BIAL Foundation

Project 81/04 - Final report

1. Identification of the project:

Date: January 1, 2005 – July 31, 2006
Title: Photon emission of a living witness in human healing and cognitive experiences.
Project number: 81/04

2. Project Leader:

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3. Summary of Activities to Date:

Ultra-weak photon emission recording was proposed as a highly sensitive measure of the field changes which result from bonding in a therapeutic (healer – patient) relationship. The current research established, based on photon emission data including higher order moments and parameters of an assumed squeezed state, that the witness, algae *Acetabularia acetabulum* can

distinguish a therapeutic (healing) relationship from a situation wherein subjects are present without healing intention.

4. Detailed Information

Background and objectives

Ultra-weak photon emission recording was proposed as a highly sensitive measure of the field changes that result from bonding in a therapeutic (healer – patient) relationship. The current research objectives were: a.) to replicate the study with more healers and in different settings, b.) to improve control by studying subjects in the same environment without any therapeutic purpose and engaged in cognitive activities, c.) to improve data analysis by characterizing photon emission distribution.

Healers and healees

The experiments were conducted in cooperation with experienced "laying on of hands" healers. The screening for experienced healers began January, 2005. It was aimed at: (a) recording ultra weak photon emission from the hands of the healer before, during and after intentional healing, (b) recording ultra weak photon emission from a healee before, during and after treatment by a healer. The screening also allowed the experimentators to learn about the healer's therapeutic procedure, cooperation with researchers and ways of participation in experimental situations.

Ten healers were screened utilizing a moveable photomultiplier device that was able to record photon emission from different anatomic sites of both healers and healees. Healers demonstrate a change in their photon emission during healing. Two male and one female healer were selected. They were familiar with scientific research and were subsequently informed about the experimental settings.

The healers invited the healees; healees were patients of the healers.

Experimental settings

Photon counting devices were installed in an office room of the healer's practise or in an office newly selected for experimentation. One of the purposes of the present experiment was to utilize different experimental settings. In our initial study (Van Wijk & Van Wijk, 2003; 2004), a treatment room in the same building but different from usual office of the healer was utilized. At that time, the photon measurement equipment was installed in the very room where the experimental healing sessions took place.

In the present series of experiments, two new settings were utilized: (a) treatment room was the same as utilized for normal practice but the photon counting device was positioned in a juxtapostion room, and (b) treatment room was approximately 40 km from healer's practice with photon measurement equipment positioned in the same room. A male Dutch healer participated in setting (a); one male and one female German healer participated in setting (b).

Two cooled, highly sensitive photomultiplier devices were utilized: (a) In the Dutch setting, a vertical photomultiplier positioned above the petri dish containing cells, and (b) In the German setting, a horizontal photomultiplier recording the photon emission from cells in a cuvet. Both photomultipliers have a 50 mm diameter photocathode sensitive in the 300 – 850 nm range. Both measurement systems were completely automatic; operations were managed by software.

Ultra-weak photon emission of vegetative algae *A. acetabulum* was proposed as a sensitive measure for recording changes by an "intentional healing field" resulting from healer-healee bonding in a therapeutic relationship. Prior to each recording session, vegetative *A. acetabulum* cells (length of 2-4 cm) were cultured in artificial sea- water at 20°C on a 12 h light – 12 h dark cycle. Approximately 50 cells were placed in a container containing 15 ml of culture medium and then positioned for at least 18 h in the complete darkness of the measuring chamber at a temperature of approximately 20°C. This period of time served to eliminate delayed luminescence due to previous light-dark culturing cycles.
During the 18 h period prior to each recording session, the shutter between the measuring chamber and the photomultiplier tube was closed. The recording of *A. acetabulum*'s photon emission was initiated approximately 20 min before the experimental sessions began. A recording consisted of 12000 registrations of 100 ms. Then, the first healing recording

consisting of 12000 registrations of 100 ms was performed. The healing recording was followed by similar recording during a period without any healing encounter.
Exact protocols including number and duration of healing encounters and non-healing periods are mentioned in the section on Data collection

Data collection

Initial Dutch study

Data from the initial study were derived during 7 days of experimentation that included 36 experimental healing sessions. During the first day, the experiment included treatment of 6 patients. Over the following 6 days of experimentation, 5 patients were treated each day. Healer encounters had a duration of 20 min and alternated with 20 min non-healing periods.

The protocol for measurements was as follows. Background measurements were taken to determine the electronic noise of the equipment prior to initiating any experimental healing session. Registration lasted for 17 min both during the healing and non-healing periods. In both periods, ultra weak photon emission was counted utilizing a sample time of 1 s. Healing and non-healing periods had runs of 1020 measurement points.

