Neural Correlation of Faradarmani Consciousness Field Mind Mediation: A Comparative Functional Connectivity and Graph analysis

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Abstract

The study of the brain networks using analysis of electroencephalography (*EEG*) data based on statistical dependencies (functional connectivity) and mathematical graph theory concepts is common in neuroscience and cognitive sciences for examinations of patient and healthy individuals. The Consciousness Fields according to Taheri theory and applications in the optimization of system under study have been investigated in various studies. In this study, we examine the results of working with Faradarmani Consciousness Field (FCF) in the brain of Faradarmangars. Faradarmangars are one of the necessary components in mind mediation of the function of Faradarmani Consciousness Fields according to Taheri. For this purpose, the functional and effective connectivity and the corresponding brain graphs of EEG from the brain of Faradarmangars is compared with that of non Faradarmangar groups during FCF connection. According to the results of the present study, the brain of the Faradarmangars shows significant decreased activity in delta (BA8), beta2 (BA4/6/8/9/10/11/32/44/47) and beta3 (in 34 of 52 BA) frequency bands mainly in frontal lobe and after that in parietal and temporal lobes in the comparison with the non Faradarmangars. Moreover, the functional and effective connectivity analysis in the frontal network shows dominant multiple decreased connectivity mainly in the case of beta3 frequency band in all parts of the frontal network. On the other hand, the graph theory analysis of the Faradarmangar brain shows an increase in the activity of the O2-T5-F4-F3-FP2-F8 areas and significant decrease in the characteristic path length and increases in global efficiency, clustering coefficient and transitivity. In conclusion, the unique higher graph function efficiency and the reduction in the brain activity and connectivity during the Faradarmani Consciousness Field mind mediation, shown the passive and detector like function of the human brain in this task.

Keywords: brain graph; EEG; Faradarmani Consciousness Field; functional connectivity

1. Introduction

Understanding the mechanisms of consciousness has been one of the most challenging topic of study in the fields of neuroscience and cognitive science in the last century. Regardless of whether the source of consciousness is viewed to be from within the brain or as a result of events outside the brain (Chalmer's hard problem of consciousness; Chalmers 1995), the study of brain function during various activities or in different health and disease conditions is possible through the use of different methods. Various methods such as fMRI (functional magnetite resonance imaging), PET (positron emission tomography), EEG (electroencephalography), MEG (magnetoencephalography), TMS (trans-cranial magnetic stimulation) or a combination of them can reveal dimensions of brain function (Hecht and Stout 2015), each with different strengths and weaknesses.

Among these methods, EEG has a higher temporal resolution than PET or fMRI, and resultant data can be time-locked to stimuli and responses on a millisecond scale. In this method voltage fluctuations can be detected at the scalp which are caused by the aggregate electrical activity of large numbers of neurons closely beneath the scalp. Moreover, oscillations filtered into different frequency bands, and the relative power of the bands can be compared for various stimuli (Hecht and Stout 2015). In this way, the results of the effects of various stimuli, also called tasks, can be measured with high accuracy and compared with the baseline state (rest or without stimulus).

Various analyses are performed on EEG data to obtain more comprehensive information about each activity and related brain processes. Measurements are based on the criterion that human brain is organized along two fundamental principles, functional segregation and functional integration (Friston 2002). In functional segregation principle, the cerebral cortex, as a non-homogeneous entity can be subdivided into regionally distinct modules in structure (brain

anatomy) and function (processing of specific stimuli). On the other hand, functional integration principle emphasizes on the concept that no brain region is by itself sufficient to perform a particular cognitive process and a dynamic interplay and exchange of information between different regions of brain is necessary. This principle is used in functional connectivity studies that explore the temporal coincidence of spatially distant neurophysiological events (Friston 1994) in specific stimuli with the aim of finding the related brain network.

A most recent analysis in brain connectivity criteria that explores the organization of brain network pattern is graph theory. In graph-based analysis of the EEG signals, the stationary behavior of EEG signals is obtained and explained which cannot be achieved by other linear analysis methods (Ismail and Karwowski 2020). In this regard, use of graph theory represents distinctive characteristics of healthy and diseased patients such that it provides remarkable evidence about pathophysiological processes underlying related brain disconnection (Vecchio et al 2017).

