UNCONSCIOUS INSTRUMENTAL TELEPATHY - IT EXISTS, AND IT CAN BE USED!

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Two years ago an educational article titled MIND TO MIND INTERACTION AT A DISTANCE: PHASE TWO concluded with the following:
<<This experiment has demonstrated the interesting effect of the unconscious perception of a remote stimulus given to a “Sender”, located away from the “Receiver” and in a state of relaxation and sensory isolation. In classical ‘mind reading’ experiments, which use photos or videos, remote perception is tested by asking the perceiver to guess or describe something about the images or sensations received. This implies that a possible PSI perception must enter one’s conscious mind to be perceived and then reported. Our experiment demonstrated that NOT ONLY DOES DISTANT MENTAL COMMUNICATION EXIST, IT CAN ALSO BE TOTALLY UNCONSCIOUS. In other words, it does not necessarily cross the threshold into consciousness, although it CAN BE DETECTED INSTRUMENTALLY using a sophisticated method. … We will continue committing ourselves to constant - and hopefully significant – improvements in our experimental methods.>>
It took two years of tireless hard work, but we fulfilled our promise.

The research area this current article refers to can properly be defined as “Unconscious Instrumental Telepathy”, because it is based on a distant mental communication that is below the conscious threshold and can only be seen instrumentally. It involves two physically isolated subjects, a ‘Sender’ and a ‘Receiver’, which are used only as a *semi-passive* means of communication; in fact, all they need to do is express the intention of establishing a mental connection, while the communication itself occurs instrumentally without either of them being aware of it.

We debuted in this research area in May 2014 with the article BRAIN-TO-BRAIN (MIND-TO-MIND) INTERACTION AT DISTANCE: A PILOT STUDY (http://dx.doi.org/10.2139/ssrn.2423852), followed by BRAIN-TO-BRAIN (MIND-TO-MIND) INTERACTION AT DISTANCE: A CONFIRMATORY STUDY (https://f1000research.com/articles/3-182/v3) and then by EEG CORRELATES OF SOCIAL INTERACTION AT DISTANCE (https://f1000research.com/articles/4-457/v5) as well as an explanation of the method used in A NEW METHOD TO DETECT EVENT-RELATED POTENTIALS BASED ON PEARSON'S CORRELATION (http://bsb.eurasipjournals.springeropen.com/articles/10.1186/s13637-016-0043-z) and finally by the recent article (submitted for publication) **BRAIN-TO-BRAIN INTERACTION AT A DISTANCE: A GLOBAL OR DIFFERENTIAL RELATIONSHIP? V2**, authored by W. Giroldini, L. Pederzoli, M. Bilucaglia, E. Prati e P. Tressoldi. (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2991977).

In this our latest work we wanted to tackle a basic problem: can Unconscious Instrumental Telepathy be used to transmit codified signals?

Five adults – two women and three men – took part in this study, chosen for their experience in mind control techniques (mainly meditation) and their mutual friendships. We consider these pre-requisites essential for an adequate “mental and emotional connection” between the pairs. Each participant took turns in being both the stimulated partner (SP or Sender) and the non-stimulated partner (NSP or Receiver) with each of the others, making a total of 20 pair combinations. The members of the subject pairs were placed in separate light- and soundproof rooms, but this time the Sender (SP) was subjected to different stimulations with respect to previous occasions.

In the previous experiment – published in the abovementioned two articles titled EEG CORRELATES OF SOCIAL INTERACTION AT DISTANCE and A NEW METHOD TO DETECT EVENT-RELATED POTENTIALS BASED ON PEARSON'S CORRELATION - which was devised to confirm the existence of Unconscious Instrumental Telepathy, we used 128 equal stimuli for each session, composed of a 500 Hz sinusoidal sound wave applied at high volume through headphones and, simultaneously, a red light from an array of 16 LEDs. The light was easily visible through the Sender's eyelids, which were kept closed to minimize EEG disturbances caused by blinking. In each session the EEG output of each member of the pair was recorded via wireless Emotiv® EEG Neuroheadsets.