Mean values from the initial study: Recordings both of photon emission of *A. acetabulum* cells and electronic background demonstrated that photon counts from electronic noise was stable over periods of at least 6h. The mean values demonstrated that the contribution of cellular photon emission was 30-40 cps per 50 cells and basically stable during each experiment. Small fluctuations between experiments were mainly ascribed to biological variation in cell size and metabolic status.
Photon count distribution from the initial study: Due to biological variability, interest was not mainly focused on the mean value. Instead, the question asked was about the frequency distribution of counts as characterized by skewness and kurtosis. Both skewness and kurtosis values commonly increased during the healing segments. Application of the Wilcoxon-tests for all experimental sessions reflected the increase in skewness as well as kurtosis during healing as highly significant (P=0.0001).

The present study – Dutch setting.

Data from the present Dutch study were derived over 5 days from 20 experimental healing sessions. Over the 5 days of experimentation, 4 patients were treated each day. Subjects were not aware of the recordings on the photon emission of *A. acetabulum*.

The protocol for registration was slightly different from the initial study. A longer registration period after each healing session was included to assure that the intermediate period was sufficient to allow all parameters to return to baseline. This was accomplished by comparing photon emission characteristics of two consecutive "post-healing" periods.

The protocol for measurements was as follows. After background measurements were obtained, the actual experimental day began. Registration of photon counts was initiated with overnight dark-adapted cells: three times 20 min before the start of the first healing while the healer was already present. Then, healer and healee were both present in the therapy room while the second series of three 20 min recordings was completed: the first 20 min period included healing while the next two 20 min periods were without. This schedule was used for all subjects on any experimental day.

Mean photon emission data from the present study.
Photon emission from the cells was approximately 25 cps at the beginning of each experimental day. Mean emission steadily increased as the healer started his sessions with an approximately doubling in the 5 h experimental period.

Photon count distribution data from the present Dutch study.
Data from the experimental healing study were subjected to photon count distribution analysis. As in the initial study, the first step was to calculate the values of statistical moments, skewness and kurtosis. Skewness was not zero, which implies skewed distribution of data points. Kurtosis was not zero and instead, rather large which again rules out normal distribution of data points. Variance was higher than the mean in most data sets again suggesting that observed photon count distributions are not normal.
The absence of normal distribution rules out the origin of photon count fluctuations from random disturbances. Photon signals probably have some amount of long-term coherence.

One could calculate the Q value which would indicate the possibility of a non-classical nature of the photon signals. Q is calculated in the following manner:

$Q = [((n^2) - (n)^2) / (n)] - 1,$

wherein (n^2) is the mean of the squares of the counts and (n) is the mean of counts in the distribution. The values of Q nearly equal to –1 occur in normal distribution and indicate a classical photon signal. The value Q = 0 occurs in Poisson distribution and indicates a quantum photon signal in a coherent state. The values Q > 0 and Q < 0 occur, respectively in super and sub Poisson distributions. Both indicate the possibility of a quantum photon signal in squeezed state. The average value of Q was 0.23 before healing; rose to 0.32 during healing, and remained 0.36 at the beginning of the post-healing period; it then decreased to 0.31 in the latter part of the post-healing period.
The photon count distribution analysis implies a change in the quantum character of photon signals as a result of healing activity.

Discussion and Additional study regarding mean photon emission data from the present Dutch study.

The increase in mean photon emission could have been due to some unknown physiologic effects that were not apparent in previous experiments. Therefore, as an initial control, it was decided to make another series of recordings, even more intense. Photon counts from *A. acetabulum* were recorded during regular therapeutic treatments according to his usual clinical approach. Data were derived over 5 days from 4 hours of continuous healing practice each day. Three to four patients were treated per hour.

Under such conditions, mean photon emission also increased throughout the experimental day. In addition, note the following observations: a.) during the usual clinical approach setting photon emission steadily increased until a maximum was reached, b.) during the experimental setting, including the non-healing periods, a slight decrease of photon emission occurred from *A. acetabulum* during the post-healing period following the last subjects, and c.) during the last experimental day, the healer reported an overall lower motivation and identification with the experiment accompanied by an increase in photon emission during the day less than previous experimental days.

It is hypothesized that the mean photon emission increased due to an activation of a "conditioned space". Such did not occur when the healer-healee encounter took place in a room different from daily clinical practice even if in the same building.
An increase in mean photon emission during a possible "conditioning of space" was also previously illustrated in three group-healing experiments that were studied by the authors utilizing the biosensor, *A. acetabulum*. One member of a group, as a healer led the group of 8 experienced meditation practitioners in a group healing-meditation. Participants subjectively experienced the creation of a healing space which felt continued even after the mediation. The group meditation produced increased intensity of photon emission of the biosensor and with a lower tendency to return to initial values between healing sessions. Such data can be considered circumstantial evidence for the hypothesis that a conditioned healing space can be created by intense group meditation and also by long-term daily healing work always done in the same office space. Careful experimentation will be necessary to test this hypothesis.

