

## **Psycho-physiological correlates of non-verbal transpersonal holistic psychosomatic communication**

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**Abstract** – *The subject of this paper are psycho-physiological correlates of non-verbal psychosomatic communication in novel transpersonal holistic diagnostics and healing, applied to two pilote groups of volunteers with more or less significant psychosomatic problems, at the beginning and during next few months consecutively, in order to make control of extended effects of the holistic energy work in which energy is used to increase personal energy and energetic balance. In the first pilote group of 9 volunteers, skin conductance response changes were measured in order to get data about autonomic nervous system excitability during the process of holistic healing. In the second pilote group of 30 volunteers, EEG alpha rhythm and EEG coherence changes were measured in order to get data about central nervous system excitability during the process of holistic healing; also, a health state questionnaire is organized in order to collect data about how participants perceive different areas of their well being. The obtained results might be interpreted in terms of non-verbal transpersonal holistic psychosomatic communication, revealing holistic interaction of acupuncture system/consciousness (of healer) and vegetative and central nervous systems (of volunteers). This is in accordance with some previous pilot experiments within Transcendental Meditation program, with intersubject coherence increased from baseline to experimental periods. This might be of significance for novel holistic prospects in improvement of verbal-emotional-cognitive development of children and their psycholinguistic functions, and of psychosomatic-cognitive status of children and adults.*

**Key-words:** *non-verbal holistic psychosomatic communication, transpersonal holistic diagnostics and healing, psycho-physiological correlates, biofeedback skin conductance measurements, EEG measurements, EEG alpha rhythm, EEG coherence, health state questionnaire, prospects for improving verbal-emotional-cognitive development.*

## 1. Introduction

Nowadays it becomes more and more acceptable and appropriate to search for and receive the treatment for various diseases throughout holistic healing methods. Holistic approach to health requires the integration of body, mind and spirit (Schrauth, 1992 in Bednarowski, 1994; Raković, Škokljek, Djordjević, 2009).

Holism is a term very frequently used in alternative or complementary practices, and within the healthcare system, it can only be interpreted in relation to an individual's perception of holism (Patterson, 1998).

Spiritual healing comes from the belief that we all belong to the natural energy of the Universe, whereas the healer is a person who is channeling that energy for the wellbeing of others (Patterson, 1998). Being the part of this harmonious universal energy, all living beings can gain benefits from it, but in some cases, like trouble or illness, it is difficult to find a way to let the energy flow directly to us. In contact with the healer, this process takes its place and one starts to feel better.

Among the first results from the research in this field, were the data obtained by Brennan (1988), who as a researcher at NASA found scientific proof of human energy field (commonly called aura). She describes this field as a manifestation of universal energy which is involved with human life. Healing of this kind is focused on the balancing of energies within the energetic centers and allowing the incoming energy to continually flow from one center to the other. The balance in these energetic centers can easily be disturbed by negative thoughts and feelings, which if accumulated can occur as physical illness in the particular area where the imbalance is.

Ideas and concepts of holistic health are very different and are determined with the field of research that is trying to explain it. Usually it is linked with medical practices, alternative or complementary therapies, sometimes with a way of living, or even as a philosophy itself.

The importance of prayer for Mind/Body Healing is emphasized in all times. Praying is a practice present in all faiths, by all people. Saying prayers for another person is a form of praying called intercessory prayer, and as such it can be done for a person in close proximity or someone at great distance. These prayers transcend time and space, but the effects stay the same, even though the people receiving it do not know others are praying for them (Dossey, 1993; Byrd, 1988, in Madeline 2004; Schlitz, 1997, in Madeline, 2004; Harris et al., 1999; Cha et al., 2001; Lebovici, 2001).

One of many researches being conducted to test the effectiveness of intercessory prayer, showed significant health improvement in patients who were prayed for (Byrd, 1988, in Madeline 2004). Results indicated following changes: patients had less congestive heart failure, used fewer diuretics, had fewer cardiopulmonary arrests and less pneumonia and used fewer antibiotics, when compared with a controlled group (without praying treatment).

The subject of this paper is non-verbal holistic psychosomatic communication in novel transpersonal holistic diagnostics and healing, applied to two pilote groups of volunteers with more or less significant psychosomatic problems, at the beginning and during next few months consecutively, in order to make control of extended effects of the holistic energy work in which energy is used to increase personal energy and energetic balance. In the first pilote group of 9

volunteers, skin conductance response changes were measured in order to get data about autonomic nervous system excitability during process of holistic healing. In the second pilote group of 30 volunteers, EEG alpha rhythm changes were measured in order to get data about central nervous system excitability during the process of holistic healing; also, a health state questionnaire is organized in order to collect data about how participants perceive different areas of their well being. The obtained results might be interpreted in terms of non-verbal transpersonal holistic psychosomatic communication, revealing holistic interaction of acupuncture system/ consciousness (of healer) and vegetative and central nervous systems (of volunteers).

