STUDY OF BODY'S ENERGY CHANGES IN NON-TOUCH ENERGY HEALING 3. SYNCHRONOUS CHANGES IN QI-ENERGY LEVELS BETWEEN HEALER AND SUBJECT DURING HYPNOTHERAPY HEALING

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ABSTRACT

Continuous AMI measurement was performed simultaneously at 14 Jing-Well points of the healer's left and right toes and 14 Jing-Well points of the subject's left and right fingers for approximately 60 minutes comprising Control 1, Healing and Control 2. Four sessions were conducted with the same healer and subject under the same protocol. Acquired time series data were analyzed for the presence of the synchronous (i.e., correlation with no lag) changes by introducing a novel idea of Weighted Correlation Index Analysis (WCIA).

The WCIA was performed for all possible pairs of healer's foot meridians and subject's hand meridians for each of the four sessions. Significantly correlated changes were found in three of the four sessions. In Session 3 statistically significant occurrences ($p=0.02\sim2x10^{-7}$) of *positively correlated* changes were found in all the four pairs of healer's left/right foot meridians and subject's left/right hand meridians. In Session 1 statistically significant occurrences ($p<0.005$) of *negatively correlated* changes were also found in healer's left foot and subject's left hand meridian pairs. It was found that synchronous changes, *positive* or *negative* in correlation, occurred sporadically in varying degrees of correlation and magnitude during the period of healing and subsequent control. For cases of *positively correlated* changes significant deviation from expected frequency was found suggesting that healer's Spleen and Urinary Bladder meridians appear most frequently ($p\sim0.010$).

Keywords: Subtle energy, Energy healing, Qi, Meridian, Jing-Well points, Hypnotherapy, Synchronization, Correlation

Introduction

Bio-energetic changes induced by various modalities of the so-called "energy healing" have been studied providing evidences suggestive of their relevance to clinical efficacies.[1,2] The fact that bio-energetic changes can be detected in the subject's body system during the process of healing implies the existence of active interactions between the healer and subject at subtle energy level. Apart from the study of clinical efficacy of the healing, there have been some attempts to specifically investigate such energetic interactions by means of conventional electrophysiological measurements such as EEG, ECG and EDA.[3,4,5]

Significant correlation in EEG frequencies was detected between the healer and subject when the healer performed the act of healing with focused intention on the subject situated at a distance from the healer.[6,7,8] fMRI study showed correlated activation of certain brain functions in the subject when the healer intermittently performed the intentional healing on the subject despite the fact that the subject was sensorily isolated from the healer.[9] Coherence in the heart rate variability between physically separated individuals was confirmed by ECG study suggesting the presence of some bio-energetic interaction between people.[10] Occurrence of heart-to-heart synchronization between people induced by coherence-facilitating intentions was reported suggesting the existence of bio-energetic interaction mechanism.[11]

Electrodermal study of "sender-receiver" interaction at a distance also detected synchronous skin conductance responses indicating correlated functioning of the autonomic nervous system between the sender and the receiver.[12] However, to our knowledge no such studies have been reported with respect to synchronous (i.e., correlated) interactions at Qi-energy level.

According to National Center for Complementary and Alternative Medicine (NCCAM), hypnotherapy is categorized as Mind-body practices and is said to "focus on the interactions among the brain, mind, body, and behavior, with the intent to use the mind to affect physical functioning and promote health".[13]

Thus, the hypnotherapy is a therapeutic technique which utilizes the power of verbal induction to help heal physical as well as emotional problems. It is noted that establishing good rapport between the therapist and patient is essential to achieve effective healing in hypnotherapy. Some associated physiological changes, e.g., skin temperature, blood flow and blood pressure of the patient observed during the hypnotherapy have been reported.[14]

This particular feature of hypnotherapy, which requires good rapport, i.e., energetic connection, was considered potentially suitable for the study of possible existence of synchronous Qi-energy changes between the healer and the subject. Such synchronous changes, if detected, would provide a valuable scientific basis for the rhythmic interaction (energetic rapport) between the healer and the subject, which might well be the prerequisite for effective healing.

Experimental Method

1) Meridians and Jing-Well points

According to Traditional Chinese Medicine (TCM), "Qi" or "Chi" is said to circulate through invisible energy channels called meridians, which are closely related with functions of specific internal organs.[15,16] Smooth flow of "Qi" in good dynamic balance is regarded essential for good health and wellness, physically, mentally and spiritually.

The AMI (Apparatus for Meridian Identification) measures "Jing-Well points" of 12 primary meridians and two additional meridians, i.e., Diaphragm and Stomach Branch meridians, as shown in Figure 1. Thus, the total 28 Jing-Well points are measured in each one round of the AMI measurement.

2) AMI principle and Three parameters (BP, AP and IQ)

The AMI captures skin current response to a single square voltage pulse of 3 volt height and 512 μsec width and extracts three key parameters as follows;-

BP (μA) =initial peak current, i.e., current before the onset of ionic polarization
AP (μA) =current after completion of the ionic polarization
IQ (pC) =total electrical charge of the ions mobilized for polarization

28 sets of these three parameters are obtained at each one round of the AMI measurement. Physiological meanings of these parameters have been explained elsewhere.[17-20] To summarize it is said that;-

- BP is a measure of Qi-energy level in the particular meridian to which the Jing- Well point belongs.
- AP is a measure of the state of autonomic nervous system at the time of measurement.
- IQ reflects the capacity of the body's protective (immune system) functions.

Earlier Non-Touch Energy Healing studies1, 2 clearly demonstrated that the body's bio-energetic changes induced by the healing can be detected in a meaningful way by AMI's BP parameter reflecting the Qi-energy conditions in the person's meridian system. Therefore, in this study the parameter BP was also chosen as the energy marker for investigation.

3) Continuous AMI

The Continuous AMI system repeats the round of AMI measurement every 5 seconds and enables quasi-continuous monitoring of BP at all the 28 Jing-Well points. The system is shown in Figure 2 along with the 28 cables.

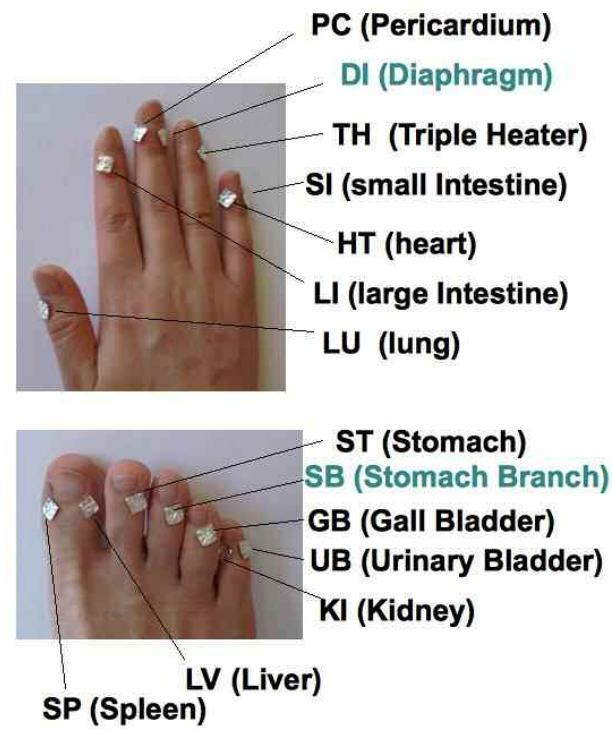
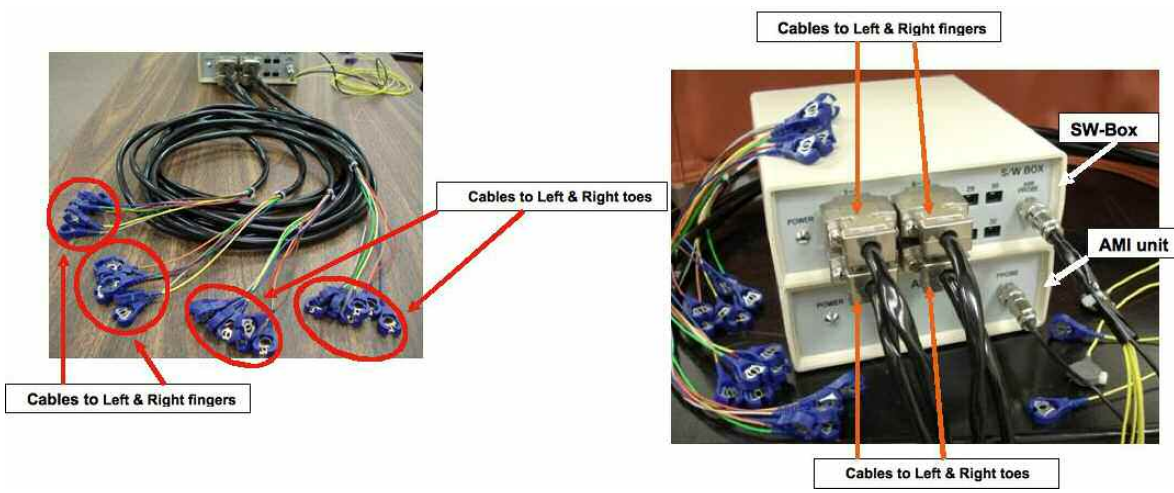


Figure 1. Jing-Well points and AMI electrodes attached to each Jing-Well point

Figure 2.



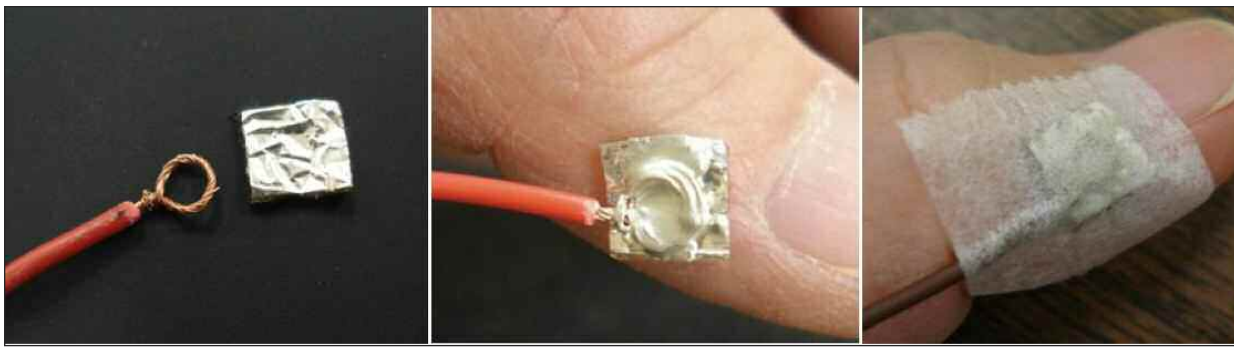


Figure 3. (left) Gel electrode and Lead Wire, (middle) Lead wire bonded to Gel electrode with Conductive Adhesive, (right) Electrode securely attached to Jing-Well point.

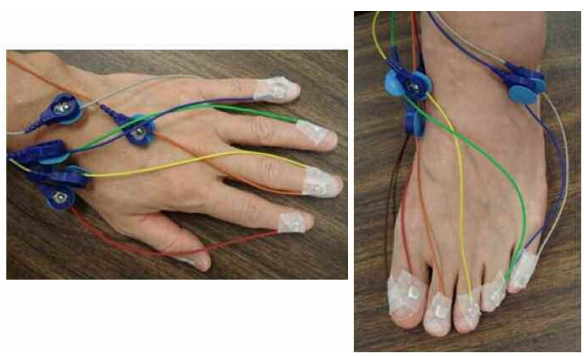
The 28 cables are connected to 7mm x 7mm electrolyte gel electrodes which are fixed at Jing-Well points by surgical tape strips. The copper lead is firmly bonded to the silver surface of gel electrode with conductive adhesive to ensure the stability of the electrical connection between the skin surface and the lead wires (Figure 3).

Figure 4 shows lead wire connections to Jing-Well points ready for measurement.

4) Healer and Subject

The healer was a female licensed psychotherapist and hypnotherapist with over 25 years of successful practice. The subject in this study, a 50-year-old female, was one of her clients on whom the healer had been performing hypnotherapy regularly for extended period of time. At the time of this study she had some weaknesses on the right side half of her body.

Figure 4.



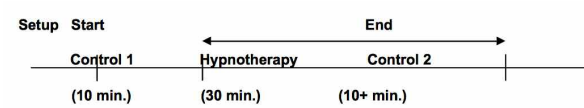
The purpose of this study and the experimental procedures were explained to the subject and the healer prior to the test sessions. The present healing study was thus conducted under informed consent.