In order to accelerate the creation of a stable low resistance contact between the skin and electrodes, and to improve the signal to noise ratio of EEG signals, this time each member of the pair used a professional 20-point contact headset from Bionen of Florence (Italy), connected (via a multi-contact connector) to the electronic systems removed from a wireless Emotiv® EEG Neuroheadset, with a sample frequency of 128 samples/second. Through a switching circuit it was possible to connect each of the 14 Emotiv channels to any of the 20 contacts of the Bionen headset however we wished. Based on the standard international locations 10-20, the locations Fp1, F3, C3, P3, O1, F7, T5, Fp2, F4, C4, P4, O2, F8, T6 were used (see Figures 1 and 2), plus two reference electrodes on the earlobes.

Figure 1: EEG headset and modified Emotiv Epoc™.

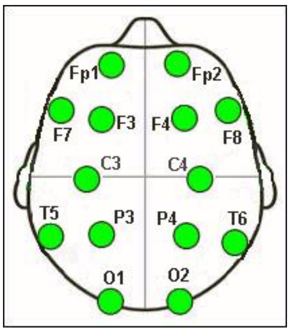

Figure 2: Placement of the EEG's 14 electrodes.

The Emotiv. Epoc™ is equipped with a built-in fifth order low-pass digital filter (bandwidth from 0.2 to 45 Hz), as well as two notch filters at 50 and 60 Hz respectively as protection against noise produced by the local electricity network.

Signal acquisition by the two EEG devices was controlled by a specially designed software program with an acquisition synchronicity precision better than 1/128 second and which ensured total electrical independence and separation between the two devices. The experiment was conducted at the EvanLab laboratory in Florence (Italy), which is comprised of two separate sound- and lightproof rooms with no electromagnetic disturbances (Figure 3).

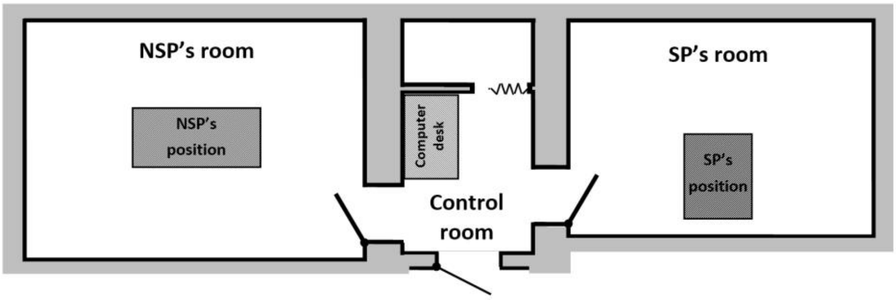

Figure 3: floor plan of EvanLab laboratory in Florence (Italy).

Hoping to obtain a more favourable signal to noise ratio from the Receiver's EEG signals, for this experiment we decided to use a method of stimulus administration with a modulation frequency from 4 to 20 Hz, called "Steady-State".

Since a long series of preliminary tests carried out in Milan and Florence produced excellent quality EEG signals, and the data processing method (GW6) developed by W. Giroldini for the previous experiment had undergone further fine tuning (and was being adapted to MatLab by M. Bilucaglia), in this experiment we chose to implement three blocks of 32 simultaneous stimulations lasting 1 second, at the same time on-off modulated at 10 Hz, 12 Hz, and 14 Hz respectively, with a constant inter-stimulus interval of 4 seconds. The three blocks were given randomly but without repetition of the same frequency. The interval between the three blocks was randomly varied at between 40 and 90 seconds. The audio modulation was performed on a 900 Hz sinusoidal carrier. The visual stimulus was provided by an array of 16 red LEDs positioned about 30 cm from the SP's closed eyes, while the sound was sent at high volume directly to the ears via earphones.

Keeping in mind the results of preliminary tests, which were carried out with Steady State modulation frequencies of 15 Hz and 18 Hz, we decided to use, for our definitive surveys, frequencies substantially smaller than 18 Hz because the connection between the SP and the NSP at this frequency proved to be significantly weaker. Consequently, in order to have a sufficiently high number of modulation cycles (at least 8) during the second of stimulation, we opted for a range of 8 Hz to 16 Hz inclusive for the possible modulating frequencies.