## **2. Materials and procedures**

### **2.1. Skin conductance response changes**

The skin conductance response, also known as the electrodermal response (and in older terminology as "galvanic skin response"), is the phenomenon that the skin shortly becomes a better conductor of electricity when either external or internal stimuli occur that are physiologically arousing. The galvanic skin response (GSR) can be used for capturing the autonomic nerve response as a parameter of the sweat gland function. Due to relative simplicity of the measurement and a quite good repeatability, GSR can be considered useful and simple method for examining autonomic nervous system function, specifically the peripheral sympathetic system. Physically GSR is a change in the electrical properties of the skin in response to different kinds of stimuli. In GSR changes in the voltage measured from the surface of the skin are recorded. The main origin of the signal has suggested to be the activation of the sweat glands. The most commonly used stimuli are an electrical shock delivered to a peripheral nerve or auditory stimuli. However, any stimulus capable of an arousal effect can evoke the response and the amplitude of the response is more dependent on the surprise effect of the stimulus than on the physical stimulus strength. In history GSR is also known as or closely related to, the sympathetic skin response (SSR) and skin conductance response (SCR). Arousal is a broad term referring to overall activation, and is widely considered one of the two main dimensions of an emotional response. Measuring arousal is therefore not the same as measuring emotion, but is an important component of it. The stimuli to which skin conductance is sensitive are manifold, including events of a novel, significant, or intense nature. Arousal level tends to be low when a person is sleeping and high in activated states such as rage or mental workload (Yerkes and Dodson, 1988). Because many different kinds of events can elevate your skin conductance (strong emotion, a startling event, a demanding task, etc.) it is impossible for an outsider to tell what made your galvactivator glow unless you participate in a highly controlled experiment (Stevovic and Stokic, 2011).

#### **2.1.1. Objective**

Objective of this experiment was to measure skin conductance response changes during novel transpersonal holistic diagnostics and healing, comprising

elements of on-line radiesthesia-like transpersonal diagnosis and control of Reiki-like and prayer-like transpersonal healing (Bedričić, cf. <http://agencijaizis.com>).

### **2.1.2. Subjects**

Sample comprised of 9 adults with more or less significant psychosomatic problems, at the beginning and during next five months consecutively, in order to make control of extended effects of the holistic treatments.

### **2.1.3. Procedures**

Subjects were put in a comfortable position in a quiet room. Two electrodes for skin conductance (SC) measurement (Biofeedback – ProComp 2, Thought Technology; Thomson and Thompson, 2003) were placed on lower surface of second and fourth finger of the subdominant hand. Resting period (3 minutes) was measured first. Second part of experiment was healing process. Third part was measurement of SC during resting state at the end of experiment. In the next 5 months procedure was repeated and process of holistic healing was measured in order to get possible extended effects of the treatments. Average skin conductance amplitude was recorded and analyzed offline.

## **2.2. EEG alpha rhythm and coherence changes**

Our previous investigations demonstrated that EEG may be applied to monitor psycho-physiological correlates of different states of consciousness (Raković et al, 1999; 2009).

Particularly interesting is the alpha rhythm, which refers to EEG activity within the 8–13 Hz range. In healthy adults, alpha activity typically has amplitude between 10 and 45  $\mu$ V, and can be easily recorded during states of relaxed wakefulness, although large individual differences in amplitudes are not uncommon (Niedermeyer, 1993). Topographically, alpha rhythms show their greatest amplitude over posterior regions, particularly posterior occipito-temporal and parietal regions.

The physiological role of alpha rhythm remains largely unknown. In recent years, alpha synchronization has been described during information processing (Cooper et al., 2003; Klimesch, 1999). Further complicating the physiological interpretation of alpha, emerging evidence indicates that different alpha sub-bands may be functionally dissociated, in particular with increasing task demands (Fink et al, 2005). Specifically, in cognitive tasks, lower alpha (e.g., 8–10 Hz) desynchronization (suppression) has been associated with stimulus-unspecific and task-unspecific increases in attention demands (e.g., Klimesch, 1999). Upper alpha (e.g., 10–12 Hz) desynchronization, on the other hand, appears to be task-specific, and it has been linked to processing of sensory-semantic information, increased semantic memory performance, and stimulus-specific expectancy (Klimesch, 1999).

EEG coherence between signals recorded from pairs of electrodes as a function of frequency might be used as a quantitative measure for synchronous electrical activity in these regions. Since connectivity patterns and neural function may be specific to the frequency of neural activity, a particular advantage of EEG coherence measures is the ability to assess topographic relations as a function of

frequency. Coherence is a sensitive measure that can reveal subtle aspects of the network dynamics of the brain which complement the data obtained by power spectral analyses (French & Beaumont, 1984; Shaw, 1984; Wada et al., 1996). In particular, frontal alpha coherence was found to be a more sensitive discriminator of the Transcendental Meditation technique than alpha power (Dillbeck and Bronson, 1981). So, it was challenging to inquire whether brain's alpha band synchronisation between two hemispheres might be indicator of specific brain state in volunteers during our transpersonal holistic treatment.

### **2.2.1. Objective**

Objective of this experiment was to measure EEG changes during novel transpersonal diagnostics and healing, comprising elements of on-line radiesthesia-like transpersonal diagnosis and control of Reiki-like and prayer-like transpersonal healing (Bedričić, cf. <http://agencijaizis.com>).

### **2.2.2. Participants**

Thirty adults with mean age of 40 and more-less developed psychosomatic symptoms participated in this experiment. No participants used any medications that may influence EEG signal at the time of experimental procedure.