6) Experimental Protocol

The healing session was comprised of Control 1 (10 min), Hypnotherapy (30 min) and Control 2 (10+ min) as shown in Figure 5. During Control 1 the healer and the subject were asked to relax comfortably without doing anything. During the hypnotherapy the healer performed a short beginning prayer, hypnosis and short ending prayer with minimal physical movements. The period of hypnotherapy was followed by Control 2 in which both the healer and the subject were asked again to relax comfortably doing nothing. There was no physical contact between the healer and the subject throughout the healing session. In each session the Continuous AMI measurement was performed throughout the whole healing session.

Of the 28 gel electrodes 14 were attached to the 7 left foot Jing-Well points and the 7 right foot Jing-Well points of the healer. Remaining 14 were attached to the 7 left hand Jing-Well points and the 7 right hand Jing-Well points of the subject. This particular

Figure 5. Schematic diagram of protocol for each session



combination of healer's Jing-Well points and subject's Jing-Well points was chosen based on the results of the preliminary experiments performed prior to this full-fledged study. Visual observation of obtained BP curves of the healer and the subject appeared to suggest that the changes in BP of the healer's foot meridians and the subject's hand meridians were somewhat similar implying the possible existence of synchronous changes.

Results

Obtained BP values of the healer's foot meridians and subject's hand meridians are shown in four groupings for Session 1 through Session 4 in Figure 6 to 9. The four groupings are as follows;-

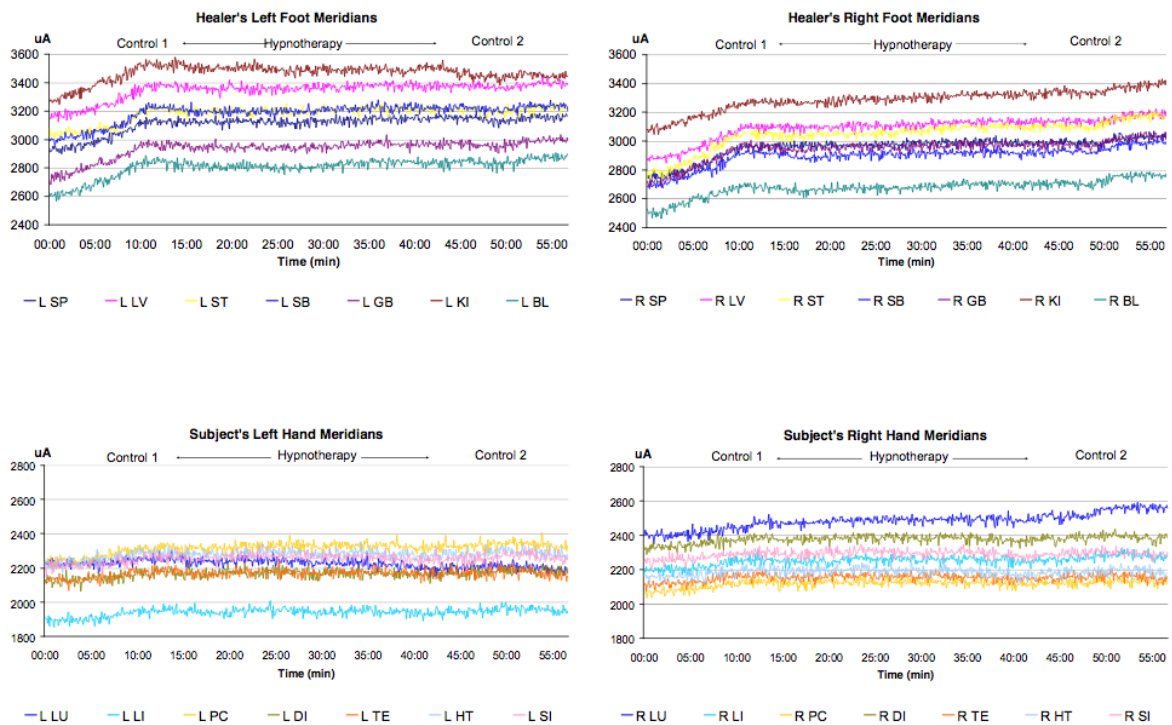
1) Healer's Left Foot meridians: L SP, L LV, L ST, L SB, L GB, L KI and L BL
2) Healer's Right Foot meridians: R SP, R LV, R ST, R SB, R GB, R KI and R BL
3) Subject's Left Hand meridians: L LU, L LI, L PC, L DI, L TE, L HT and L SI
4) Subject's Right Hand meridians: R LU, R LI, R PC, R DI, R TE, R HT and R SI

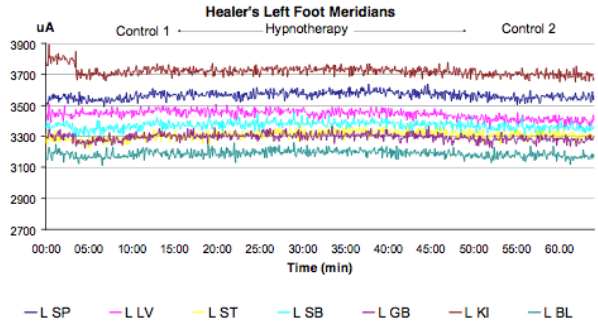
Observed time dependent changes of BP of the healer and subject were different in each of the four sessions. From visual observation of these graphs alone it was not clear if there is any synchronous changes between the healer's foot meridians and the subject's hand meridians although some particular portions of the curves seemed to have similar trends. Some systematic approach of analysis was therefore considered necessary.

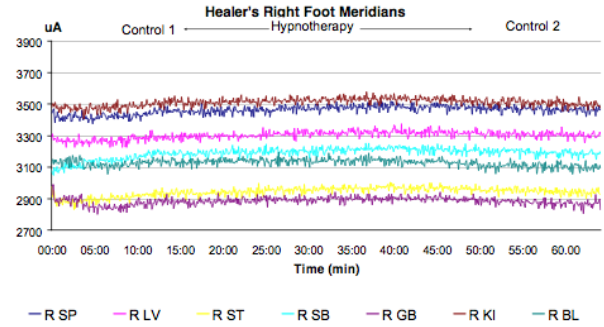
Data Analysis

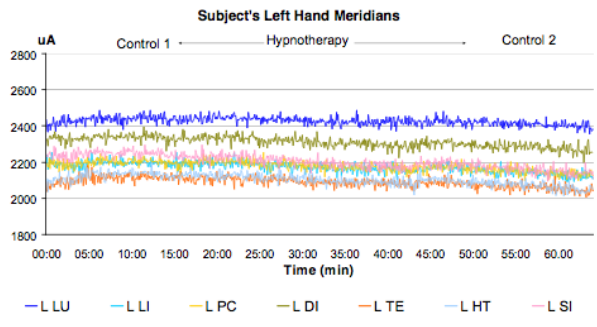
In each of the 4 test sessions described above total 28 time series data of 5 sec interval and about 600+ data

Figure 6. Session 1
Upper graph: Healer's Left foot meridians (left) & Right foot meridians (right)
Lower graph: Subject's Left hand meridians (left) & Right hand meridians (right)









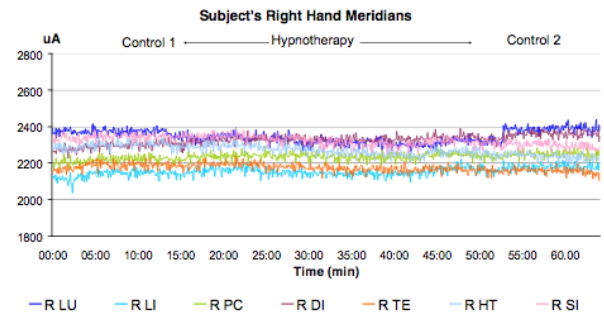
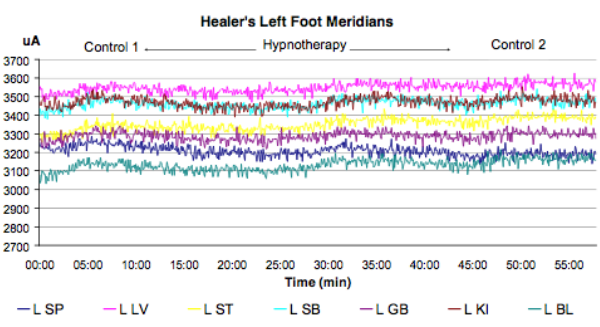
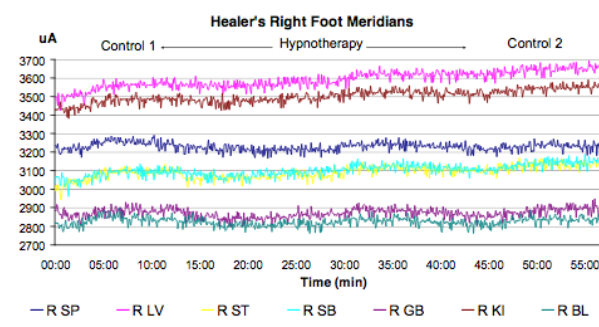
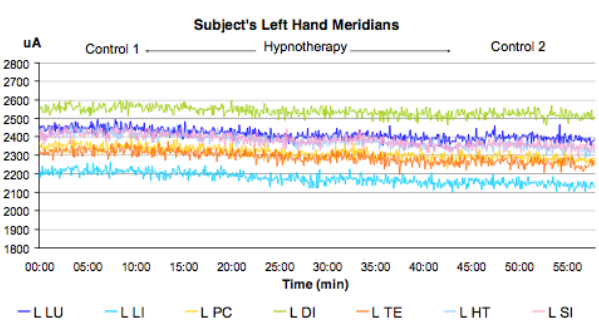


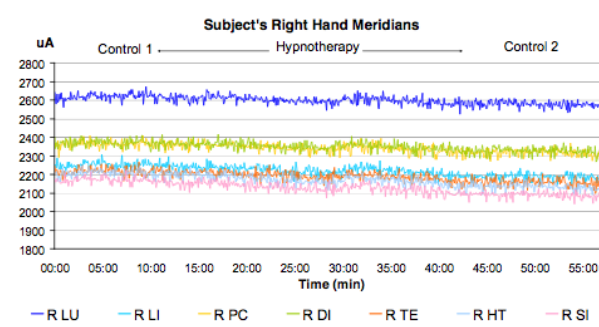
Figure 7. Session 2

Figure 8. Session 3









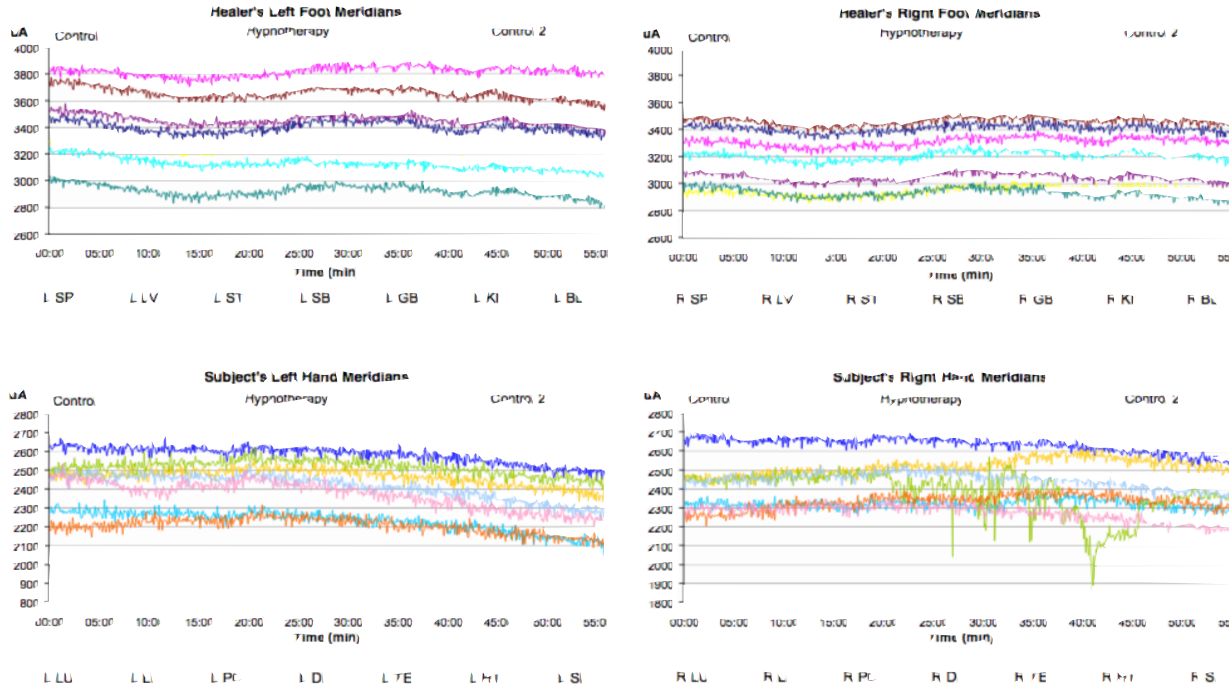


Figure 9. Session 4

points (~50+ min) were obtained. Fourteen of these were left and right foot meridians (Spleen ~ Urinary Bladder) of the healer, and the other fourteen were left and right hand meridians (Lung ~ Small Intestine) of the subject as summarized in Table 1. It was noted that, in Session 4, some large anomalous dips in BP were recorded in the subject's right side Diaphragm meridian during the period of 20-46 minutes (Figure 9). This unusual case was therefore excluded from the present correlation study.

