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A Preliminary Indication of Controllable Biological Quantum Nonlocality?

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A new analysis of a 3 decades old experiment, concerning brain wave correlations between the brains of identical twins, taken in the light of the nonlocality theories of John Bell, the successful experiment of Aspect regarding same, and subsequent corroborating work concerning existence of a transferred potential between human brains, leads one to the conclusion that controllable biological quantum nonlocality may have been accidentally and unknowingly achieved at that time. Experiments to attempt to both replicate and expand upon this corroborating evidence, are presently being performed at two universities in the United States.

A very short paper published over 3 decades ago, upon closer analysis based on developments which have taken place in the intervening period, leads one to a rather interesting if not astounding conclusion [1]. Namely, that controllable biological quantum nonlocality, implying superluminal communication is not only possible but, may have already been accidentally and unknowingly discovered on the biological level, albeit in a very

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rudimentary manner and, in contradiction of both quantum mechanics and special relativity. Ironically this paper was written around the same time as Bell's landmark paper which addressed the problem of nonlocality [2]. This question of nonlocality had first been raised by Einstein, Podolsky and Rosen (EPR) who claimed that if quantum mechanics were a complete model of reality, then nonlocal interactions between particles had to exist. [3]. Since they felt that nonlocality was impossible, quantum mechanics either had to be wrong or at least incomplete. An experiment was later performed that showed that nonlocal influences do exist once these particles interact and, that one can test the explicit quantum nature of systems via the use of EPR nonlocality [4]. And, as per Feynman, since this nonlocality cannot be duplicated by a classical system, this enables it to be used to test the quantum nature of systems [5]. The experiments performed and the results obtained were as follows.

The researchers had noted that the nonscientific literature was replete with instances in which illness or trauma in one of a pair of identical twins affects the other, even when the twins are far apart. They decided to alter the brain wave pattern of one twin and see if this would produce a similar response in the brain waves of the other twin. In this instance the alpha rhythm was utilized, which are brain waves of from 8-13 Hz, and approximately 50 microvolts. The alpha rhythm can be elicited when the subject closes his eyes, when he stares at a uniform unpatterned background or, when he sits in the dark with his eyes open. Since eye closure in a lighted room elicits immediate and reproducible results, it was chosen as the method for their investigation.

Identical twins were seated in separate lighted rooms 6 meters apart. They were both hooked up to separate electroencephalogram (EEG) machines, to measure their brain waves, with electrodes inserted in the occipital region. The subjects were both asked initially

to leave their eyes open, until one was instructed to do otherwise. It was noted that in 2 out of 15 pairs of twins tested, eye closure in one twin not only produced an immediate alpha rhythm in his brain but, also in the brain of the other twin, even though he had kept his eyes open thoughout this entire procedure while in a lighted room. Under these conditions it is highly unusual to see an alpha rhythm in the second twin, as one normally expects to see 14-25 Hz brain waves at around 20 microvolts.

These tests were repeated on several different occasions with the same results. In no instances did this induction occur between unrelated subjects. Granted, a success rate of only 13% may not be that significant and, one should not prematurely read too much into these results. However, that also represents 13% more than anyone could have ever expected to be achieved. Part of the reason for this low % of success may have been due to not prescreening the twins in order to get only those with the highest degree of phase coherence in their brain waves. Part of it they felt was a result of patent anxiety and apprehension about the testing procedures.

Even though these experiments were not carried out in a Faraday chamber, one could interpret these results as favoring biological quantum nonlocality, since they were achieved without conventional classical elicitation of an alpha rhythm in one twin, while it was being evoked under standard conditions in the other twin who had closed his eyes.

Experiments were undertaken 30 years later by Grinberg-Zylberbaum et al, under much more stringent conditions, to determine if E-P-R-style nonlocal correlations might occur at complex levels such as the human brain [6-10]. These experiments (especially those covered by Refs. 9 and 10), reflected favorably upon the prior work, and have tested the possibility of the existence of a transference of specific signals between two brains, again in a nonclassical fashion.

Several unrelated pairs of subjects were allowed to meditate (interact) together, until their brains' EEGs displayed phase coherence to each other. This is a well known signature of quantum nonlocality, and refers to the fact that oscillations or frequencies at different places beat time with each other. Approximately 25% of the subjects attained this quantum correlation or direct communication.