### **2.2.3. Procedure**

During the experiment the subjects were placed in a comfortable sitting position in a sound isolated room (quiet room). Participants were sitting in the chair surrounded by the white non-transparent curtains, and they were watching black square on the white background. The first part of the each experimental recording consisted of the recording period named „resting period“ for 5 min during which they had a task to visually fixate a black square on a white background. Participants were asked to minimize their movements (eye blink, head and limbs movement) as possible in order to eliminate artifacts in raw EEG trace. All EEG recordings during healing process were conducted at the beginning, then two months and sixth months later. The treatment itself comprises holistic energy work in which energy is used to increase personal energy and energetic balance. Health questionnaire, specially designed for this research, has been organized in order to collect data about how participants perceive different areas of their well being.

### **2.2.4. EEG recording**

EEG was acquired using the Nihon Kohden Corporation, EEG 1200K Neurofax apparatus with Electrocap (model number 16 755) International, Inc., Ag/AgCl ring electrodes filled with electro-conductive gel, providing 16 EEG channels. Electrodes were positioned according to the 10/20 system in longitudinal, bipolar montage. Additional EOG electrodes were used in order to register horizontal and vertical eye movements and disk electrodes for detection of jaw muscle movements during recording session. Also ECG electrodes were placed on the lower surface of both hand wrists in order to get heart rate. The reference

electrode was set to A1 and A2 (ear lobes) and C3 and C4 creating longitudinal bipolar montage. Resistance was kept below  $5k\Omega$ , lower filter was set on 0.53 Hz and upper filter on 35Hz. Sampling rate was 256 Hz. According to International 10/20 system of electrode positioning following cortical regions are covered: Fp1-Fp2 (frontopolar), F3-F4 (mid frontal), F7-F8 (inferior frontal, anterior temporal, frontal-temporal), T3-T4 (mid temporal), T5-T6 (posterior temporal), C3-C4 (central), P3-P4 (parietal), O1-O2 (occipital), Fz (frontal midline central), Cz (vertex) and Pz (parietal midline). Odd numbers represent left hemisphere and even numbers right hemisphere.

### **2.2.5. EEG alpha rhythm analysis procedure**

Fast Fourier Transform (FFT) was used in order to separate EEG alpha band from the raw EEG trace and to divide it into 5 EEG alpha sub-bands: 8 Hz, 9 Hz, 10 Hz, 11 Hz and 12 Hz. First task in signal analysis was to choose artifact-free epochs. Before computing FFT each epoch was multiplied by an appropriate windowing function (Hamming window was used) in order to avoid border problems (leakage). Then FFT was computed in order to get spectrograms of selected artifact-free epoch of resting state at the beginning of the experiment, then period of diagnostics, then treatment, and finally resting state at the end of experimental procedure. EEG alpha sub-bands were further analyzed by determining the amplitude peak of each EEG alpha sub-band in order to get one peak and to follow its shifting during each epoch. Amplitude value was statistically analyzed in order to determine statistically significant differences (Student's t-test) among each epoch. In addition, cortical shifting of EEG alpha sub-bands peak was analyzed.

### **2.2.6. EEG coherence analysis procedure**

Mathematically EEG coherence is defined as the normalized cross-power spectrum and it is computed between two simultaneously recorded EEG signals from different scalp locations per frequency band. It is a statistical measure of the average agreement in phase difference, weighted by amplitude, between two signals measured over time, and is frequency specific. Coherence values range from 0 to 1, with 1 meaning perfect agreement in phase difference and 0 meaning completely random phase differences (when the phase difference between two signals is constant then coherence is 1, when the phase difference between signals is random then coherence is 0). Although EEG coherence measures cannot provide the anatomical specificity attainable by the use of fMRI, the high degree of frequential specificity provides a useful complement to those results.

