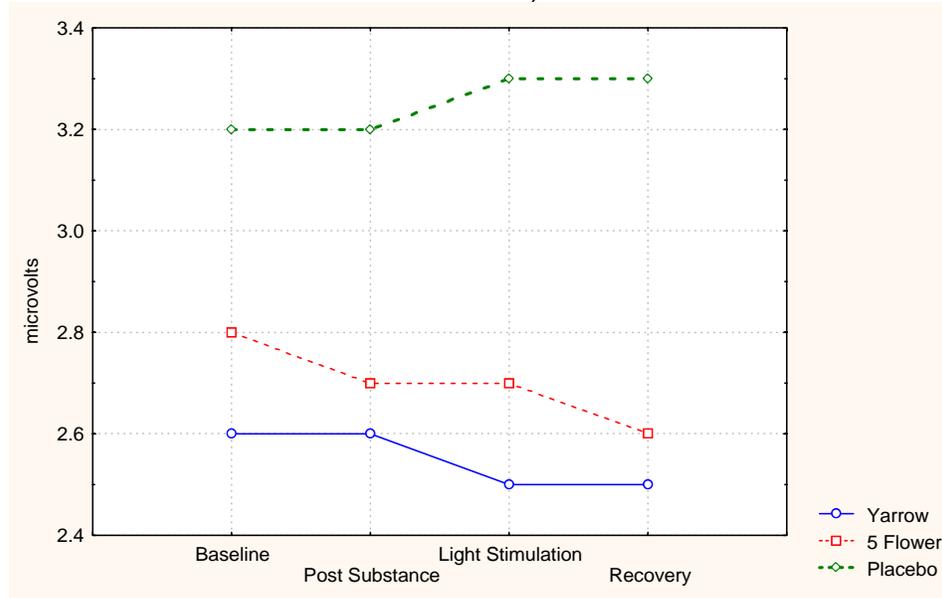
**Table 4.** Probability statement from the ANOVAs calculated at each sEMG site. (Significance and trends are bolded. S=Substance, E=Event, M=Minute)

| Muscle Site     | Substance | Event       | SxE         | SxExM       |
|-----------------|-----------|-------------|-------------|-------------|
|                 |           |             | Interaction | Interaction |
| Frontal/3rd Eye | 0.32      | 0.57        | 0.34        | <b>0.01</b> |
| Mastoid/Medulla | 0.22      | <b>0.08</b> | <b>0.08</b> | 0.32        |
| Cervical/Throat | 0.58      | <b>0.03</b> | 0.30        | 0.96        |
| T6/Heart        | 0.58      | 0.84        | 0.95        | 0.50        |
| T12/Lumbar      | 0.72      | 0.76        | 0.62        | 0.71        |
| L1/ Sacral      | 0.16      | 0.49        | 0.93        | 0.96        |

Given these overall findings, I found it informative to look at some interesting parallels in the paraspinal sEMG data to the qEEG data.