The Naming and Notations in this table will be referred to as needed hereafter.

Our primary interest was to examine if there were synchronous changes between the healer's foot meridians and the subject's hand meridians. In this paper the word "synchronous change" of two time series data is used synonymously with the word "correlated change" between the two with no time lag. The correlated changes associated with the

Table 1

HEALER			
Grouping	Notation	Meridian	Notation
Left Foot Meridians	H-LFoot	Spleen	H-LSP
		Liver	H-LLV
		Stomach	H-LST
		Stomach Branch	H-LSB
		Gall Bladder	H-LGB
		Kidney	H-LKI
		Urinary Bladder	H-LBL
Right Foot Meridians	H-RFoot	Spleen	H-RSP
		Liver	H-RLV
		Stomach	H-RST
		Stomach Branch	H-RSB
		Gall Bladder	H-RGB
		Kidney	H-RKI
		Urinary Bladder	H-RBL

SUBJECT			
Grouping	Notation	Meridian	Notation
Left Hand Meridians	S-LHand	Lung	S-LLU
		Large Intestine	S-LLI
		Pericardium	S-LPC
		Diaphragm	S-LDI
		Triple Heater	S-LTE
		Heart	S-LHT
		Small Intestine	S-LSI
Right Hand Meridians	S-RHand	Lung	S-RLU
		Large Intestine	S-RLI
		Pericardium	S-RPC
		Diaphragm	S-RDI
		Triple Heater	S-RTE
		Heart	S-RHT
		Small Intestine	S-RSI

healer's act of healing, if any, is expected to occur after the period of Control 1, i.e., initial 10 minutes in which both the healer and the subject just relaxed doing nothing. Therefore, analyses of the correlated changes were performed with respect to the 40 minute time span from the start of the Hypnotherapy (for 30min) and 10 minute span into the subsequent period of Control 2.

It is unlikely that synchronous changes are present with equal degree of correlation throughout the 40 minute period of interest. It was anticipated that, if the synchronous changes were present, it would have occurred sporadically off and on in varying degrees of correlation. Some systematic method enabling statistical analysis to assess the existence (or non-existence) of the correlated changes over extended time span was definitely needed.

However, to the best of our knowledge no known methods of time series analysis meet this requirement. We therefore ventured to develop a novel method as described below and applied it to evaluate the frequency of occurrence of synchronous changes between the healer's foot meridians and the subject's hand meridians in each test session.

1. Method of Analysis

The method of analysis developed and applied in this study consists of the following three steps.

Step 1: Reducing spiky noise components and Subtracting the Mean

The original time series data of BP contain spiky or fast-changing components which have been empirically ascribed to the noise of the Continuous AMI measuring system. These noise components were first reduced by applying a moving average (window size=9 data points). This is approximately equivalent to applying Low-pass filter of a cut-off frequency at 0.0098Hz. The mean value of the entire data of the filtered time series was then calculated and a new time series data of the *Deviation from the Mean* was generated. This process eliminates the large DC component of the BP signals and extracts the time varying components relative to the mean of the entire time series data. Correlation analyses were then performed on the time series data of this *Deviation from the Mean* which were thus generated from the original time series data.

Step 2: Introducing the Moving Weighted Correlation Coefficient

One feasible approach to capture the correlated changes within the time span of interest is to define a data window of an appropriate size for which simple cross correlation coefficient can be calculated. By sliding such window across the total time span of interest in the same way as performed in moving average, a time series data of the cross correlation coefficient can be generated. This process yields the cross correlation coefficients, values of which range from -1 to +1, as a time dependent variable for each pair of the time series data to be analyzed. However, the magnitude of the cross correlation coefficient can be large, i.e., close to +1 or -1, if the variations of the two time series data within the window are "near parallel" to each other *irrespective of the magnitude of the value range* of such "near parallel" changes. Even if the changes are virtually flat, which means no significant variation in time, the magnitude of the calculated correlation coefficient could come out quite large. Therefore, for a given window size, the magnitudes of the correlation coefficients may be found to be very close at different points in time. However, the magnitudes of the value ranges within respective windows may be very different. Our interest is to see if there were synchronous or correlated "changes" across the entire time span of interest. The larger the magnitude of the value range within the window, the more significant and meaningful it ought to be regarded. This suggests that some weighting factor need to be incorporated to reflect this situation properly. One possible approach is to use an appropriately defined ratio between the magnitude of the value range within the window for which the correlation coefficient is calculated and the value range of the entire time span of the two time

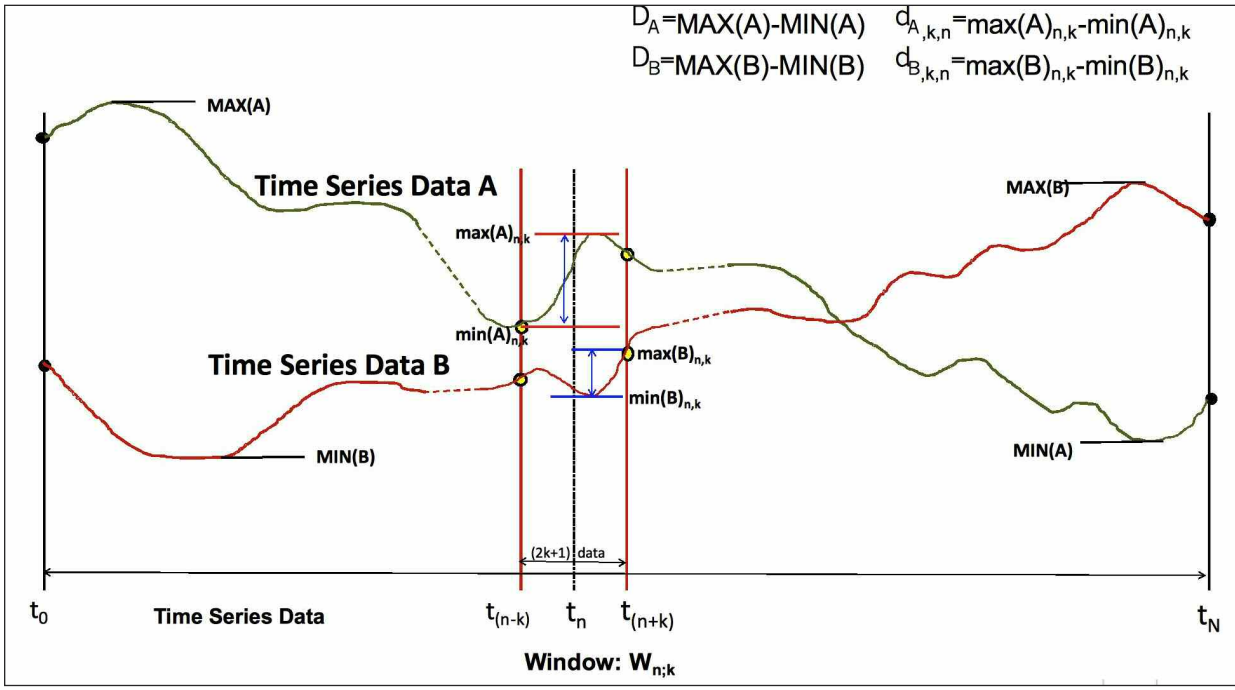


Figure 10.

series data. This is schematically shown for two time series data "A" and "B" in Figure 10.

For a given time tn a window is defined with k data points behind the time tn and k data points ahead of it. This window consisting of 2k+1 data points with time tn at its center is denoted by $W_{n;k}$. Taking the applied smoothing by 9-point moving average into consideration, calculation of the correlation coefficient was performed for the four different window sizes as defined in Table 2. The widest (k=15) was 2.5 minutes wide with 31 data points, while the narrowest (k=6) was 1 minute wide with 13 data points.

For the time series data "A" the maximum and minimum values within the window Wn;k are denoted by $\max(A)_{n,k}$ and $\min(A)_{n,k}$ respectively. Likewise for the time series data "B" $\max(B)_{n,k}$ and $\min(B)_{n,k}$ are defined for the same window $W_{n;k}$. With respect to the entire span of the time series of "A" and "B" the maximum and minimum values can be defined in the same way and are denoted by MAX(A), MIN(A), MAX(B) and MIN(B) respectively.

Table 2. Window Sizes for Correlation Calculation

k-value	# Data Points	Time Width (min)
15	31	2.5
12	25	2.0
9	19	1.5
6	13	1.0

In principle these maximums and minimums could be anywhere within the time span of the entire time series data.

Then, define the value ranges of the entire time series "A" and "B" by;-

Δ_A= MAX(A) - MIN(A)

Δ_B= MAX(B) - MIN(B)

Likewise define the value ranges of the time series data of "A" and "B" within the window Wn;k by;-

$\sigma_{A,k,n}$= $\max(A)_{n,k}$ - $\min(A)_{n,k}$

$\sigma_{B,k,n}$= $\max(B)_{n,k}$ - $\min(B)_{n,k}$

Then, the ratio given by the following equation is defined as the *Weighting Factor* ($W_{Fn;k}$) for the particular window $W_{n;k}$ of size (2k+1) data centered at time t_n.

$$WF_{n;k} = \frac{\sqrt{\delta^2_{A,k,n} + \delta^2_{B,k,n}}}{\sqrt{\Delta^2_A + \Delta^2_B}} \quad \text{---- (1)}$$

The value of $W_{Fn;k}$ varies as the window is shifted by changing the center time t_n. It also varies if the window size is changed by changing the k value.

For each window $W_{n;k}$ centered at time t_n the correlation coefficient $R_{n;k}$ between the (2k+1) values of "A" and "B" is calculated first. Then, by taking the product of the weighting factor $WF_{n;k}$ and the correlation coefficient $R_{n;k}$ a new coefficient Weighted Correlation coefficient ($WR_{n;k}$) is defined by the following equation.

$$WR_{n;k} = R_{n;k} \times WF_{n;k} \quad \text{--- (2)}$$

Thus, by sliding the window, i.e., as the center t_n of the window is shifted to successive time position $t_{(n+1)}$ a new weighted correlation coefficient $WR_{(n+1);k}$ is calculated. In this way a new time series data of the *Weighted Correlation Coefficient* ($WR_{n;k}$) between the two time series data "A" and "B" can be generated.

Step 3: Introducing a Weighted Correlation Index

Step 2 above yields the weighted correlation coefficient between the two time series "A" and "B" in the form of a new time series for the entire time span of the test session. Our main interest is to evaluate if there were synchronous changes, i.e., correlated changes with no time lag, between the two time series data during the 40 minute period comprising the period of Hypnotherapy for 30 minutes, and subsequent 10 minutes into Control 2 in which both the healer and subject just relaxed without doing anything. To enable comparative assessment of the overall degree of correlated changes within this time span of interest a new parameter was introduced. In this paper this parameter is called *Weighted Correlation Index,* which is defined as follows.

For any given weight factor $WF_{n;k}$ defined by equation (1), the time positions of the $\max(A)_{n,k}$, $\min(A)_{n,k}$, $\max(B)_{n,k}$ and $\min(B)_{n,k}$ could in principle be anywhere within the window $W_{n;k}$. This means that, for a given value of $WF_{n;k}$, the correlation coefficient between the two data sets contained in the window $W_{n;k}$ could take any value between -1 and +1. Therefore, an hypothetical situation such that the correlation coefficient $R_{n;k}$ is equal to +1 throughout the entire time span of interest conceptually represents the case of fully synchronous, i.e., 100% correlated moment after moment, changes. This situation never occurs in real life. However, this hypothetical case provides the theoretical maximum against which the actual case obtained can be scaled. A new index which serves as a measure of "overall correlated changes" within the time span of interest (40 minutes in this study) is defined by the ratio of the two quantities in percentage as follows.