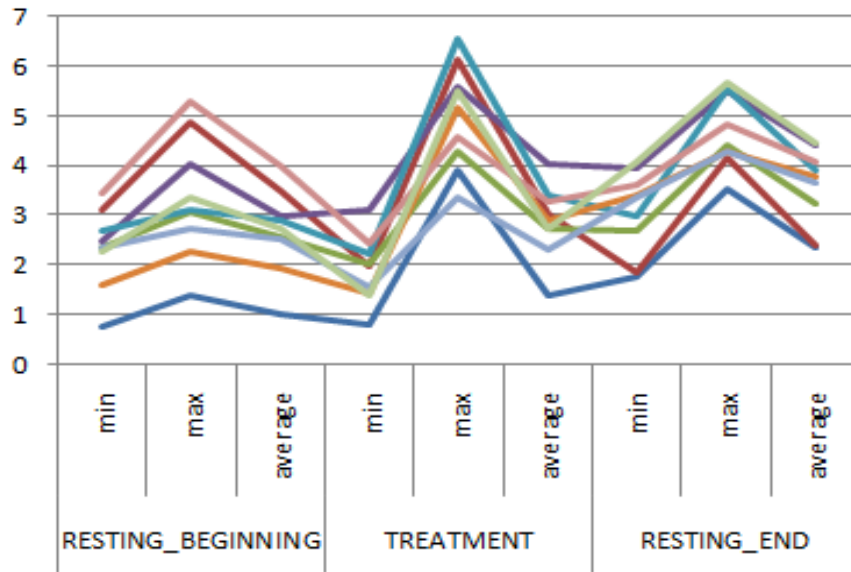
## **3. Results**

### **3.1. Skin conductance response changes during holistic energy work**

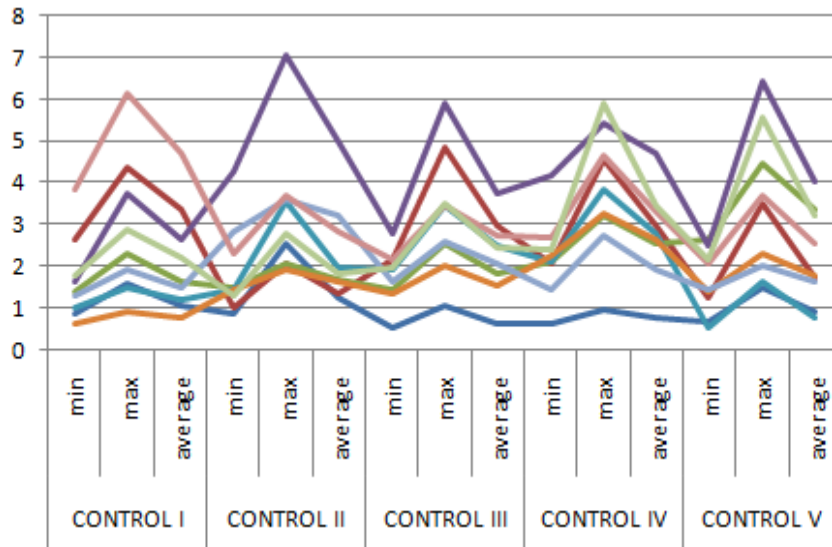
Fig. 1 shows the amplitude value of SC for 3 periods in: resting state (beginning), treatment process, and resting state at the end of experiment. We can

see that there is an increase in SC during period of treatment and resting state at the end of experiment, when compared to resting period at the beginning.

ANOVA (SS4.0756, df2, MS2.0378, F7.33, P0.01) test showed statistically significant differences between three periods with increase during treatment and resting period at the end of experiment when compared to resting period at the beginning.



**Figure 1.** SC measurements during first healing session.



**Figure 2.** SC measurements during five consecutive months of healing sessions.

Fig. 2 presents results of SC measurements during 5 consecutive months of treatment. We can see quite homogenous results with no statistically significant differences between each of the 5 experimental situations in 9 subjects.

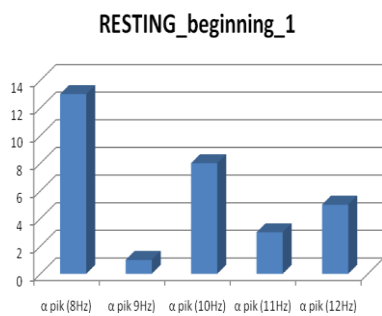
ANOVA (SS2.4028, df4, MS0.6007, F1.07, P0.39) test showed no statistically significant differences between 5 control recordings during 5 consecutive months of treatment.

In both Figs. 1 and 2 there are differences between minimal and maximal values, but they cannot be interpreted properly due to the sensitivity of autonomic nervous system to either external or internal stimuli and they must be observed as a measure of entire process of healing (average value).

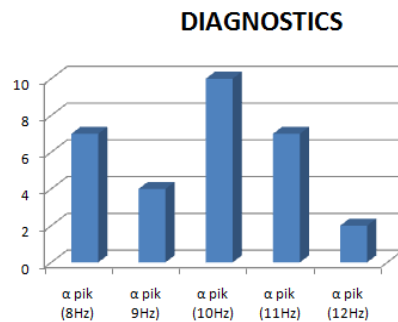
### 3.2. EEG alpha rhythm and coherence changes during holistic energy work

#### 3.2.1. Distribution of EEG alpha band

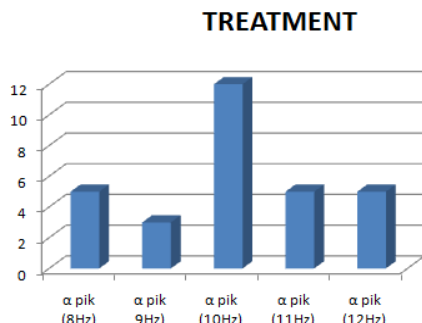
Figs. 3 represents EEG alpha band distribution during selected resting epoch 1, before periods of holistic diagnostics and treatment. We can see alpha band distribution, divided into 5 sub-bands (8 Hz, 9 Hz, 10 Hz, 11 Hz, and 12 Hz). Most of the Alpha sub-bands were in the range of 8 Hz and 10 Hz.