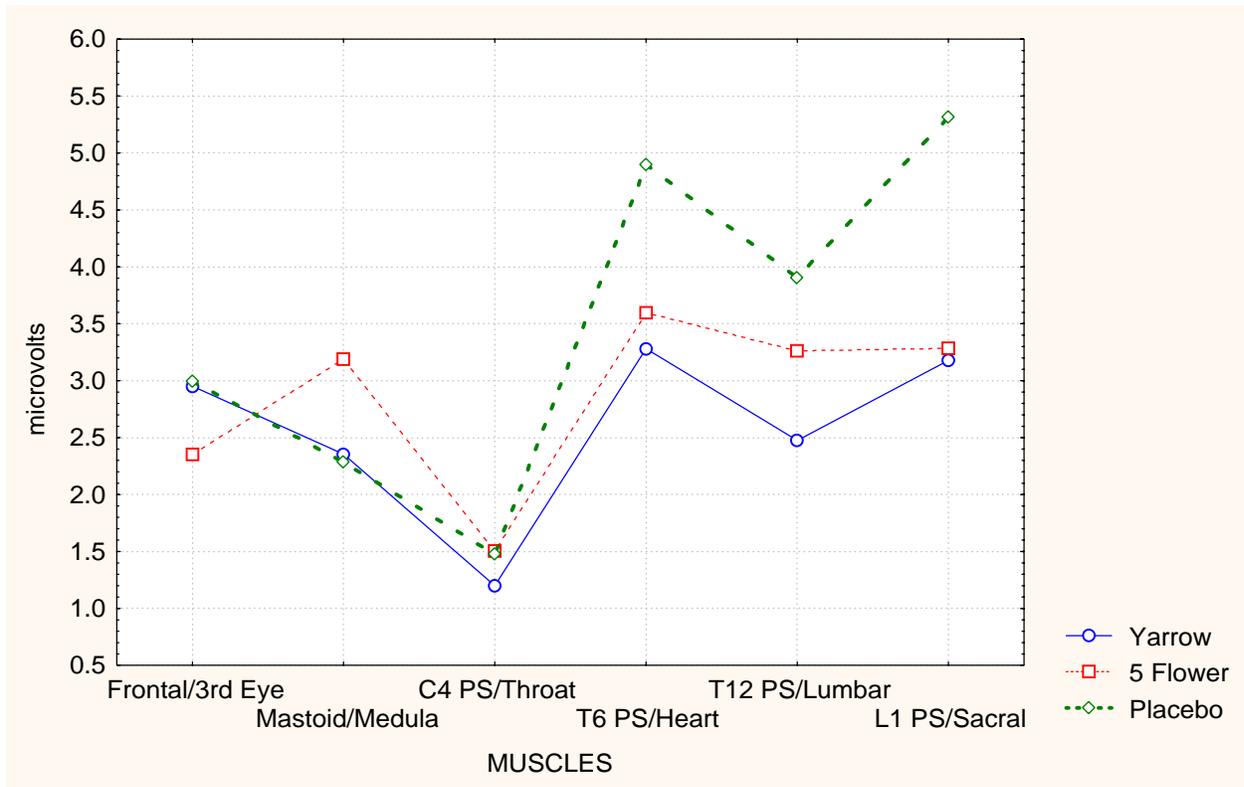
The first is the general interaction of Substance with Event. While this interaction was non-significant ( $F(6,63)=.70$ ;  $p<.6526$ ), Figure 7 below shows the overall general activation of the EMG as a function of Substance to be similar to that which was seen in the qEEG. It would appear that the premotor cortex of the brain is associated to increased muscle tone, but only for the Placebo group.

**Figure 7.** sEMG interaction of the Event and Substance. (Collapsed over all muscle sites and minutes)



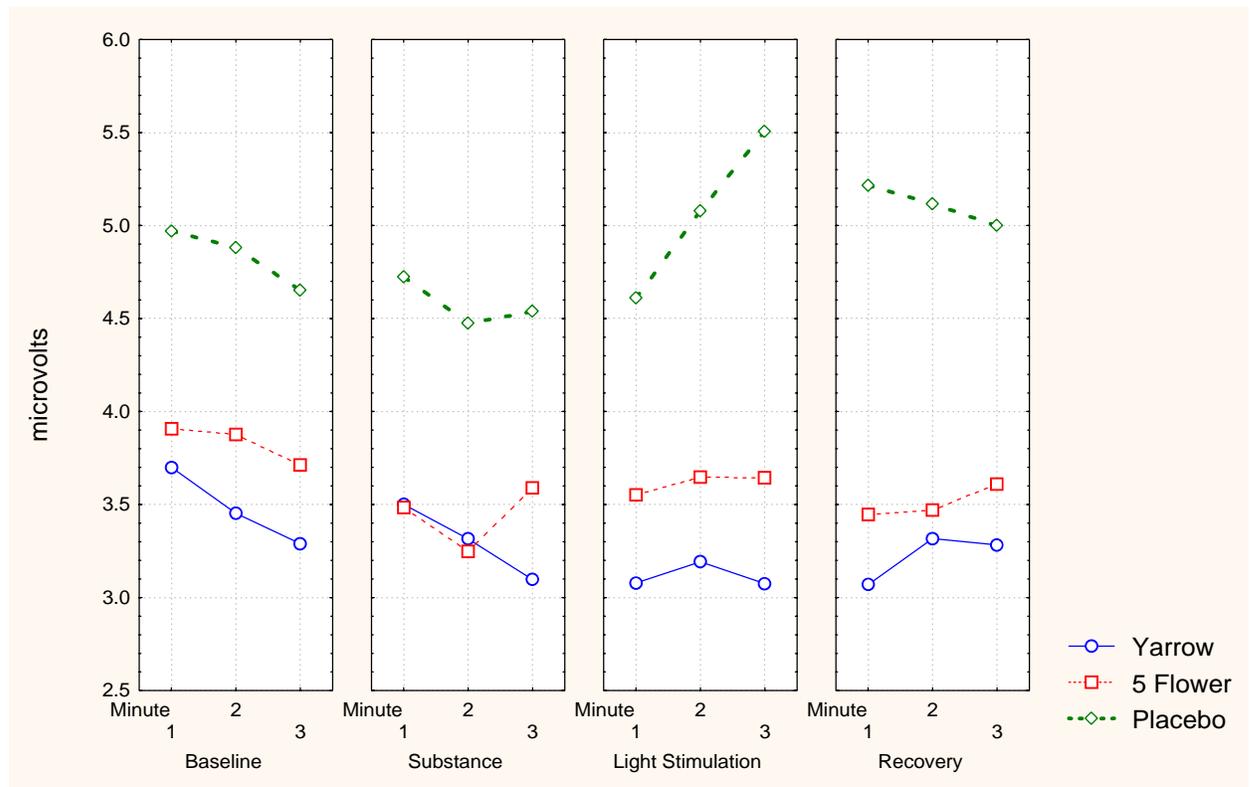
Next, I visually examined the non-significant interaction of sEMG activation as a function of Muscle Site and Substance ( $F(10,105)=.59$ ;  $p<.8197$ ). In Figure 8 we see an activation of the mid and lower back, suggesting an extension of the back more so for the Placebo group than for either of the experimental group.