Weighted Correlation Index $WCI_{k,40}$ (%):

$$WCI_{k,40}(\%) = \frac{\sum_n R_{n;k} \times WF_{n;k}}{\sum_n 1 \times WF_{n;k}} \times 100 \quad \text{--- (3)}$$

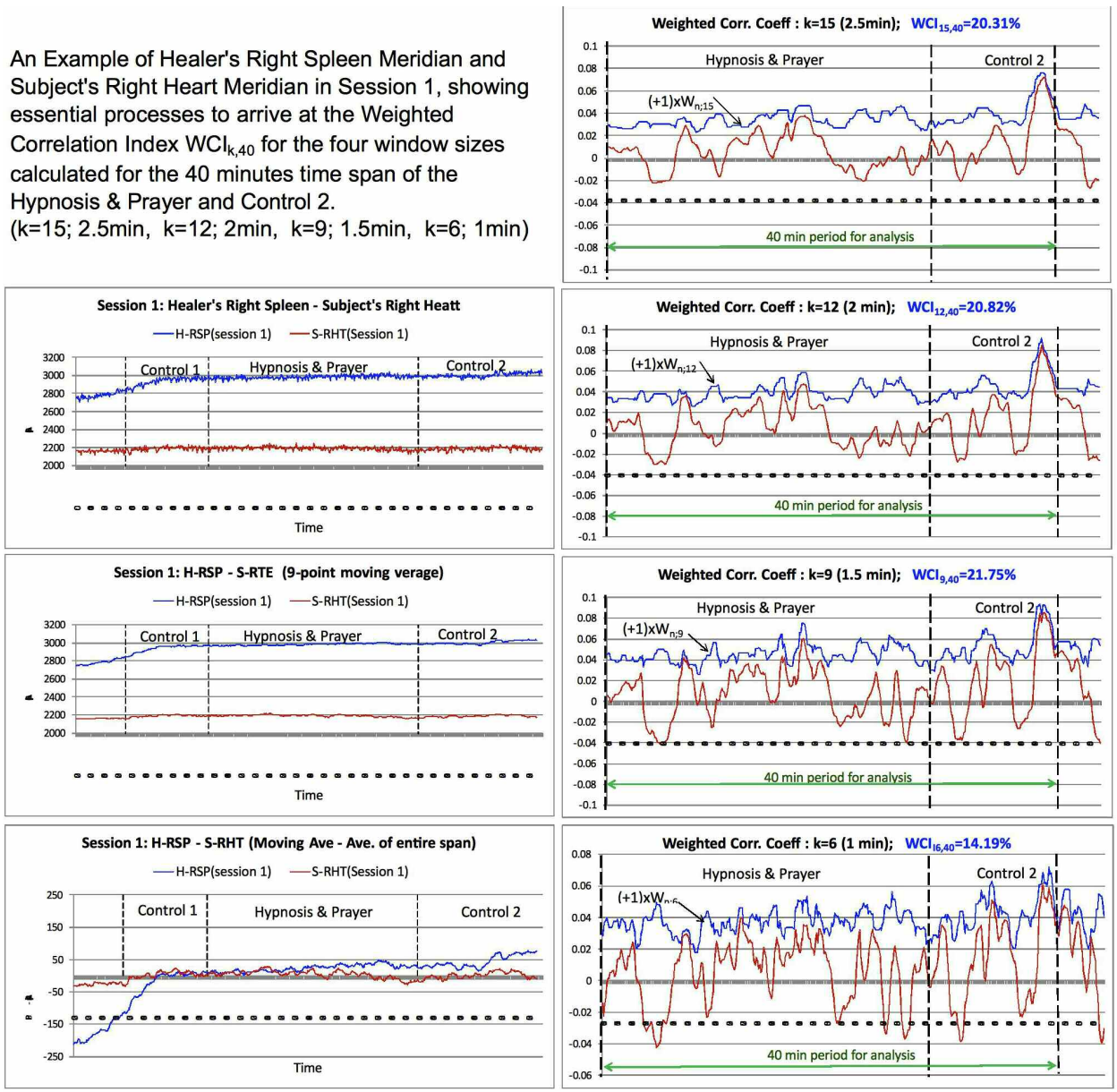
Graphically the numerator is the area under the curve of the *Weighted Correlation Coefficient* ($WR_{n;k}$) for the entire time span of interest (40 minutes). The denominator is the area under the curve of the *Weighting Factor* ($WF_{n;k}$) or *Weighted Correlation Coefficient* ($WR_{n;k}$) at 100% correlation ($R_{n;k}$ =1). Thus, the equation (3) defines the *Weighted Correlation Index* ($WCI_{k,40}$) as the ratio between the areas under these two curves expressed in percentage.

As an example of the above steps to arrive at the *Weighted Correlation Index* ($WCI_{k,40}$), the case of the Healer's Right Spleen Meridian and Subject's Right Heart Meridian obtained in Session 1 is shown graphically in Figure 11.

Here, from the graphs of the *Weighted Correlation Coefficient* ($WR_{n;k}$) calculated for the four different window sizes (k=15, 12, 9 and 6), it is to be noted that wider windows tend to pick up broader trends of correlated movements showing slower changes, while narrower windows tend to pick up finer changes showing more frequent ups and downs. Although exceptions have been noted, the values of *Weighted Correlation Index* ($WCI_{k,40}$) calculated for the four different window sizes typically turn out the smallest for the narrowest window (k=6).

2. Evaluation of the Correlated Changes between the Healer's Left & Right Feet and the Subject's Left & Right Hands

Figure 11



By visual observation of the graphs (Figure 6 to 9) it was noted that the seven time series data within each of the 4 Groupings in Table 1 have somewhat similar trends although details of the time dependent changes are different. For this reason attempt was first made to evaluate the existence (or non-existence) of correlated changes among the 4 Groupings with respect to the averaged time series data of each Grouping. Namely, Healer's Left Foot Meridians (H-LFoot), Healer's Right Foot Meridians (H-RFoot), Subject's Left Hand Meridians (S-LHand) and Subject's Right Hand Meridians (S-RHand) were obtained by point-by-point averaging of the seven time series data in each Grouping. Resultant averaged time series data are graphically shown in Figure 12 to 15. Three vertical broken lines indicate the boundaries of Control 1, Hypnotherapy and Control 2 segments in each test session.

The *Weighted Correlation Index* ($WCI_{k,40}$ (%); k=15, 12, 9, 6) was calculated for all possible pairs of the healer's left and right feet and the subject's left and right hands. The results are summarized in Table 3.

For each window size (k=15, 12, 9 and 6) Table 3 gives 4x4 matrix of the Weighted Correlation Index:

Figure 12. Session 1

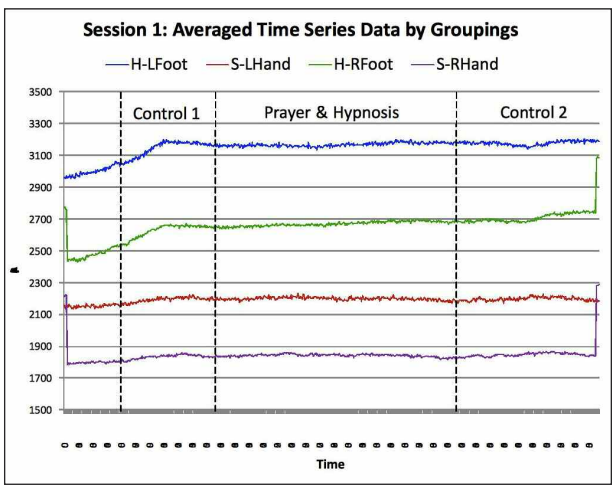


Figure 13. Session 2

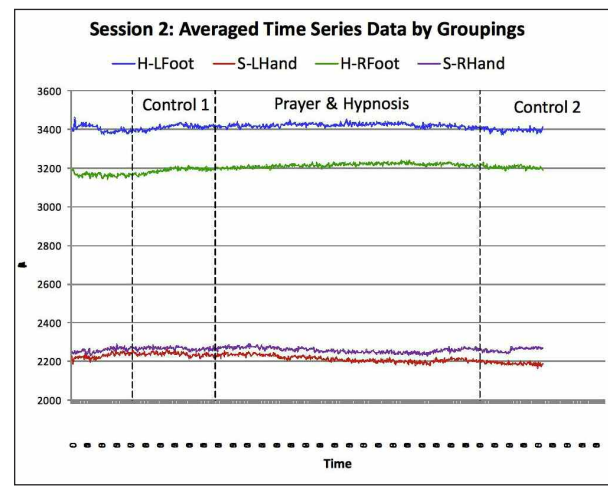


Figure 14. Session 3

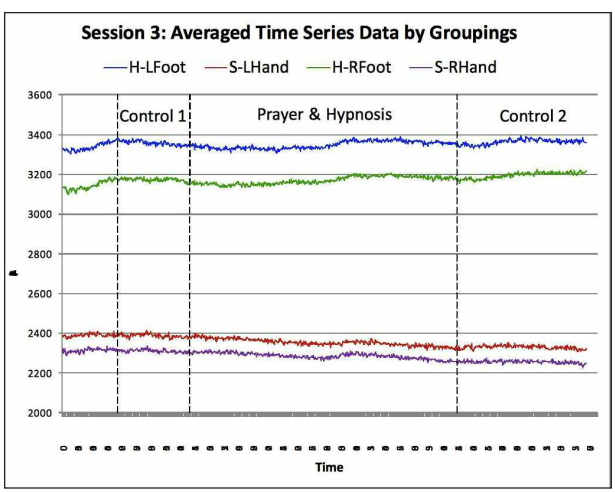
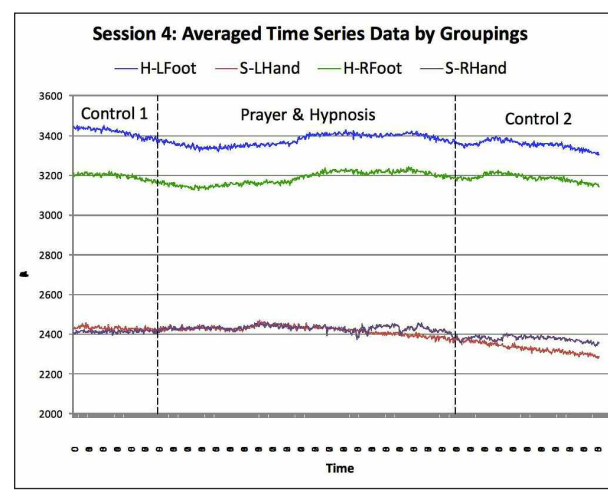


Figure 15. Session 4



	HRFoot and SRHand				HRFoot and SLHand				HLFoot and SRHand				HLFoot and SLHand			
Session	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6
1	19.9%	18.7%	17.7%	11.7%	-0.9%	-2.2%	-3.3%	-1.8%	-11.6%	-11.4%	-10.4%	-6.9%	-19.4%	-18.0%	-16.8%	-9.9%
2	24.6%	24.6%	23.7%	14.3%	16.5%	16.9%	17.9%	11.7%	3.3%	2.1%	2.1%	1.7%	4.3%	2.0%	-0.4%	-1.4%
3	17.2%	17.2%	18.0%	12.5%	18.4%	18.9%	19.1%	12.3%	26.4%	25.3%	23.7%	14.5%	26.6%	24.8%	22.2%	12.0%
4	-0.9%	-0.6%	-0.3%	-0.6%	-5.9%	-5.0%	-4.6%	-2.3%	-0.4%	0.3%	0.4%	1.0%	0.0%	-0.5%	-1.3%	-1.1%

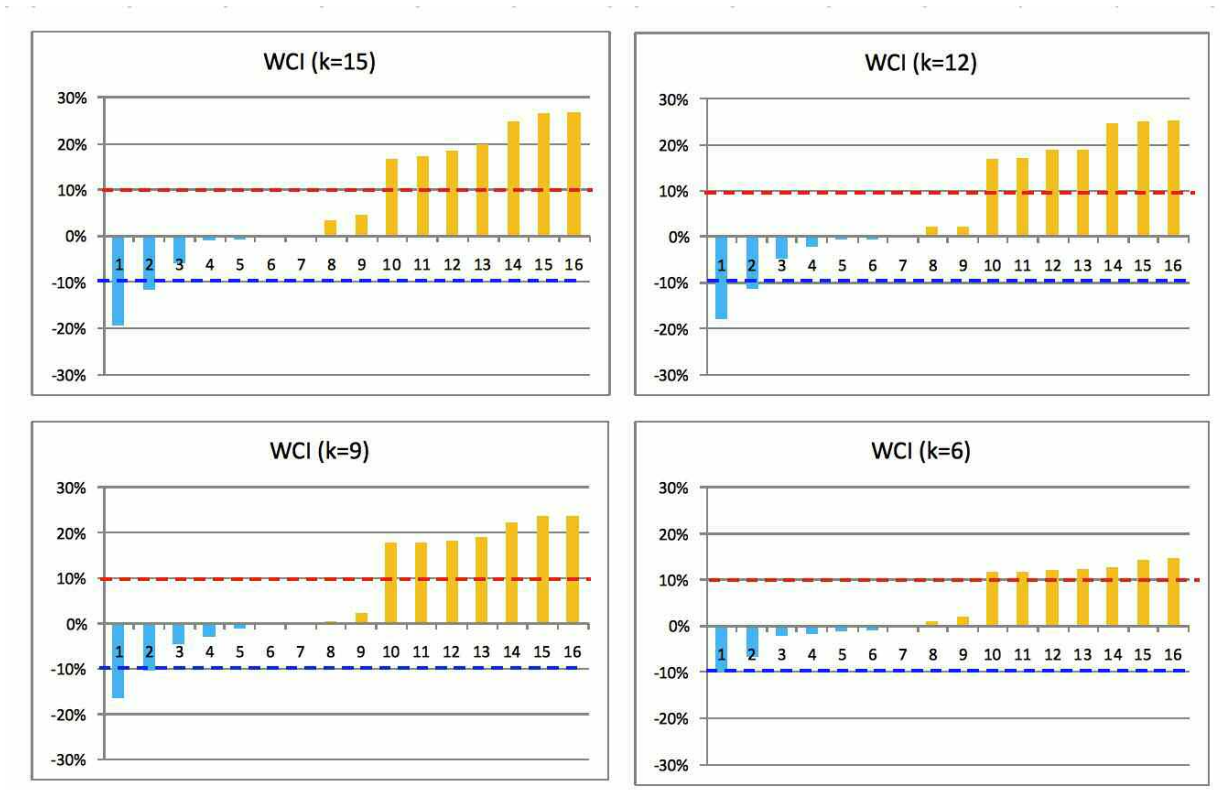
Table 3. Weighted Correlation Index: $WCI_{k,40}$(%); k=15, 12, 9, 6

$WCI_{k,40}$(%). In order to see the spread of the Indices, the 16 numbers in each matrix were sorted by their magnitudes and displayed in bar graph, positive indices in orange and negative indices in blue. The results are shown in Figure 16.