The present study continued – German approach

The German healers participated in the second part of the present study. They did experimental healing in a neutral setting consisting of a different treatment from their usual practice in a building 40 km from their own office building. The photon emission measuring equipment and the biosensor, *A. acetabulum* cells were situated in the room where the experimental healing sessions took place. The data from this study were derived from 6 days of recording including 25 sessions in which the two healers participated. Subjects were not aware of the recordings on the photon emission of *A. acetabulum* in the room. Protocol for measurements was essentially the same as that of the Dutch healer: a 20 min healing period followed by two consecutive 20 min "post-healing" periods. Background measurements were documented to determine the electronic noise of the equipment prior to starting any experimental healing session. Registrations of photon counts began with overnight dark-adapted cells: three times 20 min prior to the start of the first healing. Then, with healer and healee both in the therapy room, began the second series of three 20 min recordings: during the first 20 min period, the healing was completed; the next two periods of 20 min were without healing. After the first healee, the next healee was treated according the same schedule, etc.

Mean photon emission data from the present German study

Data demonstrated that photon emission during the several experimental days did not change significantly and was approximately 30 cps. Mean values were 30.0 ± 6.2 cps during the pre-healing phase, 31.7 ± 6.5 cps during the healing, and 31.5 ± 6.6 cps and 30.3 ± 6.4 cps for both the first and second post-healing periods.

Photon count distribution data from the present German study:

Neither skewness nor kurtosis values were zero, implying both skewed distribution of data points and ruling out normal distribution of data points. Variance was systematically higher than the mean, also suggesting that photon count distributions were not normal.

The data were, therefore, further evaluated by the more informative parameter, Q, which is an indicator of the non-classical nature of a photon signal. The average value of Q was 0.32 before healing; it rose to 0.35 and then 0.48 both during healing and in the first post-healing period; then it decreased to 0.38 in the second part of the post-healing period. These data, again, imply a change in the quantum character of the photon signals as a result of the healing. The shift is qualitatively similar to the shift observed during the experimental healing sessions with the Dutch healer.

Summary of the entire study

In the present study, utilizing different settings, photon count distribution analysis from photon emissions of *A. acetabulum* demonstrated remarkable alterations during the ritual of the healer-healee encounters resulting in increased Q values. One way ANOVA on treatment stages (independent variable) and photon count distribution parameter Q (dependent variable) demonstrated highly significant effects ($p=0.000000$). A post-hoc (Fischer LSD) test demonstrates that the increase in Q is already almost significant during treatment, and it became significant ($p=0.01$) during the first post-healing period. The data confirm the initial 2003 study suggesting a change in the quantum character of photon signals as a result of healing.

Although mean emission intensity did not increase significantly during the healing encounter when experimentation is carried out outside the healer's office, mean photon intensities do increase when experimentation takes place inside a healer's own working space. Such data

suggest that regular healer-healee encounters could create a "conditioned space" where the effects of encounters are more intense. Careful testing, however, will be necessary to test this latter hypothesis.

5. Outcomes and work in progress

Meetings / conferences

- Eduard P.A. Van Wijk – Licht uitstraling van de mens. Annual Meeting of Parapsychology (Utrecht, The Netherland). April 16, 2005.
- Roeland Van Wijk, Eduard P.A. Van Wijk – Homeopathy, biophoton field and healing. 60th Congress of the Liga Medicorum Homeopathica Internationalis (Berlin, Germany) May 4-7, 2005.
- Eduard P.A. Van Wijk – Influence of physiological and psychological states on photon emission of human being. Summerschool 2005 on Biophotonics and applications of biophotons (Neuss, Germany). August 14 –19, 2005.

Published and submitted manuscripts

- Roeland Van Wijk, Rajendra P. Bajpai, Eduard P.A. Van Wijk, Photo count distribution of photons emitted from three sites of a human body. Photochemistry and Photobiology B: Biology (2006) 84, 46-55.
- Roeland Van Wijk, Rajendra P. Bajpai, Eduard P.A. Van Wijk, Photo count statistics analysis of biophotons from hands of practitioners of meditation and control subjects. Manuscript submitted.

Manuscripts in preparation

- Eduard P. A. Van Wijk, Roeland Van Wijk, Studies on photon emission characteristics of healers. Manuscript in preparation.
- Eduard Van Wijk, Rajendra P. Bajpai, Roeland Van Wijk, Photon count distributions of quasi-stable *Acetabularia acetabulum* in healing and non-healing environment. Manuscript in preparation.