The choice of only 32 simultaneous visual-auditory stimulations was risky because the signal to noise ratio could have been too low to allow recognition of the signals of interest to us, but it was essential for reducing communication times. Furthermore the 10 Hz frequency fell in the Alpha range, which is usually characterized by particularly intense EEG signals, and risked being undetectable, but we thought it worth trying anyway, counting on a reduction in the Receiver's closed-eye Alpha waves amplitude and the fact that, during the Sender's stimulation, we usually observe a strong reduction in the spontaneous Alpha frequency (the well-known Alpha-block effect). The 12 and 14 Hz frequencies seemed interesting and able to by themselves guarantee – if detectable – the possibility of transmitting a codified sequence of two logical states (equatable to 1 and 0), that is, an articulate and recognizable message. With three available frequencies we expected to recognize, at the end, at least two with sufficient certainty.

Once data collection for the experiment's 20 pairs was completed, the recorded EEG signals were first pre-processed in accordance with the GW6 method, then filtered in a narrow band (1 Hz) and finally a multiple correlation measurement between EEG channels was obtained, also according to the GW6 method. This procedure was applied to each stimulation period taking into examination 4 seconds of data (1.5 secs pre-stimulus, 1 sec stimulus, and 1.5 secs post-stimulus).

While in the Senders the correlation between EEG channels was highest exactly at the stimulation frequencies (10 Hz, 12 Hz, and 14 Hz), in the Receivers, unexpectedly, the maximum was half a hertz below the stimulation frequency (9.5 Hz, 11.5 Hz, and 13.5 Hz respectively). The same analysis program was applied to all of them, therefore the software cannot be responsible for the results. We are at the moment unable to explain this phenomenon. Final results are shown in Figure 4.

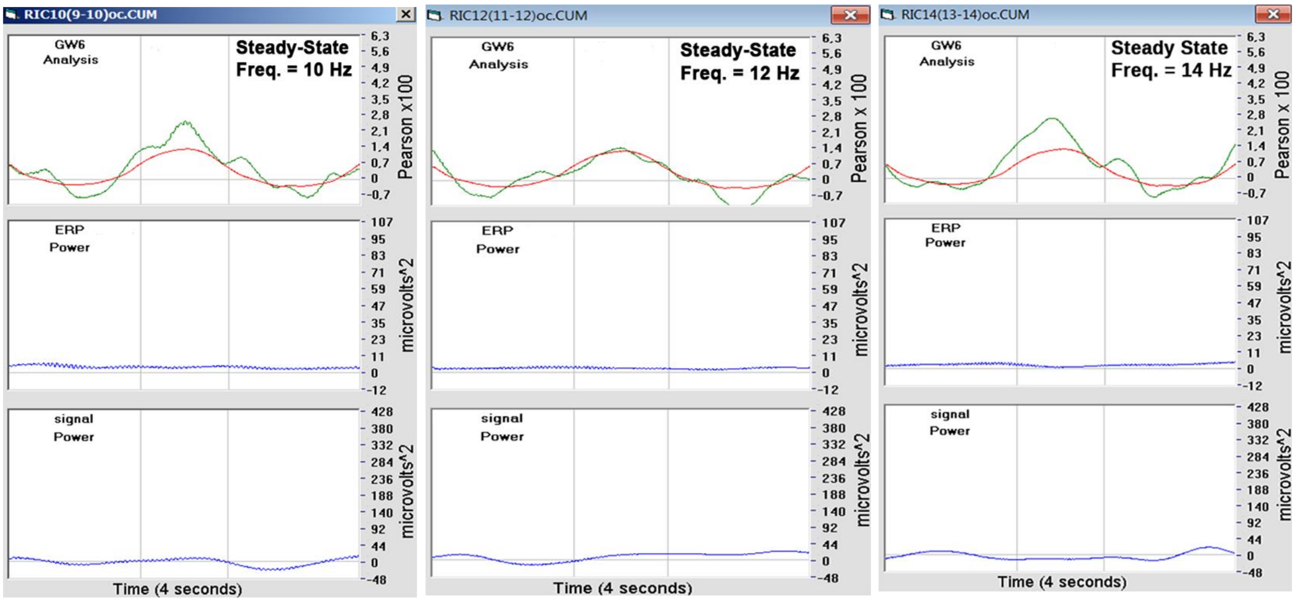

Figure 4: Average of 32 stimuli given to 20 pairs of participants, with filtering at 9.5 Hz (left), at 11.5 Hz (centre), and at 13.5 Hz (right).