Quite interestingly, the graphs in Figure 16 show that the positive indices can be separated into two distinct groupings, i.e., those above +10% and those substantially less than +10%, implying the existence of some systematic cause for the difference. Based on this observation, +10% was adopted as the threshold to distinguish between the "significantly positively correlated changes" and "not significantly positively correlated changes" as working assumption. The cells of indices equal or greater than +10% are highlighted yellow in Table 3. Similarly -10% was adopted as the threshold to distinguish the "significantly negatively correlated changes" from "not significantly negatively correlated changes". Thus, the cells of indices more negative than -10% are highlighted blue in Table 3.

The yellow cells imply the existence of positively correlated changes while the blue cells imply the existence of negatively correlated changes. Of the 4 sessions conducted in the present study, Session 3

Figure 16.



stands out in that the *Weighted Correlation Index* $WCI_{k,40}$ of greater than +10% are found for all k-values in all the four possible pair combinations of the healer's left and right foot and subject's left and right hand.

Of the four possible pairs of the healer's foot and subject's hand, relatively large positive *Weighted Correlation Indices* were detected with the H-RFoot_S-RHand pair in the first three consecutive sessions. This may be an indication for the presence of more frequent bio-energetic interactions between the healer's right foot meridians and the subject's right hand meridians. On the other hand the *Weighted Correlation Indices* in Session 4 were found to be substantially small, closer to +/-0%, for all possible pair combinations, implying the absence of correlated changes in this particular session. Likewise, the *Weighted Correlation Indices* for healer's right foot and subject's left hand in Session 1, and healer's left foot and subject's right and left hands in Session 2 were found to be close to +/-0%, similarly suggesting the absence of correlated changes in those particular pair combinations.

Based on these findings the analyses by means of the *Weighted Correlation Index* $WCI_{k,40}$ were performed specifically with respect to those individual meridians of the healer and the subject which belong to the cells highlighted yellow and blue in Table 3 (total 9). These 9 combinations of healer's foot and subject's hand meridians are referred to as Case 1) ~ Case 9) in further analysis and discussions hereafter.

3. Correlated changes between the Healer's Foot Meridians and the Subject's Hand Meridians

Weighted Correlation Index was calculated for all possible pair combinations of the healer's left or right foot meridians and the subject's left or right hand meridians for all the 9 Cases highlighted in Table 3 above. Corresponding to each of the highlighted cells there are seven meridians of the healer's foot and seven meridians of the subject's hand. The *Weighted Correlation Index* $WCI_{k,40}(\%)$ was calculated for all the four k-values with respect to total 49 (=7x7) pair combinations of the healer's individual foot meridian and the subject's individual hand meridian.

Positive and negative *Weighted Correlation Indices* were found for each of the four window sizes (k-values). The *Weighted Correlation Indices* $WCI_{k,40}(\%)$ obtained are summarized in Table 4 and Table 5 together with the results of additional analyses *a)* and *b)* as described below.

a) Probability for the Deviation from Expected frequency of occurrences of the Positive and Negative $WCI_{k,40}(\%)$ cells

Frequency of occurrences of the positive and negative *Weighted Correlation Index* $WCI_{k,40}(\%)$ was counted for all the four k-values. If there are no correlated changes at all, then the positive and negative indices are expected to occur with equal probability. The probability for the obtained deviation to occur by chance were then rigorously calculated by binomial distribution and shown on lower left of each Case block. Against the preset criteria of p=0.05, if the number of cells of positive *Weighted Correlation Index* is greater than that of the cells of negative Index and if the p-value is less than 0.05, the occurrence of this "positive>negative" deviation is regarded statistically significant. It is shown in bold letter in red color. Likewise statistically significant deviation the other way, i.e., "positive<negative", is shown in bold letter in blue.

b) Histogram

The p-value calculated in *a)* above does not take into consideration the distribution of the magnitudes of the *Weighted Correlation Indices.* Mathematical formalism for the rigorous statistical assessment of this distribution is yet to be developed. However, to facilitate the visual observation of the extent of such deviations, "positive" or "negative", from the expected "neutral situation" of zero deviation, a histogram with 5% interval is produced for the cases of widest window (k=15) and narrowest window (k=6). The vertical dotted line indicates the 0% position, i.e., the center of the "neutral distribution" as expected under "no bias" assumption. If there are no

correlated changes, the histogram should be ideally left/right symmetric about this dotted line. Bars on the negative side are colored blue and those on the positive side are colored orange. Absolute value of the ratio of the sum of the positive *Weighted Correlation Indices* and the sum of the negative *Weighted Correlation Indices* (=∑|(+%)/(-%)|) are also shown in each of the histograms as a quantitative measure of the shift either to the positive or to the negative side.

Furthermore, to assess the statistical significance of the deviation of the histogram from the "neutral situation", the 5% intervals were compacted into 4 partitions and χ^2-test for "goodness of fit" to expected distribution was performed for the cases of widest window (k=15) and narrowest window (k=6). An example of this step is shown in Table 4. In each of these χ^2-calculations, Yate's correction was applied where the frequency number in any of the four partitions was less than 5. The p-values obtained are also shown for each Case.

Discussion

1. Positively Correlated Changes

Of the 9 Cases whose results of analyses are summarized in Table 5 and Table 6, 6 Cases [1), 4), 6), 7), 8), 9)] showed statistically significant deviation (p-value=0.022 ~ $2x10^{-7}$) to "positive" *Weighted Correlation index* $WCI_{k,40}$(%) for all k-values. The absolute value of the +/- sum ratio (=∑|(+%)/(-%)|) of the positive indices and the negative indices for these 6 Cases were found to be 2.40 ~ 10.42 , all significantly greater than the neutral situation (=1). By visual observation of the shapes of the histograms it is obvious that, if amplitude distribution is taken into consideration, these Cases would be found to be even more significantly slanted toward the positive side. Indeed, except for Case 1), Cases 4), 6), 7), 8) and 9) yielded statistically significant p-values by χ^2-test for deviation from the expected "neutral situation". These results are summarized in Table 7.

The results of Cases 6), 7), 8) and 9) obtained in Session 3 are particularly conspicuous in terms of the higher +/- sum ratios as well as of the smaller p-values. In fact the Session 3 stands out in that all the four combinations of the healer's left foot and right foot meridians and the subject's left hand and right hand meridians showed large +/- sum ratios indicating the strongest "positively correlated" changes of the four sessions conducted in this study.

To illustrate the features of the correlated changes observed in Cases 6), 7), 8) and 9) of Session 3, the

Table 4.

Case 1) k=15

Data Interval	Frequency	Actual	Partition	Expected
< -30%	0			
-30%~-25%	0			
-25%~-20%	0	1	-30% ~ -15%	6.5
-20%~-15%	1			
-15%~-10%	5			
-10%~-5%	6	17	-15% ~ -0%	18
-5%~0%	6			
0%~5%	6			
5%~10%	9	19	+0% ~ +15%	18
10%~15%	4			
15%~20%	8			
20%~25%	3	12	+15% ~ +30%	6.5
25%~30%	1			
> +30%	0			

χ^2=	9.41880342
dF=	3
p=	0.02421103

Case 1) k=6

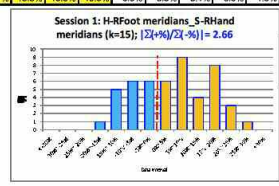
Data Interval	Frequency	Actual	Partition	Expected
< -30%	0			
-30%~-25%	0			
-25%~-20%	0			
-20%~-15%	0	1	-20% ~ -10%	2.5
-15%~-10%	1			
-10%~-5%	5	16	-10% ~ -0%	22
-5%~0%	11			
0%~5%	14	28	+0% ~ +10%	22
5%~10%	14			
10%~15%	4	4	+10% ~ +20%	2.5
15%~20%	0			
20%~25%	0			
25%~30%	0			
> +30%	0			

χ^2=	5.07272727
dF=	3
p=	0.16655

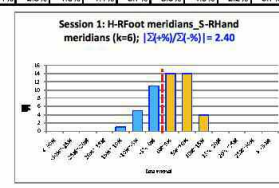
1) Session 1: Healer's Right Foot and Subject's Right Hand Meridians

Session 1	Subject's Right Hand																											
Healers	LU				LI				PC				DI				TE				HT				SI			
Right Foot	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6
SP	2.8%	1.6%	2.0%	1.8%	-12.5%	-12.3%	-11.0%	-5.8%	16.8%	17.5%	19.3%	14.6%	-6.1%	-5.7%	-5.9%	-4.6%	-16.2%	-15.6%	-15.7%	-10.5%	20.3%	20.8%	21.7%	14.2%	1.8%	2.5%	3.6%	2.9%
LV	16.6%	13.5%	10.4%	5.4%	15.0%	12.1%	9.8%	5.3%	-8.2%	-9.2%	-9.1%	-5.4%	-3.2%	-3.0%	-1.6%	1.2%	-5.1%	-4.8%	-3.7%	-1.3%	-2.9%	-5.7%	-7.5%	-4.4%	7.4%	6.8%	6.5%	4.8%
ST	25.4%	21.9%	18.1%	8.5%	19.0%	17.8%	16.0%	9.1%	-8.5%	-10.2%	-10.6%	-6.9%	7.0%	7.7%	8.1%	5.5%	-8.8%	-8.1%	-8.4%	-2.6%	5.7%	1.8%	-2.1%	-3.4%	2.6%	1.9%	1.1%	0.3%
SB	15.4%	11.4%	8.4%	3.8%	3.3%	1.6%	0.5%	-0.5%	19.2%	18.7%	19.0%	12.7%	11.9%	11.5%	10.9%	6.2%	1.1%	1.8%	2.9%	2.7%	16.1%	15.4%	14.8%	9.8%	9.4%	9.0%	8.9%	4.8%
GB	18.3%	16.1%	14.1%	7.6%	11.1%	10.6%	10.8%	7.8%	-5.0%	-6.2%	-6.1%	-3.6%	-13.0%	-12.1%	-9.8%	-5.1%	-10.0%	-9.1%	-7.9%	-4.6%	4.5%	3.3%	2.6%	2.0%	-2.6%	-2.4%	-1.0%	0.3%
KI	15.6%	15.0%	13.7%	6.4%	7.6%	5.9%	4.4%	2.0%	6.0%	7.0%	9.1%	7.4%	-10.6%	-11.6%	-12.6%	-8.9%	-10.3%	-8.6%	-6.2%	-3.5%	12.1%	10.9%	9.7%	5.5%	-6.5%	-7.0%	-6.9%	-3.5%
BL	22.2%	19.0%	15.5%	7.6%	20.1%	18.3%	16.5%	10.0%	6.6%	6.8%	8.4%	6.0%	-1.5%	-1.8%	-2.2%	-2.1%	-2.5%	-1.6%	1.1%	3.7%	8.0%	4.9%	2.2%	0.7%	6.4%	6.0%	5.7%	3.7%

Frequency of Occurrence	Window Size (k-value)			
	15	12	9	6
(+)% cells	31	31	31	32
(-)% cells	18	18	18	17
Total	49	49	49	49
p-value	0.043	0.043	0.043	0.022