**Figure 8.** sEMG recordings as a function of Substance and Muscle Site.



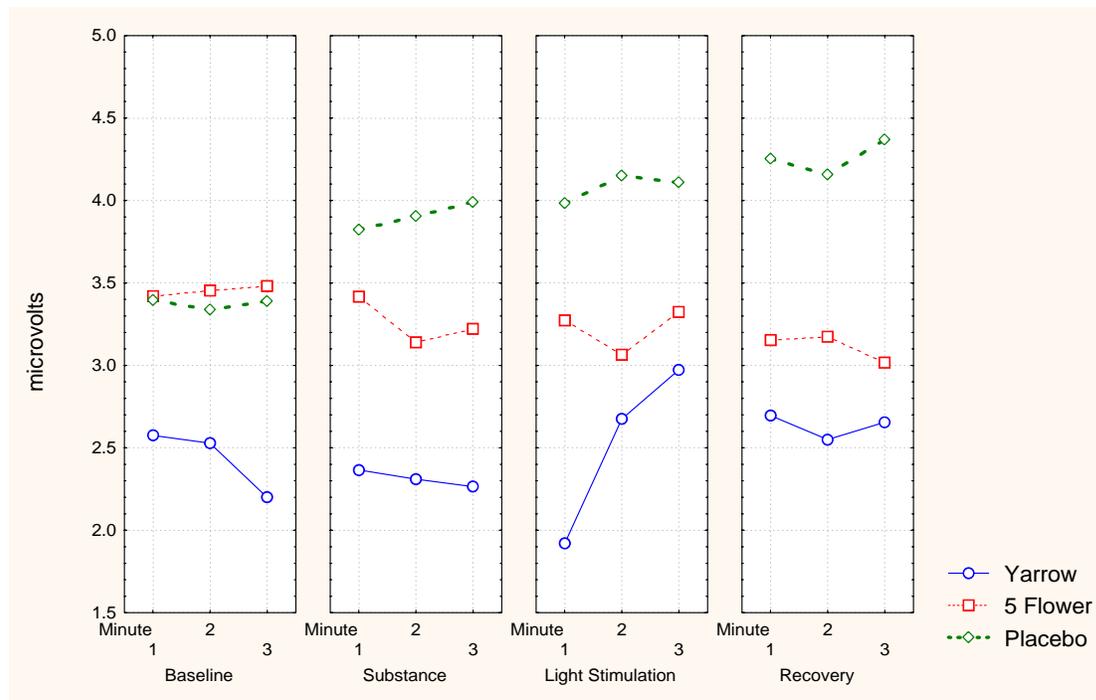
Given the above finding, I more closely examined the interaction of Substance, Event and Minute at the T6 site ( $F(12,126)=.94, p<.50$ ). In Figure 9 one can easily see an activation in the chest area, which occurs only in response to the light stimulation, and only in the Placebo Group. Once again, suggesting the extension of the thoracic spine as part of the stress response. This is not present in the two experimental groups.