As expected, the curves denoted "ERP Power" and "Signal power" in the Figure 4 graphs are totally insignificant, and in fact are results obtained with traditional analysis methods: only the GW6 method gives useful and reproducible results. From results obtained by this method we noticed an increase in correlation between the Receiver's EEG channels corresponding to the Steady-State stimulation frequency applied to the Sender. A clue is provided by the green curves in Figure 4, the maximum value of which, to be useful, must be greater than that of the reference red curves (random expectation). This seemed to occur in a significant way in connection to the Steady State stimulation frequencies of 10 Hz and 14 Hz, whereas for 12 Hz the excess was of little significance. The 10 Hz frequency, which was inserted into the experiment purely out of curiosity and with many doubts, ended up giving good results, as often happens in research without precedents for preliminary indications.

Nonetheless the graphs in Figure 4 refer to the average of all 32 stimulations applied at one frequency (either 10, 12, or 14 Hz) to all 20 participant pairs. Initial results guaranteed the existence of the correlation we were looking for, but a single pair of subjects could have either greatly exceeded the average or not reached it at all. It was therefore necessary to investigate further.

It was necessary to apply a complicated statistical procedure to each Receiver, with a calculation based on 'fake' stimulations repeated 10,000 times for each of the three stimulation frequencies used, in order to correctly estimate the precision of results. Eventually, after another statistical procedure (Montecarlo), Table 1 was produced.

Table 1: Probability of the observed correlation compared to the random correlation.

Frequency	Observed max correlation	'Fake' max correlation	Probability
10 Hz	1.98	1.37	.20
12 Hz	1.85	1.39	.29
14 Hz	2.31	1.45	.084
Average	1.97	1.40	.043

These results determine that the existence of a global relationship between the SP and NSP EEG activities is highly probable, associated with a less probable response relative to the 14 Hz stimulation.

To be extra sure, another long statistical procedure was applied, independent of the previous one. The results are presented in Table 2.

Table 2: Descriptive statistics and Bayes Factor H1/H0 related to the maximum value of NSP correlation estimated with the GW6 algorithm, compared with the random values estimated with the bootstrap procedure

Frequency	Observed max correlation mean (SD)	Random max correlation	$BF_{H1/H0}$
10 Hz	4.09 (2.47)	1.64	210
12 Hz	3.26 (1.94)	1.63	55
14 Hz	3.77 (3.03)	1.69	14
Average	2.7 (.96)	1.51	2036

Overall, the two statistical procedures confirm that the existence of a useful global relationship between the EEG activities of the stimulated and non-stimulated partners is indeed highly probable, at least in two of the three experimental frequencies.

It is noteworthy that a significant correlation between the response intensity induced in the Receiver and that observed in the Sender did not emerge; this suggests that it is a non-transmissible physical characteristic between isolated partners. It appears however that the fact of a stimulus's arrival and its characteristics can be transmitted, but not the strength of the reaction of the stimulated partner to this stimulus.

CONCLUSIONS

Although the GW6 method is able to reveal a high probability of the existence of an instrumentally detectable distant mental correlation between Sender and Receiver, it is limited in that it cannot specify the received signal's physical characteristics.

Another limitation is the need for 32 consecutive identical stimuli given to the Sender so that a significant correlation can be instrumentally detected in the Receiver. In practice, if each group of 32 stimuli is associated with a bit, then the transmission rate will be around one bit every 160 seconds – not exactly warp speed, but it's a start!

Yet a third limitation is the numerous calculations required, which are time-consuming on a normal computer, but which could be carried out faster using a specialized calculating device.

On the positive side, at least two separate Steady State frequency stimulations can be used, thus enabling the messages to be codified in binary code.

Another merit is that the usable frequencies can be more than two, therefore increasing the number of bits that can be transmitted in a single stimulus.

A third merit is that all raw data, including the processing programs used, are publicly available on http://tiny.cc/owzyly , and (in the MatLab version) from:
http://it.mathworks.com/matlabcentral/fileexchange/63973-gw6-grand-average-erp-algorithm

Finally, it is important to note that this experiment could represent something similar to Marconi's first radio transmission, only this time without the radio. The article **BRAIN-TO-BRAIN INTERACTION AT A DISTANCE: A GLOBAL OR DIFFERENTIAL RELATIONSHIP? V2** may in such a case represent the shot that Marconi's collaborator fired from his rifle to mark the momentous transmission.

Let's hope we don't have to wait another two years for the next step...