In a novel approach presented by Mohammad Ali Taheri, consciousness is one of the three elements of the universe that is neither matter, nor energy, but that has direct effect on both matter and energy through specific and distinct non-material, non-energetic fields called the Consciousness Fields (CFs) which are the subcategories of a richly networked universal internet called the Cosmic Consciousness Network (CCN). The mentioned CFs are one of the achievements of using the CCN, in which people as a user receive troubleshooting and repair programs, by "Etesal" (virtual connecting) to the CCN followed by correction and treatment.

The CFs based on its position of influence and the special type of function, has several types, one of which is the Faradarmani that is applicable to all living (and non-living) creature including plants, animals, microorganisms, molecules etc. Faradarmani, establishes a

consciousness bond between the whole consciousness and the parts where all constituents will be scanned and corrected.

The applied CFs according to Taheri, is mediated by Faradarmangar's mind (a person who makes a virtual connection). In this type of affection, mind-matter interaction occurred through connecting to the CCN by a Faradarmangar. In other words, according to the theory of the consciousness field, the human mind, has an intermediary role in this affection and the main achievement obtained as a result of the operation of the CFs. However, in cognitive science and neuroscience, mind is considered with an active role which has an interaction with the world of matter and energy.

 By defining consciousness as neither matter nor energy we cannot associate a quantity to it. Since Consciousness isn't measurable its existing can only be known through experience. Although, the mechanism of this linkage is not yet definable by science, its consequences can be measured and studied scientifically (Taheri 2013).

Accordingly, Sciencefact has been defined by Mohammad Ali Taheri in 2020. Sciencefact discovers evidence of influence on the world of matter and energy through the consciousness fields (CFs) but conventional science studies matter and energy. The common point between science and Sciencefact is that both of them can be experienced at the level of matter and energy through reproducible laboratory experiments. On the other hand, investigation, usage and application of consciousness in Sciencefact distinguishes it from conventional science. In fact, the world of science is seen as a tool for the emergence of Sciencefact evidence

According to theories of the FCF, the human brain, in the role of a powerful detector, can manifest the effects of such connection (Taheri 2014). The study of electrical behavior of

Faradarmangar's brains during Faradarmani connection was performed in a previous study (Taheri et al 2020[a]).

In this study, we aim to investigate the differences in the Faradarmangars' brain in comparison with other persons under the FCF connection. For this, we examine the electrical behavior of the Faradarmangars brain in comparison with non Faradarmangars brain. The Faradarmangars' brain EEG data was analyzed based on the functional effective connectivity and graph theory to demonstrate distinctive features of the Faradarmangars brain network during the FCF function.

2. Methods

This study is designed to investigate and compare the effects of FCF on EEG features as a biomarker of brain function in two different groups. We recruited 45 Faradarmangar (33 women and 12 men, in the age range of 20-50 years, M = 34.5, SD = 7.10) and 15 non-Faradarmangars (11 women and 4 men, in the age range of 20-50 years, M= 34.3, SD= 5.90).

2.1 FCF application

In order to apply FCF, two procedures were implemented. First, in the Faradarmangar group, each person announces the FCF for themselves (here named the *announcement* process) (Figure1). *Announcement* is a process in which Taheri, or any certified announcer can declare and send the information of subjects under study to the Cosmic Consciousness Network by just recalling his/her name, the agreed time, and the location of the subject. The subject under study can be any individual who is willing to experience the Cosmic Consciousness Network.

In the present study, the subject of study is the announcer within the Faradarmangar group. *Faradarmangars* (as announcer in Figure 1) are trained and certified individuals who completed two years of specific training courses taught by Mohammad Ali Taheri or his certified masters. In these courses the announcers learned theoretically and practically how to use the Consciousness Fields in Cosmic Consciousness Network.