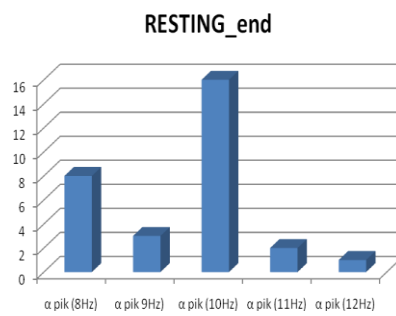
**Figure 3.** Distribution of EEG alpha band during resting period 1 at the beginning



**Figure 4.** Distribution of EEG alpha band during holistic diagnostics



**Figure 5.** Distribution of EEG alpha band during holistic treatment



**Figure 6.** Distribution of EEG alpha band during resting period after holistic treatment

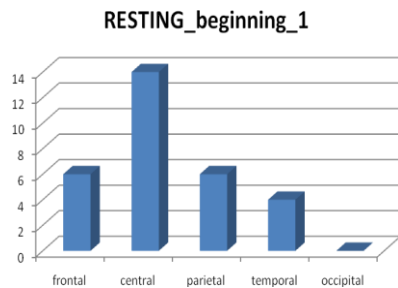


Fig. 4 represents EEG alpha band distribution during period of holistic diagnostics. We can see an increase of the 10 Hz alpha sub-band with a decrease of the 8 Hz sub-band when compared to resting epoch 1 from the beginning of the experiment, when no influence by the healer was present. But, no statistical differences were found between diagnostic period and resting epoch 1 ( $t = 0.658$ ,  $p = 0.516$ ,  $P = 0.484$ ;  $t = 0.092$ ,  $p = 0.928$ ,  $P = 0.072$ ).

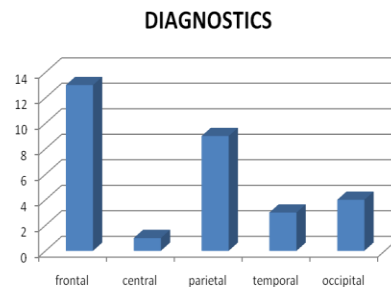
Fig. 5 represents EEG alpha band distribution during period of holistic treatment. We can see an increase of 10 Hz alpha sub-band and a decrease of all others when compared to holistic diagnostic period and resting epoch 1. Statistically significant differences were found between holistic treatment period and resting epoch 1 ( $t = 1.861$ ,  $p = 0.073$ ,  $P = 0.927$  with confidence of 92.7%), but between holistic treatment period compared holistic diagnostic period no significant differences were found ( $t = 1.223$ ,  $p = 0.231$ ,  $P = 0.769$ ;  $t = 1.087$ ,  $p = 0.286$ ,  $P = 0.714$ ).

Fig. 6 represents EEG alpha band distribution during resting period after holistic treatment. We can see decreases of 11 Hz and 12 Hz alpha sub-bands. Statistically significant differences were found between resting state after holistic treatment and the treatment period itself ( $t = |-2.169|$ ,  $p = 0.038$ ,  $P = 0.962$ ).

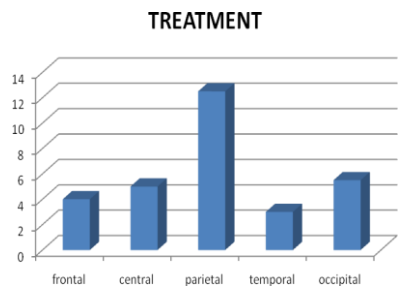
### 3.2.2. Cortical localization of EEG alpha band



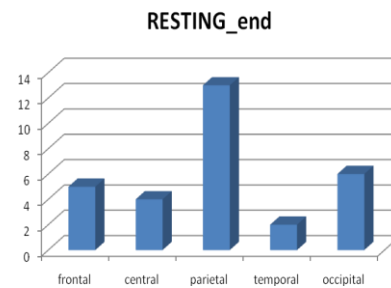
**Figure 7.** Cortical localization of EEG alpha band during resting period 1 at the beginning



**Figure 8.** Cortical localization of EEG alpha band during holistic diagnostics



**Figure 9.** Cortical localization of EEG alpha band during holistic treatment



**Figure 10.** Cortical localization of EEG alpha band during resting period after treatment

Figs. 7-10 represent cortical re-distributions of EEG alpha band. We can see that during resting epoch 1 alpha band peak is localized in central and parietal cortical regions. During holistic diagnostics there is a decrease of the alpha band in central regions and an increase in frontal regions compared to resting epoch 1. During holistic treatment there is return to parietal alpha band localization and this form remains during resting state after holistic treatment.

### 3.2.3. Coherence changes in EEG alpha band

Figs. 11-15 present coherence analysis (in %) for each analyzed frequency domain (8 Hz, 9 Hz, 10 Hz, 11 Hz, and 12 Hz) during resting state (beginning and end), diagnostics and holistic treatment. Blue bar presents total number of coherent connections and red bar presents total number of interhemispheric coherent connections between two homologous electrodes (homologous regions of the left and right brain hemisphere).