**Figure 9.** Substance by Event by Time Interaction for the T6/Heart area.



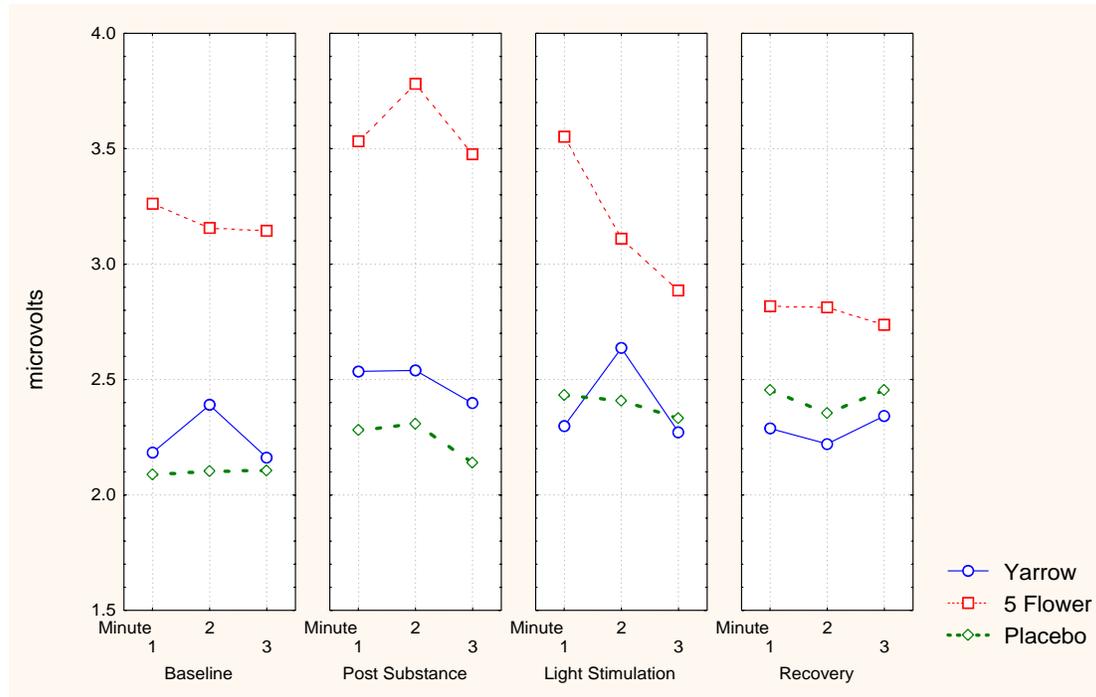
If the Placebo group reacts most strongly in the Chest area, where does one find the strongest reaction for the two other groups. For the Yarrow group, it was in the Lumbar area. Figure 10 shows the same interaction is presented for the Lumbar area ( $F(12,126)=.73$ ,  $p<.71$ ). This suggests more of a Lumbar extension. Comparing this to the T6/Heart area recruitment, there is very little activation seen up above, thus it all comes from below.

**Figure 10.** Substance by Event by Minute Interaction for the T12/Lumbar Site.



Then the largest reaction to photic stimulation for the 5 Flower essence was observed in the large drop in sEMG at the Mastoid/Medulla site ( $F(12,126)=1.5$ ;  $p,.32$ ). This may be seen in Figure 11.

**Figure 11.** Substance by Event by Minute interaction for the Mastoid/Medulla area.



## Discussion

The overall finding for this study suggests that the intense photic stimulation from the banks of florescent lights provoked a physiological stress response. This stress response was seen in Frontal Lobe activation, along with extension of the thoracic spine. This fight or flight response was seen only in the placebo subjects, but not for the subjects that took either of the flower essences. Thus, flower essences seem to have an ameliorating effect on the stress response associated with noxious environmental stimulation.

The qEEG data was highly significant for the main effect for the CONDITION, indicating that the photic stimulation was an adequate

stimulus for the study. This effect was seen in the clear attenuation of the alpha and theta bands of activity. This "alpha blocking" is well known in the EEG arena.

The qEEG INTERACTION effect (CONDITION x SUBSTANCE) for each energy band is of the greatest interest for the study. With this analysis, we can see how the flower essences modulate the physiological effects of the high photic stimulation. The findings for the Beta band of EEG were quite striking. Here, seven of the nineteen recording sites, all located in the prefrontal, premotor and motor area (F7, F3, Fz, F4, C3, Cz, and C4), showed strong trends ( $p < .1$  or better). Post Hoc analyses of these trends show that the placebo condition subjects experienced increased beta activation. The Five Flower essence group's Beta activity didn't change, and the Yarrow Special formula group actually shows a slight decrease in Beta activity.

While the major finding of the study was the substantial attenuation by the two flower essences of frontal lobe activation seen during and following intense photic stimulation, it should be noted that none of the qEEG interactions reached a .05 level of significance. The .05 level of significance is used to protect from TYPE 1 errors, and allows only 1 out of 20 comparisons to be significant by chance alone. In this study I considered and examined findings at the 0.1 level of significance. Thus, only 1 out of 10 comparisons could be reached by chance alone. The confidence in the qEEG findings in the current study centers on the fact that there were seven significant trends for the Beta bandwidth, substantially more than the two which could occur by mere chance alone. And, these significant trends were not randomly scattered around the brain, which one would expect by random significance alone. Instead, they were all clustered tightly together in the frontal lobes of the brain. The pattern of the results is actually very remarkable.