The subjects were put into 2 soundproof electromagnetically isolated Faraday chambers 14.5 meters apart, each hooked up to their own EEG machine. One of the subjects was stimulated by a series of unpatterned flashes of light from a photostimulator, which resulted in an evoked potential being elicited. An evoked potential is a normal electrophysiological brain response produced by a sensory stimulus [11]. When the stimulated subjects showed a distinct evoked potential, potentials of a similar morphology were found in 25% of the unstimulated subjects, which they called *transferred potentials.* Blind control experiments which were run, revealed no *transferred potentials* in subjects who had not meditated together.

With the use of unpatterned photostimulation, the experimenters were able to achieve a much more distinct and replicable evoked potential as compared to merely closing and opening one's eyes. However, both techniques revealed the same striking similarity regarding the brain waves being in phase coherence although, in neither case, was there any transference of conscious subjective experience between the subjects involved.

It then occured to the present author, that numerous studies performed over a period of 6 decades, had revealed that a majority of identical twins, even after different upbringing, have very similar EEGs and mental habits, whether within or outside the normal range [12-20]. And, that when the brain waves of these types of twins was analysed, they were found to be almost indistinguishable from one another during the solving of a simple sum. Further analysis of the

literature reveals recognizable similarities of EEG tracings between fraternal twins, mother/son, father/daughter, etc. related combinations [21]. It was then felt by the author, that these people could be considered as already being in natural phase coherence or entangled. They could then be used in experiments in lieu of people who had meditated together, thereby making the experimental process that much simpler, easier to replicate and subject to much less controversy [22]. In addition, unrelated subjects, who may possess varying degrees of empathy, may also be utilized.

It may be of interest to note here, that a series of experiments have just recently commenced at Bastyr University and the University of Washington in the United States, in an attempt to replicate the original Grinberg-Zylberbaum studies previously mentioned and, to investigate the possibility that conscious states can exert biological effects at a distance. This research is being conducted under a 2 year grant from the National Institutes of Health.

You will recall that the title of this paper dealt with controllable biological quantum nonlocality. How does one arrive at the "controllable aspect"? It would be the equivalent of how the computer works with binary digits, 1 = ON and 0 = OFF. The mere closure of one twin's eyes and the immediate appearance of the distinctive alpha rhythm, in both his brain and that of his sibling, would denote ON, while opening them and returning to the previous rhythm, would denote OFF. One can then achieve a binary code effect by merely opening and closing his eyes in a prearranged fashion. The interpretation of this prearranged code on the receiving end can be made by the other twin by merely looking at his own brain wave tracings and seeing the alpha rhythm appear. Granted this would be extremely rudimentary but, it would at least represent a start. A nearby observer could be positioned so as to also be able to look at the subject's EEG, and would also come up with the same conclusion.

The unusual feature in this arrangement is that the ON would represent a different frequency from the OFF, and so OFF merely represents a different but, constant brain wave situation rather than a computer version of truly being OFF i.e., the current stops flowing. A similar approach to this was also mentioned in Ref. 10, where photostimulation was utilized. It was proposed that if a flickering light signal were used (flashes of light from the photostimulator) the normal visual evoked potential (VEP) often carries a frequency signature. To the extent that this frequency signature is also retained in the transferred potential, it may be possible to send a message, at least in principle, using a Morse code. It has been suggested that the brain obeys a nonlinear Schroedinger equation in order to include self-reference [23]. It is possible for systems obeying nonlinear Schroedinger equations, that message transfer via EPR correlation is permissible [24]. In order to improve the chances for such an event to take place, it is recommended that instead of subjecting any of these individuals to just unpatterned photostimulation, we make use of what is known as checkerboard patterns or patterned stimuli. This enables one to achieve more discernible and replicable VEPs and *transferred potentials* [25]. Unpatterned stimuli, although important for the study of photoreceptors and electroretinography, have a limited role in the study of VEPs. Cortical neurons practically ignore uniform illumination of the retina, while they are selectively sensitive to specific shapes and forms. Patterned or full field stimulation evokes a large and reproducible VEP, which will be essential in any studies of this nature.

In conclusion and, in retrospect, this may have represented not only the first recorded instance of biological quantum nonlocality but, of controllable biological quantum nonlocal communication between two individuals. The messages sent, without their realizing it were: ON = “I have closed my eyes” and OFF = “I have opened my eyes”.

In addition, if the other twin had been allowed to also close and open his eyes, two way quantum superluminal communication would have been achieved. This would have been observable by not only the identical twins but, by any adjacent observer of the EEG tracings.

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