C^2-test p= 0.0522

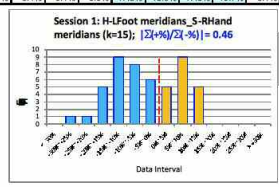


C^2-test p= 0.3143

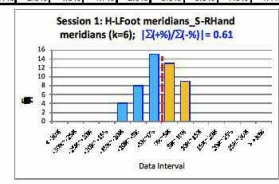
2) Session 1: Healer's Left Foot and Subject's Right Hand Meridians

Session 1	Subject's Right Hand																											
Healers	LU				LI				PC				DI				TE				HT				SI			
Left Foot	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6
SP	10.6%	10.4%	8.9%	4.3%	3.9%	2.9%	2.3%	2.8%	-3.6%	-2.4%	0.1%	2.2%	11.9%	13.2%	13.0%	8.1%	13.9%	14.5%	14.0%	8.0%	5.9%	4.4%	3.6%	2.1%	6.8%	7.8%	7.8%	6.0%
LV	3.2%	2.8%	2.4%	2.1%	-18.1%	-18.5%	-19.2%	-13.3%	-5.3%	-6.4%	-6.3%	-3.9%	-11.5%	-9.3%	-5.1%	0.5%	-11.6%	-9.8%	-7.2%	-2.8%	-6.8%	-7.1%	-6.8%	-4.1%	-3.3%	-3.7%	-4.4%	-3.3%
ST	8.2%	8.9%	9.2%	5.2%	-2.7%	-2.8%	-2.8%	-2.3%	-11.3%	-11.6%	-11.2%	-7.9%	7.0%	8.1%	8.7%	5.6%	7.5%	9.4%	10.8%	7.3%	13.6%	11.7%	8.7%	2.7%	13.4%	13.7%	12.6%	7.9%
SB	-6.1%	-6.2%	-6.3%	-4.7%	-7.7%	-8.7%	-8.0%	-4.2%	-27.3%	-27.2%	-25.2%	-14.7%	-22.9%	-22.4%	-21.2%	-13.3%	-4.2%	-2.3%	-0.5%	-0.2%	-5.7%	-6.5%	-5.7%	-3.4%	-11.0%	-10.8%	-9.4%	-4.5%
GB	3.9%	3.4%	3.4%	2.6%	-8.4%	-8.0%	-6.7%	-3.5%	-13.5%	-12.0%	-8.9%	-2.8%	-17.5%	-17.0%	-15.2%	-7.2%	-14.6%	-13.6%	-12.2%	-7.3%	0.0%	1.3%	4.1%	4.9%	-15.8%	-14.8%	-12.5%	-4.8%
KI	-16.6%	-15.6%	-14.0%	-9.0%	7.6%	8.3%	8.0%	4.2%	-6.5%	-6.8%	-6.3%	-3.3%	-11.6%	-12.1%	-11.4%	-6.4%	-13.8%	-12.9%	-11.1%	-6.7%	-8.7%	-9.4%	-10.5%	-8.5%	-11.4%	-9.9%	-9.1%	-5.0%
BL	-3.1%	-4.1%	-5.6%	-4.5%	7.7%	8.4%	9.1%	5.0%	-17.8%	-18.0%	-17.3%	-10.7%	6.1%	9.3%	12.5%	9.1%	2.0%	4.0%	4.7%	2.0%	9.0%	8.3%	7.6%	4.4%	2.7%	3.4%	3.3%	1.9%

Frequency of Occurrence	Window Size (k-value)			
	15	12	9	6
(+)% cells	19	20	21	22
(-)% cells	30	29	28	27
Total	49	49	49	49
p-value	0.076	0.126	0.196	0.284



C^2-test p= 0.1474

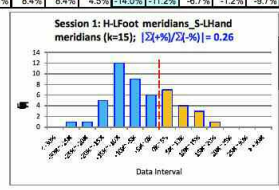


C^2-test p= 0.5222

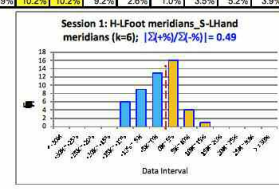
3) Session 1: Healer's Left Foot and Subject's Left Hand Meridians

Session 1	Subject's Left Hand																											
Healers	LU				LI				PC				DI				TE				HT				SI			
Left Foot	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6
SP	-7.4%	-6.4%	-6.3%	-3.6%	11.5%	13.3%	13.7%	9.8%	-5.1%	-4.8%	-4.8%	-3.4%	-7.0%	-7.2%	-7.6%	-5.2%	7.5%	7.3%	5.8%	1.8%	1.2%	1.7%	0.7%	0.6%	8.7%	8.5%	8.6%	5.0%
LV	-8.9%	-6.7%	-5.7%	-3.0%	-14.9%	-14.3%	-12.8%	-8.2%	-11.0%	-8.4%	-5.1%	-0.1%	9.8%	9.6%	8.9%	4.9%	-12.6%	-11.2%	-8.9%	-4.3%	-12.5%	-13.2%	-13.7%	-9.8%	1.3%	3.4%	4.6%	3.0%
ST	-12.4%	-8.5%	-3.5%	1.2%	-1.4%	0.1%	1.0%	0.3%	-5.4%	-2.8%	0.7%	3.0%	-8.8%	-9.4%	-7.9%	-3.7%	-4.1%	-5.0%	-7.2%	-7.2%	1.1%	2.3%	2.0%	0.9%	-7.5%	-7.2%	-6.2%	-2.9%
SB	-22.4%	-20.7%	-18.7%	-10.9%	-0.7%	1.8%	4.9%	5.2%	-26.6%	-26.4%	-24.4%	-14.0%	-19.8%	-21.0%	-20.7%	-13.4%	18.6%	18.2%	17.3%	10.0%	2.3%	4.7%	7.1%	6.3%	-0.8%	-1.0%	-1.4%	-1.3%
GB	-8.5%	-6.5%	-3.1%	-0.1%	-15.5%	-14.0%	-11.2%	-4.6%	-12.5%	-12.2%	-11.1%	-6.8%	-14.3%	-13.2%	-10.8%	-10.8%	4.7%	4.8%	5.4%	3.8%	-10.9%	-8.0%	-4.4%	0.4%	-10.4%	-11.5%	-11.9%	-8.5%
KI	-12.7%	-10.6%	-9.2%	-5.6%	-13.9%	-12.9%	-11.3%	-7.1%	-3.9%	-1.9%	1.7%	3.4%	-17.6%	-17.0%	-17.3%	-12.5%	-17.6%	-18.1%	-18.6%	-13.0%	1.6%	3.2%	4.8%	4.1%	-2.2%	-4.3%	-5.4%	-3.8%
BL	-16.4%	-14.9%	-12.3%	-6.8%	7.1%	8.4%	8.4%	4.5%	-14.0%	-11.2%	-6.7%	-1.2%	-9.7%	-8.5%	-6.6%	-2.9%	10.2%	10.2%	9.2%	2.6%	1.0%	3.5%	5.2%	3.9%	10.5%	12.1%	13.5%	10.3%

Frequency of	Window Size (k-value)			
	15	12	9	6
(+)% cells	15	17	19	21
(-)% cells	34	32	30	28
Total	49	49	49	49
p-value	0.005	0.022	0.076	0.196



C^2-test p= 0.0844

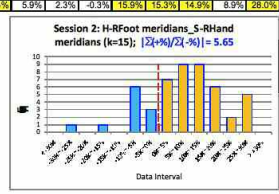


C^2-test p= 0.5107

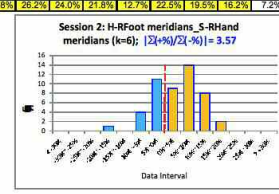
4) Session 2: Healer's Right Foot and Subject's Right Hand Meridians

Session 2	Subject's Right Hand																											
Healers	LU				LI				PC				DI				TE				HT				SI			
Right Foot	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6
SP	1.4%	2.1%	2.1%	1.7%	11.3%	10.7%	10.5%	6.7%	8.5%	8.4%	3.0%	0.1%	12.4%	10.2%	7.4%	1.7%	16.9%	16.0%	15.1%	10.0%	10.2%	8.0%	5.8%	1.8%	19.6%	18.9%	17.7%	10.3%
LV	10.0%	13.6%	16.5%	12.0%	-15.4%	-15.2%	-13.7%	-8.5%	28.7%	28.8%	29.0%	19.3%	15.8%	14.3%	12.7%	7.1%	-0.4%	0.7%	0.3%	-0.9%	7.0%	7.5%	8.1%	6.6%	-7.5%	-5.5%	-2.7%	1.4%
ST	14.3%	13.2%	11.6%	5.4%	-0.9%	-0.1%	-0.1%	-0.4%	3.1%	2.1%	1.2%	-0.4%	23.2%	21.5%	18.1%	9.3%	-26.2%	-26.2%	-26.0%	-17.3%	6.1%	7.2%	8.9%	7.6%	-5.4%	-4.8%	-5.5%	-4.5%
SB	25.0%	23.3%	21.6%	14.4%	2.9%	2.8%	1.7%	0.3%	12.7%	12.1%	11.0%	7.2%	19.0%	17.9%	15.1%	7.4%	-6.4%	-5.1%	-6.1%	-3.8%	0.4%	0.4%	-0.1%	-0.6%	7.0%	11.2%	14.3%	11.7%
GB	19.0%	18.5%	18.2%	12.5%	1.0%	0.9%	-0.7%	-1.4%	14.2%	13.8%	11.7%	5.7%	11.5%	10.0%	8.6%	5.4%	-6.7%	-6.9%	-8.1%	-6.2%	1.0%	-1.8%	-4.7%	-5.3%	-8.9%	-9.5%	-11.1%	-8.5%
KI	9.1%	9.4%	10.0%	6.6%	2.2%	0.8%	-1.6%	-2.7%	9.0%	7.4%	5.7%	2.5%	-0.2%	-2.2%	-3.8%	-3.5%	5.0%	4.2%	2.3%	0.2%	12.1%	11.8%	12.1%	8.1%	-6.2%	-6.4%	-6.4%	-4.4%
BL	26.5%	24.6%	23.0%	14.1%	10.4%	5.9%	2.3%	-0.3%	15.5%	15.3%	14.9%	8.9%	28.0%	26.6%	25.7%	16.8%	26.2%	24.0%	21.8%	12.7%	22.5%	19.5%	16.2%	7.2%	7.4%	5.9%	5.0%	3.1%

Frequency of Occurrence	Window Size (k-value)			
	15	12	9	6
(+)% cells	38	38	35	33
(-)% cells	11	11	14	16
Total	49	49	49	49
p-value	7.1E-05	7.1E-05	0.002	0.011



C^2-test p= 4.06E-03

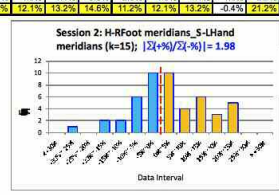


C^2-test p= 0.1518

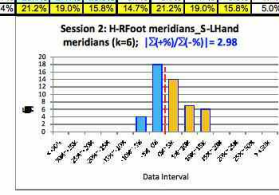
5) Session 2: Healer's Right Foot and Subject's Left Hand Meridians

Session 2	Subject's Left Hand																											
Healers	LU				LI				PC				DI				TE				HT				SI			
Right Foot	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6	k=15	k=12	k=9	k=6
SP	0.6%	-0.1%	-0.7%	-0.5%	19.5%	17.4%	15.6%	9.5%	10.5%	9.1%	7.2%	3.9%	11.4%	10.6%	10.1%	5.7%	23.9%	22.0%	18.4%	9.3%	9.0%	6.8%	3.9%	0.6%	2.4%	-0.7%	-3.1%	-1.6%
LV	-0.9%	1.2%	3.1%	2.2%	-0.9%	1.2%	3.1%	2.2%	-8.2%	-7.7%	-5.9%	-2.2%	0.5%	1.0%	0.4%	-0.7%	17.3%	18.2%	18.0%	11.2%	-4.3%	-5.5%	-7.0%	-4.6%	-2.8%	-1.0%	1.9%	4.0%
ST	-15.6%	-14.4%	-11.8%	-8.1%	-1.5%	-2.3%	-3.6%	-4.3%	5.0%	7.0%	9.9%	10.3%	2.8%	5.0%	7.6%	7.6%	3.4%	4.4%	5.0%	3.2%	-18.6%	-17.3%	-15.2%	-9.3%	-5.5%	-6.3%	-8.0%	-6.2%
SB	-1.9%	-2.3%	-2.6%	-1.7%	5.1%	5.3%	5.9%	4.7%	-1.2%	0.0%	1.5%	2.0%	-2.2%	0.1%	3.0%	3.7%	10.9%	11.8%	13.9%	10.8%	-12.0%	-9.5%	-6.0%	-1.6%	-12.0%	-9.5%	-6.0%	-0.9%
GB	-5.4%	-6.9%	-9.9%	-9.1%	-5.4%	-6.9%	-9.9%	4.0%	-5.4%	-6.9%	-9.9%	0.1%	-5.4%	-6.9%	-9.9%	9.2%	6.8%	6.0%	5.2%	9.2%	6.8%	6.0%	5.2%	-1.9%	-4.5%	-5.6%	-6.9%	-1.9%
KI	2.3%	1.4%	1.1%	0.8%	2.3%	1.8%	1.1%	3.3%	2.3%	1.8%	1.1%	-1.8%	-2.2%	-2.2%	-1.6%	-0.7%	-25.4%	-27.1%	-25.6%	-0.7%	3.3%	4.7%	5.8%	-0.7%	15.1%	14.1%	12.6%	-0.7%
BL	11.2%	12.1%	13.2%	9.4%	11.2%	12.1%	13.2%	14.6%	11.2%	12.1%	13.2%	-0.4%	21.2%	19.0%	15.8%	-0.4%	21.2%	19.0%	15.8%	14.7%	21.2%	19.0%	15.8%	5.0%	21.2%	19.0%	15.8%	12.0%

Frequency of Occurrence	Window Size (k-value)			
	15	12	9	6
(+)% cells	28	30	31	27
(-)% cells	21	19	18	22
Total	49	49	49	49
p-value	0.196	0.076	0.043	0.284



C^2-test p= 0.6867



C^2-test p= 0.2440

Table 5.