The frontal lobes of the brain is where our "executive" functions take place. It is the location where we interpret, plan, decide and direct things. It is also the location where our emotions are interpreted and our emotional reactions regulated. When an emotion is generated by the limbic system of the brain, it is sent to the frontal lobes to be evaluated for the degree of threat, and to plan a strategy to deal with it. For example, if one had seen a bear while walking in the woods, the limbic system would signal fear, and the frontal lobes would evaluate the level of threat, survey the options available and decide whether to throw rocks at the bear, climb a tree or run. A physiological fight or flight activation occurs once the threat is perceived. .

In this study, the "threatening event" wasn't a bear, but rather that of intense environmental stimulation via bright fluorescent lights. When

the placebo group was compared to the two flower essence groups, the placebo group activated the frontal lobes and began to engage in the appraisal of this event, along with orchestration of a physiological response of fight or flight. The two flower essence groups did not show the cortical activation, perhaps suggesting that flower essences effect structures below the cortex, and thus preventing the cortex from being strobed or queried.

Turning our attention now to the neuromuscular system or spine, the overall findings for the sEMG sites generally parallel and support the frontal lobe activation observation for the placebo group. Specifically, the Condition by Essence shows the pattern of activation identical to that of the qEEG. Even though significance was not reached, the pattern of sEMG activity for the Placebo group showed increased activation of the dorsal spine during photic stimulation, while the two flower essence groups appear not to react, and in fact seem to show a decrease in dorsal sEMG activity. The net effect of the muscular effort for the placebo group is to lift the chest, thus allowing the eyes to meet the horizon. This provides a stronger base for the visual sensory information needed to service the alarm being processed in the frontal cortex. The more erect posture also better prepares the individual to fight or flee. The brain and the spine work together to carefully orchestrate the stress response.

When we examine the biomechanical aspects of the sEMG findings, we note a significant Site effect. Here, the cervical site seems to be significantly lower than all other sites. This may be an artifact associated with the strain relief of how the qEEG cap is secured to the chest.

When we look at overall muscular tone, the Placebo group appears to have higher resting tone in the muscles from the mid back (T6) down. As a group, they overall seem to be extending the spine slightly more than the two flower essence groups.

When one puts emotional reactivity together with posture, a picture begins to form. Examining the non-significant interaction pattern of the T6 site for Substance and Event (Figure 9), what one clearly sees is an activation of the mid back during photic stimulation. But only for the Placebo group. This suggests that the placebo group is not only activating the Frontal lobes to process the potential threat, but it is also raising its chest (and head) to fight or flee. Such a reaction is not seen for the two flower essence groups.

In further exploring the patterns of activation along the spine, the Yarrow Special Formula group appears to show a strong, if not striking activation at the T12/Lumbar site during photic stimulation. Perhaps the combination of essences in the Yarrow Formula effect the Lumbar

chakra in some special way. Could it be that different essences effect different segments of the etheric body. The lumbar chakra seems to organize itself around identity of self, self image, self confidence, the self out into the world <sup>30 31</sup>. And many of the substances in the Yarrow Special Formula speak to these concept. The photic stressor may have played out its impact on this level of organization, rather than the physical / physiological one seen in the placebo group.

The Five Flower Formula subjects seemed to react most strongly at the medulla site. Here we see a striking drop in the sEMG activity as a function of photic stimulation. The medulla is often referred to as the "seat of the ego" <sup>30 31</sup>. It is seen as the negative pole of the "3<sup>rd</sup> Eye", and while the 3<sup>rd</sup> Eye reflects our intuitive knowledge, the medulla sits more with our ego. Again, rather than working on a cortical level, it is possible that this essences work at energetic levels that preclude the physiological response from occurring by dealing with the stressful event at a "pre conscious" level, or deeper level. The decrease in sEMG here could represent a release of the threat to the ego and thus the "threat" was not perceived and thus processed in the prefrontal lobes.

In conclusion, this study systematically assessed the effect of two flower essences on intense environmental (photic) stimulation. Using a scientifically based randomized double blind placebo control group design, the two flower essences were found to reduce physiological activation and stress on the human organism. They appeared to antidote the individual from the adverse physiological effects of intense environmental stimulation.

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