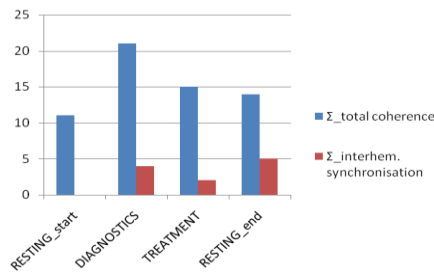


Figure 11. Coherence at 8 Hz

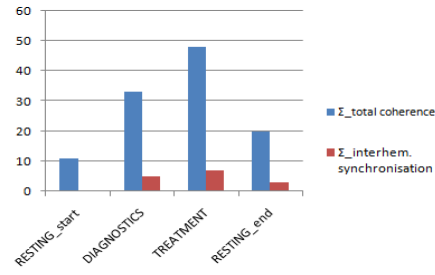


Figure 12. Coherence at 9 Hz

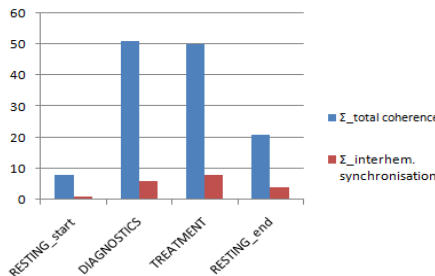


Figure 13. Coherence at 10 Hz

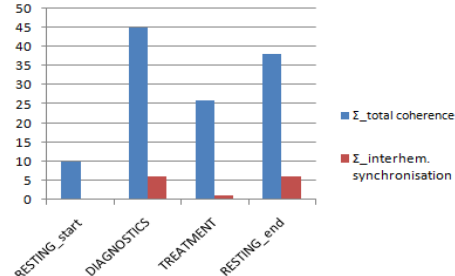


Figure 14. Coherence at 11 Hz

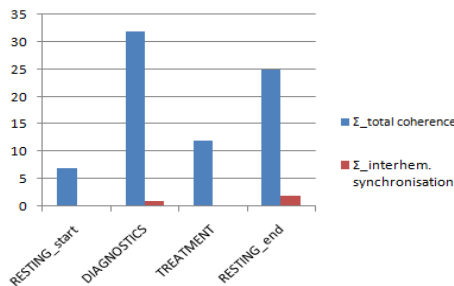


Figure 15. Coherence at 12 Hz

Interhemispheric connections were analyzed in order to examine if synchronisation process between two hemispheres was present during holistic treatment. Brain's alpha band synchronisation between two hemispheres regarding same regions (one in left and other in right hemisphere) might be indicator of specific brain state during holistic treatment. It also might indicate non-questionable influence of holistic treatment to participant in this experiment.

From Figs. 11-15 we can conclude that interhemispheric coherent connections – synchronisation between left and right hemisphere – were found only during periods of diagnostics, holistic treatment and resting state after holistic treatment. During period of resting state before holistic treatment we found no synchronisation processes between hemispheres (except one synchronisation in 10 Hz).

These findings showed that alpha rhythm's coherence between different brain regions was changed due to influence of holistic diagnostics and treatment.

#### **3.2.4. Health survey data analysis**

In this survey a sample of 30 subjects (23 female and 7 male), with mean age of 40 years, participated in the study of effects of holistic energy work aimed to increase personal energy or to establish energetic balance in the body. For the purposes of this study the questionnaire was designed and entitled Health Survey, which contains 32 statements about various psychosomatic complaints that a person can at some point in their life feel. Participants were asked to rate (from never to always) how often do they feel some of these symptoms, and then to indicate the intensity of symptoms they feel (high, medium and low). The items in this questionnaire were related to symptoms including respiratory, gastrointestinal, skeletal and muscular systems. Other discomfort related items included insomnia, boredom, indecision, apathy, and various types of addictions which subjects evaluated in the extent to which they are present, or to what extent they interfere with their everyday functioning. Since the Health Survey questionnaire was given only in the beginning of the research in order to scan their initial state, the data can be used only for describing the participants, and not as originally intended for monitoring the effects of treatments that are conducted on them. As a general answering tendency in all participants, it is observed that they mark the intensity of the symptoms present as low or medium (except in cases where they didn't respond anyhow). These data tells us important information about individuals in the sample, which with regard (because of the nature of introspective data) we could say belong to normal population. Apparently, symptoms they experience from time to time (different types of physical and psychological discomfort) do not seem to interfere to greater extent with their everyday functioning. Since 30 subjects participated, and the largest degree of discomfort could have been expressed on a rating of 5 on each item, the maximum total score could have been 150. Participants, however, largely skipped the questions about the intensity and frequency in terms of specific symptoms, so their scores range in the interval from 18 to 50, which can be considered as rare or seldom occurrence. An item which was the least frequently marked as present was "I keep a diet", while three statements that stand out as the most common are: 1st Problems with hair (dry, oily, falling, gray hair present); 2nd Headache, dizziness, visual obscuration, pale skin; 3rd Pain in the spine. Given that

the participants in the sample are an average age of 40 years, the first symptom that includes a variety of problems and changes related to the hair, can be attributed to changes of ageing. The next two most common symptoms that are related to various problems or difficulties are expressed like pain in the head and spine. Of great importance in this case is data obtained by analyzing brainwaves, in order to make possible connections on the functioning of certain brain regions with the aforementioned symptoms of discomfort in the head. Below are attached top five symptoms in this study: 1st Hair (dry, oily, falling, graying hair presence), 2nd Headache, dizziness, visual obscuration, pale skin, 3rd Pain in the spine, 4th Tension or sharp pain in the eye, Inflammation of the eyelids; 5th It takes time for me to start doing something. The symptoms rated as the least frequently present are 1st I keep a diet; 2<sup>nd</sup> Hearing problems, pain or inflammation; 3<sup>rd</sup> Problems with joints, impaired mobility or pain; 4th Shortness of breath, inflammation of the respiratory system, asphyxia, asthma; 5th I feel bored.