EEG activities were recorded by means of a 19-channel device in rest and task conditions. In the rest condition, subject's eyes were closed without performing any tasks. In the task condition within the Faradarmangar group, the subject was asked to start Faradarmani connection with the learned method. On the other hand, in the task condition of non-Fars-therapist group, a Faradarmangar states the connection between the subject under study (a non Faradarmangar person) and the CCN (see Figure 1).
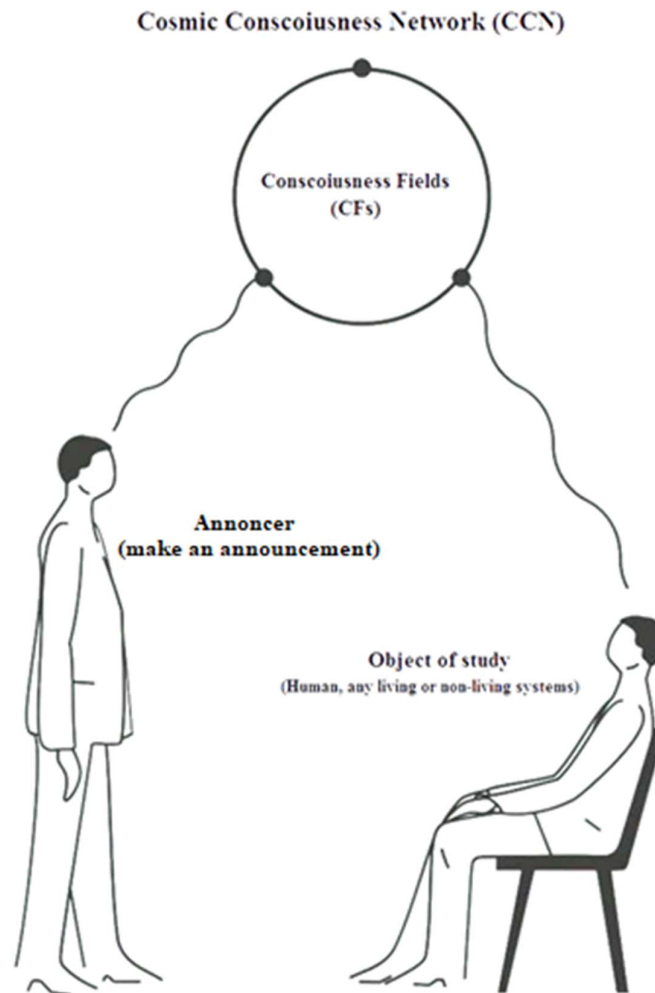
Figure 1. How to announce and communicate between the subject of study and the Cosmic

Consciousness Network (CCN) through CF according to Taheri.

Gaining an announcement: a process that is available to everyone anywhere in the world, 24

hours a day. Apart from the present study, in which the announcers themselves have been the

subject of the study. For any study or experience using the CFs, researchers must register on

the COSMOintel Website (www.cosmointel.com). Once registered, they can go to the

researcher/connection experience section and fill out a form. In order to study or experience at

any given time and place, the researchers or volunteer simply need to introduce the testing

center or person to the guidance center. It should be noted that registration on the website is necessary and requesting or gaining an announcement is free.

2.2 EEG assay

All volunteers in the present study were seated comfortably in a sound and light attenuated room. Approximately 15 minutes or more of closed-eyes task/rest EEG data were collected by means of a 19-channel device (EEGR 19-26, Medicom company, Russia). The data processing and analysis steps are the same as in the [a]Taheri et al (2020) study.

2.3 EEG-source localization analysis

In the present study, eLORETA was applied to estimation of the cortical electrical activity from the surface EEG data (Pascual-Marqui, 2007; Pascual-Marqui et al., 2011). A single nearest voxel was selected for defining the ROIs from seed points. The calculation of intracranial spectral density from purified EEG was carried out by eLORETA software with a resolution of 1 to 80 Hz. eLORETA functional images of spectral density were estimated for eight frequency bands: delta (1.5-4 Hz), theta (4–8 Hz), alpha 1 (8–10 Hz), alpha 2 (10–13 Hz), beta 1 (13–21 Hz), beta 2 (21–30 Hz), beta 3 (31-40 Hz) and gamma (40-80 Hz).