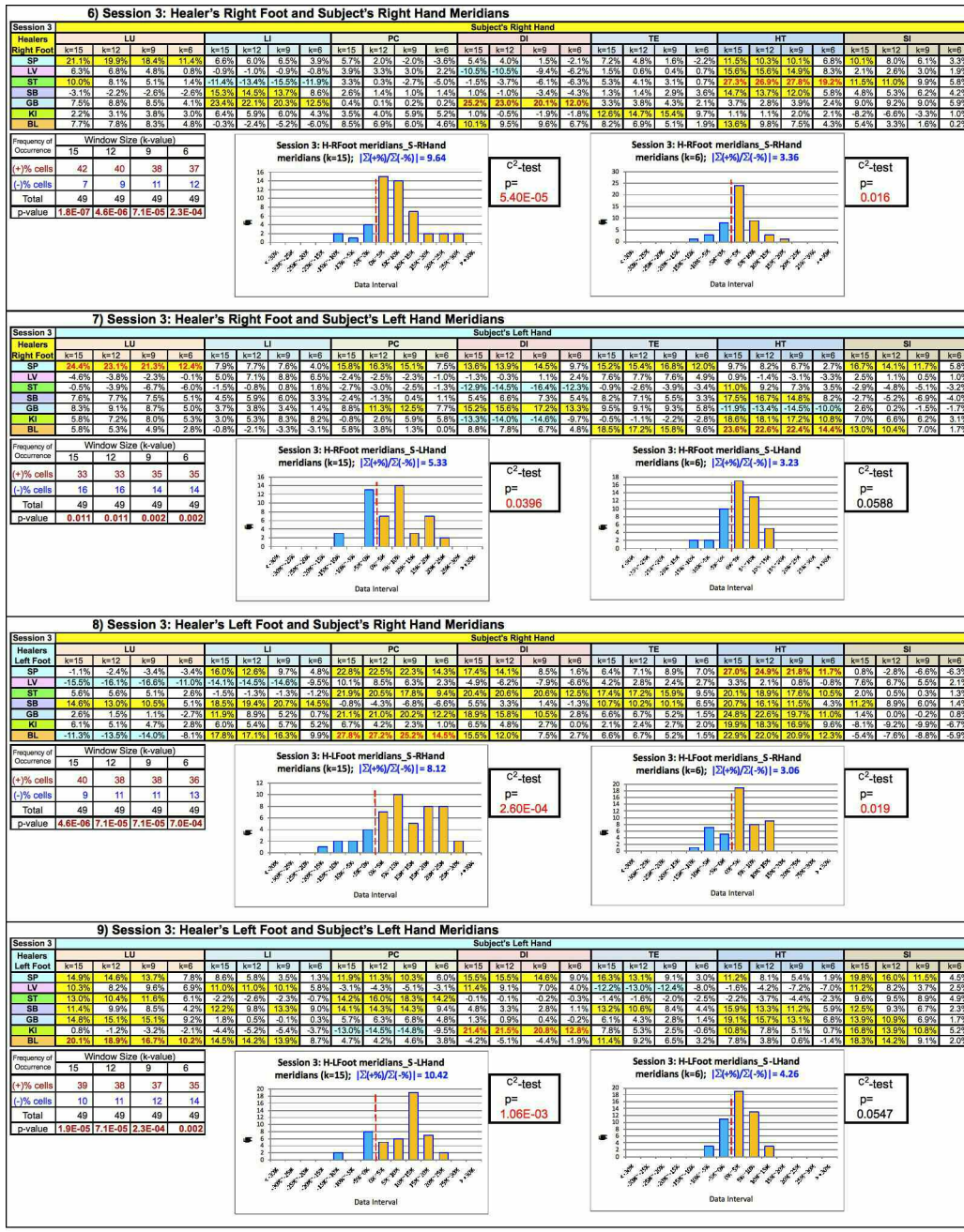


Table 6.

"healer meridian/subject meridian" pairs which gave the largest and the 2nd largest *Weighted Correlation index* $WCI_{k,40}(\%)$ are shown in Figure 17 and 18. The two of the meridian pairs taken from each of the four Cases are summarized in Table 8.

Interestingly the subject's meridians involved are Lung, Diaphragm, Heart and Pericardium, which are all Yin meridians, except for the Diaphragm meridian which is not associated with Yin-Yang distinction, related with the subject's circulatory system. In contrast, the healer's meridians involved are Stomach, Gall Bladder, Spleen, Urinary Bladder and Kidney, which are related with the healer's digestive system and genito-urinary

Case No.	(+)/(-) Frequancy Number				Histogram	
	|Σ(+%)/Σ(-%)|		p-value		^{C}2-test	
	k=15	k=6	k=15	k=6	k=15	k=6
1)	2.66	2.4	0.043	0.022	0.052	0.314
4)	5.65	3.57	7E-05	0.011	0.004	0.152
6)	9.64	3.36	2E-07	2E-04	5.40E-05	0.016
7)	5.33	3.23	0.011	0.002	0.040	0.059
8)	8.12	3.06	5E-06	7E-04	2.60E-04	0.019
9)	10.42	4.26	2E-05	0.002	1.06E-03	0.055

Table 7.

Session 3

Case No.	Meridian pairs of Largest and 2nd Largest $WCL_{k,40}$			$WCI_{k,40}$(%) values	
	Healer Meridian	Subject Meridian	Notation	k=15	k=6
6)	Right Stomach	Right Heart	H-RST_S-RHT	27.3%	19.2%
	Right Gall Bladder	Right Diaphragm	H-RGB_S-RDI	25.2%	12.0%
7)	Right Spleen	Left Lung	H-RSP_S-LLU	24.4%	12.4%
	Right Bladder	Left Heart	H-RBL_S-LHT	23.6%	14.4%
8)	Left Bladder	Right Pericardium	H-LBL_S-RPC	27.8%	14.5%
	Left Spleen	Right Heart	H-LSP_S-RHT	27.0%	11.7%
9)	Left Kidney	Left Diaphragm	H-LKI_S-LDI	21.4%	12.8%
	Left Bladder	Left Lung	H-LBL_S-LLU	20.1%	10.2%

Table 8.

system, but more importantly they are the meridians closely related with lower chakras such as the Svadhistana and Manipura. It may be that the healer established the vital energy connection with the subject through the activities of these lower chakras.

In Figure 17 the graph of H-RST_S-RHT shows a large significant synchronous change with nearly 100% correlation for about 2 minutes at about 29:40 time stamp indicating prolonged moments of strong synchronization, roughly in the middle of the Hypnotherapy. The graph obtained for the narrowest window (k=6) shows some 20 or so peaks of significantly high correlation coefficient. It is noted that the duration of these peaks are typically 10-120 sec and they appear most frequently during the 30 min healing period and lingers on in the subsequent period of Control 2. Upon closer scrutiny a small number of peaks suggesting the presence of short period of negatively correlated changes are also noted.

Graphs obtained for the meridian pairs of H-RGB_S-RDI, H-RSP_S-LLU and H-RBL_S-LHT shown in Figure 17 and those of H-LBL_S-RPC, H-LSP_S-RHT, H-LKI_S-LDI and H-LBL_S-LLU shown in Figure 18 exhibit features similar to those in the graph of H-RST_S-RHT pair as described above, although the shapes, timings and frequency of appearances seem different for each meridian pair. It is evident that the degree of correlation changed up and down as time elapsed. However, the duration and magnitude of the positively correlated changes are visibly greater than those of the negatively correlated or uncorrelated moments. The fact that strongly correlated changes were found in all the four combinations of the healer's left foot and right foot meridians and the subject's left hand and right hand meridians in Session 3 suggests that the Qi-energy interaction between the healer and the subject was taking place more fully in Session 3 than in three other sessions. In sharp contrast to this result of Session 3, little correlated change was found in Session 4. Determining factors that modulate the intensity and/or the frequency of the correlated changes requires further investigation.

2. Negatively Correlated Changes

Of the remaining 3 Cases out of the 9 Cases in Table 3, Case 3) of Session 1 is unique in that it showed significantly greater occurrence of "negative" *Weighted Correlation Indices* $WCI_{k,40}$(%). The Case 2) of Session 1 was not statistically significant with respect to the p-value obtained. However, negative slant is evident in its histogram. The Case 5) gave a significant p-value for the window of k=9 only. However, the histograms of k=15 and k=6 both indicate substantial slant toward the positive side as supported by the values of +/- sum ratio being 1.98 and 2.98 respectively. The Case 5 should therefore be regarded as a case of relatively weak positive correlation.

Thus, the Case 3) and Case 2) of Session 1 stand out as showing the predominantly *negatively correlated* changes, which deserves careful scrutiny. The +/- sum ratios and the p-values of these two Cases are shown in Table 9.

For Case 3) the values of +/- sum ratio were found to be 0.26 for the widest window (k=15) and 0.49 for the narrowest window (k=6). This means that the absolute value of the sum of the "negative" *Weighted Correlation Indices* is 3.85 times that of the positive

Case No.	(+)/(-) Frequancy Number				Histogram	
	|Σ(+%)/Σ(-%)|		p-value		^{C}2-test	
	k=15	k=6	k=15	k=6	k=15	k=6
3)	0.26	0.49	**0.005**	0.1958	0.084	0.511
2)	0.46	0.61	0.076	0.28409	0.147	0.522

Table 9.

Session 1

Case No.	Meridian pairs of Largest and 2nd Largest $WCL_{k,40}$			$WCI_{k,40}$(%) values	
	Healer Meridian	Subject Meridian	Notation	k=15	k=6
3)	Left Stomach Branch	Left Pericardium	H-LSB_S-LPC	-26.6%	-14.0%
	Left Stomach Branch	Left Lung	H-LSB_S-LLU	-22.4%	-10.9%
2)	Left Stomach Branch	Right Pericardium	H-LSB_S-RPC	-27.3%	-14.7%
	Left Stomach Branch	Right Diaphragm	H-LSB_S-RDI	-22.9%	-13.3%

Table 10.

indices for k=15, and 2.04 times for k=6, indicating that negatively correlated changes were indeed dominant in this particular case. The Case 2) also has negative deviation but it is not as significant as in Case 3). Nevertheless, of the 7x7=49 pairs of healer's meridians and subject's meridians, graphs of the healer-subject meridian pairs that showed the largest and the 2nd largest magnitudes of the "negative" *Weighted Correlation Index* are presented for both Case 3) and Case 2) in Figure 19. The meridian pairs taken from these two cases are shown in Table 10.

In contrast to the graphs of "positive" *Weighted Correlation Indices* as shown in Figure 17 and 18, the *Weighted Correlation Coefficients* $WR_{n;k}$ (brown color) in Figure 19 show a number of peaks or deflections 180 degrees out of phase, i.e., in the direction opposite to those of the Weighting Factor $WF_{n;k}$ (blue color). These negatively correlated changes were detected predominantly for Cases 3) "Healer's Left Foot meridians and Subject's Right Hand meridians", and Case 2) "Healer's Left Foot meridians and Subject's Left Hand meridians", both in Session 1. What these negative correlation means and the reason why these two pair combinations of the healer's foot meridians and the subject's hand meridians showed predominantly negatively correlated changes in Session 1 alone is unknown.

3. Search for the Correlation Patterns between Healer's Foot meridians and Subject's Hand meridians

Certain patterns or tendency may exist among the healer's foot meridians and the subject's hand meridians that showed relatively significant correlated changes. In other words certain particular foot meridians of the healer and the subject's hand meridians may be more often correlated than others. In order to examine if this is true, Cases 1) to 9) were consolidated into one 7x7 matrix of healers foot meridians and subject's hand meridians and examined for statistically significant features.

a) Patterns in positively and negatively correlated changes

Extraction of correlation pattern(s) was carried out by following procedures.