#### **4. Discussion**

The subject of this paper was non-verbal holistic psychosomatic communication in novel transpersonal diagnostics and healing, applied to two pilote groups of volunteers with more or less significant psychosomatic problems, at the beginning and during next few months consecutively, in order to make control of extended effects of the holistic energy work in which energy is used to increase personal energy and energetic balance. The obtained results are interpreted in terms of non-verbal holistic psychosomatic communication (with final goal to reveal holistic interaction of acupuncture system/consciousness and vegetative and central vegetative nervous system both experimentally and theoretically).

In the first pilote group of 9 volunteers, skin conductance response changes were measured in order to get data about autonomic nervous system excitability during process of holistic healing, with following remarks:

- Results of skin conductance measurements showed statistically significant differences only during first holistic healing session;
- Results of skin conductance measurements, during 5 consecutive months of control holistic healing, showed no differences among each other.

In the second pilote group of 30 volunteers, EEG alpha rhythm changes were measured in order to get data about central nervous system excitability during the process of holistic healing, alongside with a health state questionnaire organized to collect data about how participants perceive different areas of their well being, with following remarks:

- No statistical differences in EEG alpha band were found between holistic diagnostic period and resting epoch 1 (but we observed an increase of the 10Hz alpha sub-band peak and a decrease of the 8Hz sub-band when compared to the resting epoch 1);
- Statistically significant differences in EEG alpha band were found between holistic treatment period and resting epoch 1 (with observed increase of 10Hz alpha sub-band and a decrease of all others when compared to the resting epochs 1 and to the diagnostic period);

- Statistically significant differences in EEG alpha band were found between the resting state after holistic treatment and the treatment period itself (with observed decreases of 11 Hz and 12 Hz alpha sub-bands peaks);
- Cortical re-distributions of EEG alpha band were also found (during resting epoch 1 alpha band is localized in central and parietal cortical regions; during holistic diagnostics there is a decrease of the alpha band in central regions and an increase in frontal regions compared to resting epoch; during holistic treatment there is a return to parietal alpha band localization and this form remains during resting state after holistic treatment);
- Coherence analysis showed significant increase in interhemispheric coherent connections between homologous brain regions during processes of diagnostics and holistic treatment with prolongation of its influence during resting state at the end of experiment. These findings indicate synchronisation of brain's alpha rhythm between left and right hemisphere. Lowest number of coherent connections was found during resting state at the beginning of experiment.
- Health survey questionnaire was designed, with 32 statements about various psychosomatic complaints of a person. Since this questionnaire was given only in the beginning of the research in order to scan their initial state, the data were used only for describing the participants (belonging to normal population according to analysis of the health survey questionnaire), and not as originally intended for monitoring the effects of treatments that were conducted on them.

Bearing in mind the objective of the research and the importance of monitoring the effects of treatment, for future research it is extremely important to follow the prepared protocol completely. Planned number of participants in a sample and methodology are subject to change over time, as well as the motivation of participants. Therefore, in the event of resizing or some other changes, it is necessary to implement appropriate corrections in the work, but not to distract significantly from the set agenda. As ideas for next survey, in addition to the monitoring methodology for high quality data, it would be useful to correct the sample itself, including equally both sexes and a wider range of age, create experimental and controlled groups, and only then to interpret and make some generalizations about the effects of treatment. Also, standardized psychological tests could be beneficial for following the status of the participants from the beginning till the end of research, and also to make the comparison with some previous research or the ones that are going to be conducted in the future.

## 5. Conclusion

The subject of this paper is non-verbal holistic psychosomatic communication in novel transpersonal holistic diagnostics and healing, applied to two pilote groups of

volunteers with more or less significant psychosomatic problems, at the beginning and during next few months consecutively.

The obtained pilot results of SC and EEG psycho-physiological correlates of the applied novel holistic healing might be interpreted in terms of non-verbal holistic transpersonal psychosomatic communication, revealing holistic interaction of acupuncture system/consciousness (of healer) and vegetative and central nervous system (of participants).

This is in accordance with some previous pilot experiments within Transcendental Meditation program, with intersubject coherence increased from baseline to experimental periods (Orme-Johnson et al, 1982).

As ideas for next survey, it would be useful to create experimental and controlled groups, and only then to interpret the effects of holistic treatment. Also, standardized psychological tests could be beneficial for following the status of the participants from the beginning till the end of research.

This might be of significance for novel holistic prospects in improvement of verbal-emotional-cognitive development of children and their psycholinguistic functions, and of psychosomatic-cognitive status of children and adults.