(1) Calculate the average of the *Weighted Correlation Indices* for the four window sizes (k=6, 9, 12, 15) and use it as the variable representing the degree of correlated changes for each particular pair combination of the healer's foot meridian and the subject's hand meridian.

(2) As adopted when highlighting the cells in Table 3, set +10% and -10% as the thresholds to distinguish between the "significantly correlated" and "not significantly correlated". Assign "1" to the cell of "significantly correlated" *Index* and "0" to that of "not significantly correlated" Index. This process creates a 7x7 matrix of "1" or "0" for each of the nine Cases.

(3) Irrespective of the left/right distinction of the meridians, sum up the nine 7x7 matrices "cell by cell" and generate a new 7x7 matrix with healer's 7 foot meridians for the row titles and subject's 7 hand meridians for the column titles.

(4) Where applicable, apply χ^2-test to statistically evaluate the obtained deviation of the frequency of occurrence from the frequency expected under "no bias" assumption.

Results for positively correlated changes (>+10%) and negatively correlated changes are separately shown in Table 11.

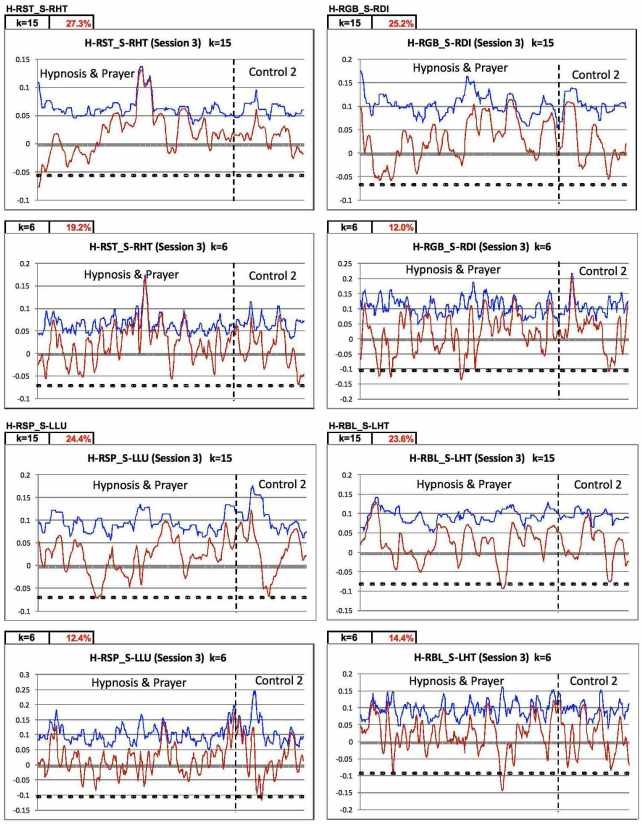


Figure 17. Positively Correlated Changes – Case 6) & 7) of Session 3

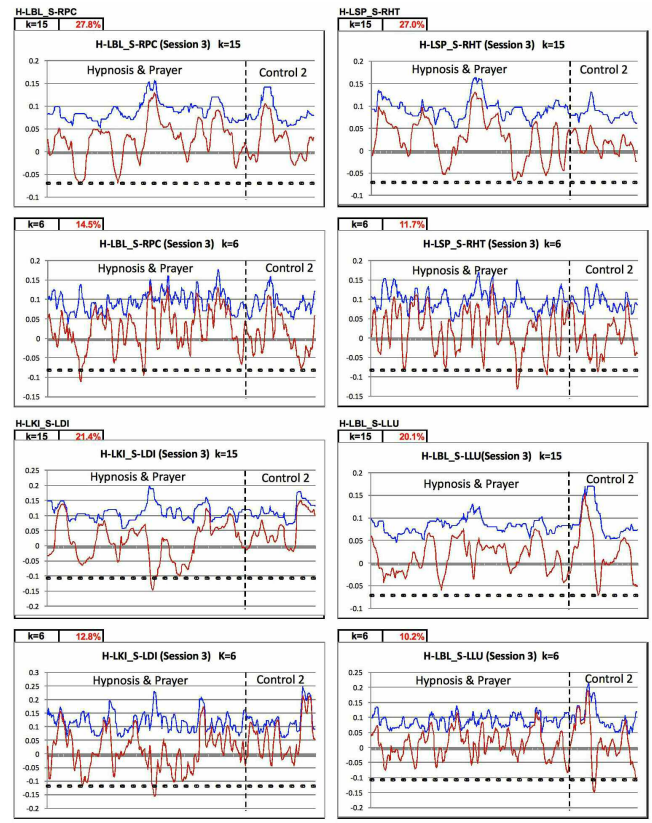


Figure 18. Positively Correlated Changes – Case 8) & 9) of Session 3

In the 7x7 contingency tables the numbers in the cells are 5 or less. It is therefore not appropriate to apply the χ^2-test to this table as a whole. However, it is possible to apply χ^2-test for the "goodness of fit" to the expected frequency of occurrence for the sum numbers of healer's foot meridians and those of subject's hand meridians. There is no reason a priori to assign greater probability of occurrence of correlated changes to any particular meridian. Therefore, expected frequency is uniform for all the 7 meridians both for the healer and the subject.

Against these "no bias" expectations χ^2-tests were performed. The results are shown under the matrices in Table 11. The healer's foot meridians alone showed statistically significant deviation (p=0.01).

Table 11.

Case 1)~9) all combined

	Average of k=6, 9, 12, 15 > +10%							
Healer's Meridian	Subject's Meridian							
	LU	LI	PC	DI	TE	HT	SI	
SP	3	3	3	4	5	2	3	23
LV	2	1	1	1	1	1	0	7
ST	3	1	2	2	1	2	1	12
SB	2	3	3	2	2	5	1	18
GB	3	2	3	3	0	2	0	13
KI	1	0	0	1	1	3	2	8
BL	4	4	2	2	3	4	3	22
	18	14	14	15	13	19	10	103

Healer's Foot meridians		Subject's Hand meridians	
C^2 =	14.7143	C^2 =	3.767
df=	6.000	df=	6.000
p=	0.0100	p=	0.7082

Case 1)~9) all combined

	Average of k=6, 9, 12, 15 < -10%							
Healer's Meridian	Subject's Meridian							
	LU	LI	PC	DI	TE	HT	SI	
SP	0	1	0	0	1	0	0	2
LV	1	4	0	0	1	1	0	7
ST	1	1	1	1	1	1	0	6
SB	1	0	2	2	0	0	0	5
GB	0	1	1	3	1	1	2	9
KI	1	1	1	4	3	0	0	10
BL	2	0	1	0	0	0	0	3
	6	8	6	10	7	3	2	42

Healer's Foot meridians		Subject's Hand meridians	
C^2 =	8.667	C^2 =	7.667
df=	6.000	df=	6
p=	0.1932	p=	0.26356

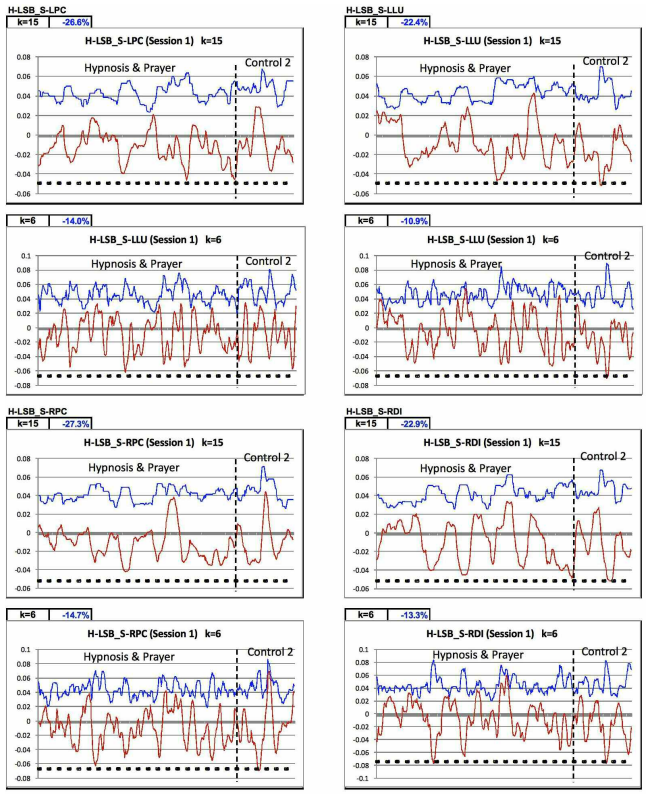


Figure 19 . Negatively Correlated Changes – Case 3) & 2) of Session 1

Average of k=6, 9, 12, 15 > +10%

	Subject		
Healer	Yin	Yang	sum
Yin	16	16	32
Yang	25	15	40
sum	41	31	72

c2 =	1.133
df=	1
p=	0.287

Average of k=6, 9, 12, 15 < -10%

	Subject		
Healer	Yin	Yang	sum
Yin	9	6	15
Yang	8	6	14
sum	17	12	29

c2 =	0.024
df=	1
p=	0.877

Table 12.

Average of k=6, 9, 12, 15 > +10%

	Subject		
Healer	Right	Left	sum
Right	41	22	63
Left	21	19	40
sum	62	41	103

c^2 =	1.616
df=	1
p=	0.204

Average of k=6, 9, 12, 15 < -10%

	Subject		
Healer	Right	Left	sum
Right	7	6	13
Left	14	15	29
sum	21	21	42

c^2 =	0.111
df=	1
p=	0.739

Table 13.

The sums on extreme right of the 7x7 contingency matrix for the positive *Indices* imply that the Spleen meridian and Urinary Bladder meridian appear more frequently than other foot meridians. No such significant deviation was found with respect to the subject's hand meridians, however. The matrix of the negative *Indices* has smaller numbers in its cells. Presumably for this reason neither showed statistically significant deviations, although the sums on extreme right of the 7x7 contingency matrix for the negative *Indices* seem to imply that Kidney and Gall Bladder meridian appear more frequently.

b) χ^2-tests by Yin-Yang Grouping of meridians

From the matrices of Table 11, the healer's foot meridians and the subject's hand meridians were grouped into Yin and Yang categories, and a 2x2 Yin-Yang contingency table was generated to perform a χ^2-test for "independence" between the healer's Yin-Yang and the subject's Yin-Yang groupings. The results are shown in Table 12. Actual numbers of frequency and p-values obtained are not at all suggestive of any correlation.

c) χ^2-tests by Left and Right Grouping of meridians

Similarly 2x2 contingency table was generated by left and right category for the healer's foot meridians and the subject's hand meridians for χ^2-test of independence. The results are shown in Table 13. Neither the positive *Index* grouping nor negative *Index* grouping showed significant correlation. However, the frequency of occurrence in the cell of the healer's right foot and the subject's right hand seem to be noticeably greater than three other values in the contingency table of the positive *Index* case. This observation reflects the fact that this particular combination of healer's right foot and the subject's right hand showed significant positively correlated changes consecutively for the first three sessions as stated earlier in section 2 of Data Analysis. This

observation might be related to the fact that the subject had some significant weaknesses on the right side of her physical body at the time of these sessions.

Conclusion

Foot meridians of the Healer and hand meridians of the Subject were monitored by AMI's BP parameter continuously for 50+ minutes through the Control 1, Healing and Control 2 periods. Forty minutes time span from the start of the Hypnotherapy through to the initial 10 minutes of Control 2 were closely analyzed by introducing a novel idea of *Weighted Correlation Index.*

From the analysis of the four Groupings of the healer's left and right foot meridians and the subject's left and right hand meridians, 6 Cases of significantly positively correlated changes and 2 Cases of significantly negatively correlated changes were found. Highly correlated changes, positive or negative, were found to arise sporadically as peaks of varying time duration, typically 10-120 sec, during the 40 minutes time span analyzed. Overwhelmingly large number of positively deflected peaks was detected for Cases of "positively correlated changes", while overwhelmingly large number of peaks of 180 degrees out of phase (i.e., negatively deflected) were detected for Cases of "negatively correlated changes".

Significant deviation (p=0.01) from "no bias" expectation was found for the frequency of occurrence of the healer's foot meridians, implying that the healer's Spleen and Urinary Bladder meridians appear more frequently than other meridians. No other statistically significant healer/subject meridian patterns were found. Larger number of test sessions than was performed in the present study would be necessary to investigate such patterns in statistically more meaningful manner.

Developing a more rigorous mathematical formalism for quantitative statistical analysis incorporating the time varying magnitudes of weighted correlation coefficients is desirable for more thorough statistical evaluation of significances.

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DISCLOSURE STATEMENT:
The authors of this paper conducted present study purely from the standpoint of scientific interest in subtle energy effects in human subject with no commercial associations.

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