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## References:

- Bednarowski, M. F. (1994). Holistic healing in the New Age. *Second Opinion*, 19(3), 65-85.
- Bedričić, M. cf. <http://agencijaizis.com>
- Brennan, B. (1988). *Hands of Light*. Bantam Books, New York.
- Cha, K.Y., Wirth, D.P., Lobo, R.A. (2001). Does prayer influence the success of in vitro fertilization-embryo transfer? *J. Reproductive Medicine* 46.
- Cooper, N.R., Croft, R.J., Dominey, S.J., Burgess, A.P., & Gruzelier, J.H. (2003). Paradox lost? Exploring the role of alpha oscillations during externally vs. internally directed attention and the implications for idling and inhibition hypotheses. *Int. J. Psychophysiol.* 47, 65-74.
- Dillbeck, M.C., Bronson E.C. (1981). Short-Term Longitudinal Effects of the Transcendental Meditation Technique on EEG Power and Coherence, *Int. J. Neurosci.* 14(3-4), 147-151.
- Dossey L. (1993). *Healing Words: The Power of Prayer and the Practice of Medicine*. Harper, San Francisco.
- Fink, A., Grabner, R.H., Neuper, C., Neubauer, A.C. EEG alpha band dissociation with increasing task demands. *Cognitive Brain Research*, (in press).
- French, C.C., Beaumont, J.G., 1984. A critical review of EEG coherence studies of hemisphere function. *Int. J. Psychophysiol.* 1(3), 241–254.

- Harris, W.S., Gowda, M., Kolb, J.W., Strychacz, C.P., Vacek, J.L., Jones, P.G., Forker, A., O'Keefe, J.H., McCallister, B.D. (1999). A randomized, controlled trial of the effects of remote, intercessory prayer on outcomes in patients admitted to the coronary care unit. *Arch Intern Med.* 159, 2273-2278.
- Klimesch, W. (1999). EEG alpha and theta oscillations reflect cognitive and memory performance: A review and analysis. *Brain Research Reviews*, 29, 169-195.
- Leibovici, L. (2001). Effects of remote, retroactive intercessory prayer on outcomes in patients with bloodstream infection: randomized controlled trial. *British Medical Journal* 323, 1450-1451.
- Madeline, M.L. (2004). The importance of Prayer for Mind/Body healing. *Nursing Forum* 3 (39).
- Niedermeyer, E. (1993). Sleep and EEG. In E. Niedermeyer, F. Lopes da Silva (Eds.), *Electroencephalography: Basic Principles, Clinical Applications, and Related Fields* (3rd ed., pp. 153-166). Williams & Wilkins, Baltimore.
- Orme-Johnson D., Dillbeck M.C., Wallace R.K., Landrith G.S. (1982). Intersubject EEG Coherence: Is Consciousness a Field? *Int. J. Neurosci.* 16(3-4), 203-209.
- Patterson, E.F. (1998). The philosophy and physics of holistic health care: spiritual healing as a workable interpretation. *Journal of Advanced Nursing* 27, 287-293.
- Raković D., Tomašević M., Jovanov E., Radivojević V., Šuković P., Martinović Ž., Car M., Radenović D., Jovanović-Ignjatić Z., Škarić L. (1999). Electroencephalographic (EEG) correlates of some activities which may alter consciousness: the transcendental meditation technique, musicogenic states, microwave resonance relaxation, healer/heelee interaction, and alertness/drowsiness. *Informatica* 23(3), 399-412.
- Raković D., Mihajlović Slavinski Ž., Sovilj M., Pantelić S., Stevović N., Bojovic J., Džamić I., Jovičić S., Baljuzović Dj., Ostojić M., Tomašević M., Radenović D., Šuković P., Škarić L. (2009). Techniques altering states of consciousness: Psycho-physiological correlates and quantum-informational implications. In S. Jovičić, M. Sovilj (eds.). *Speech and Language: Interdisciplinary Research III*. IEPSP, Belgrade.
- Raković, D., Škokljević, A., Djordjević, D. (2009). *Introduction to Quantum-Informational Medicine, With Basics of Quantum-Holographic Psychosomatics, Acupunctureology and Reflexotherapy*. ECPD, Belgrade, in Serbian; cf. <http://dejanrakovicfund.org>
- SPSS Inc. (1999). *SPSS Base 10.0 for Windows User's Guide*. SPSS Inc., Chicago IL.
- Stevovic, N., Stokic, M. (2011). Psychophysiological response to positive and negative emotion-related words in short-term memory task in children who stutter. *Proc. Third European Congress on Early Prevention, Detection and Diagnostics of Verbal Communication Disorders*. Ancient Olympia, Greece, 21-23 October 2010, pp.63-66.
- Shaw, J.C. (1984). Correlation and coherence analysis of the EEG: a selective tutorial review. *Int. J. Psychophysiol.* 1(3), 255-266.

- Thomson, M., Thompson, L. (2003). *The Neurofeedback Book: An Introduction to Basic Concepts in Applied Psycho-physiology*. Assoc. Appl. Psychophysiol. & Biofeedback, Wheat Ridge CO.
- Yerkes, R.M., Dodson, J.D. (1988). The relation of strength of stimulus to rapidity of habit-formation. *J Comp Neur Psychol.* 18, 459-482.
- Wada, Y., Nanbu, Y., Kadoshima, R., Jiang, Z.-Y., Koshino, Y., Hashimoto, T. (1996). Interhemispheric EEG coherence during photic stimulation: sex differences in normal young adults. *Int. J. Psychophysiol.* 22(1-2), 45-51.