The significant differences between cortical voxels and comparisons were measured by statistical nonparametric mapping (SnPM) via randomization. This determined the critical probability threshold values for the observed t-values with corrections for multiple comparisons across all voxels and all frequencies. This methodological capability exists within the eLORETA software. The methodology is based on fisher's permutation test (Nichols and Holmes, 2002). A total of 5,000 permutations was used to determine the significance for each randomization test. T-level thresholds were corresponding to statistically significant thresholds

($p<0.05$ and $p<0.01$). T-level thresholds and the correspondent p values were provided after applying the correction for multiple comparisons (Canuet et al., 2011; Imperatori et al., 2016).

2.4 Functional and effective connectivity analysis

The whole-brain Brodmann areas (BAs) were provided by eLORETA software based on the Talairach Daemon (http://www.talairach.org/) which selected for calculation of functional and effective connectivity. Lagged phase synchronization (LPS) was used as a measure of nonlinear functional connectivity.

2.5 Graph analysis

The graph analysis was calculated by BRAPH toolbox (Mijalkov et al., 2017). Using this toolbox, brain atlas and cohort of subjects as well as connectivity matrices were defined by selecting weighted undirected graph analysis capabilities. After uploading Talairach functional atlas in BRAPH, EEG data was imported into the software. In this way, the nodes of the network were defined. This toolbox calculates edges representing the relationship between nodes, by means of weighted undirected brain connectivity. The differences between two groups in nodal and global level were analyzed by non-parametric permutation (=1,000) tests.

3. Results

We investigated the differences in the brain behavior of Faradarmangars compared to non Faradarmangar in the present study. Considering that the Faradarmangars mind mediation when communicating with the Consciousness Fields such as FCF, we measured and compared the brain activity of the Faradarmangar and non Faradarmangar group in the task state (Faradarmani connection). For simplification, the Faradarmangar and the non Faradarmangar group's brain activity during the FCF connection task named experimental and control condition, respectively.

3.2.1 Local assay comparison

The frequency bands with decreased activity obtained in comparison of task EEG data of the experimental and control groups and respective brain areas are shown in Table 1.

Table 1. Frequency bands with significant decreased activity in comparison of the experimental and control group task and the related details (p value<0.001, threshold 1.19).

Frequency	X (MN)	Y (MN)	Z (MNI)	BA	Lobe*	Structure*
Delta	-35	20	50	8	Frontal	Middle Frontal Gyrus
	-40	20	50	8	Frontal	Middle Frontal Gyrus
	-35	25	50	8	Frontal	Middle Frontal Gyrus
Beta 2	148 coordinates in BA regions*: 10 (54), 11(62), 32(1), 4(1), 44(1), 47(3),6(7), 8(12), 9(7)				Frontal (147) Parietal (1)	Anterior Cingulate (1) Inferior Frontal Gyrus (8) Medial Frontal Gyrus (20) Middle Frontal Gyrus (45) Orbital Gyrus (6) Precentral Gyrus (11) Rectal Gyrus (4) Superior Frontal Gyrus (53)
Beta 3	2079 coordinates in BA regions*: 10 (134), 11 (228), 13 (135), 18(6), 19(59), 2(5), 20(109), 21(105), 22(89), 24(1), 25 (19), 27(2), 28(19), 32(36), 34(15), 35(13), 36(30), 37(96), 38(126), 39(29), 4(6), 40(165), 41(26), 42(19), 43(12), 44(51), 45(58), 46(43), 47(210), 5(8), 6(43), 7(1), 8(49), 9(132)				Frontal (905) Limbic, A (36) Limbic, I (1) Limbic, P (69) Limbic, P (35) Occipital (64) Parietal (179) Sub-lobar, Ext (10) Sub lobar, Ins (111) Temporal(587)	Fusiform Gyrus (86) Inferior Frontal Gyrus(1) Inferior Temporal Gyrus (75) Insula(1) Middle Temporal Gyrus(147) Sub-Gyral (11) Superior Temporal Gyrus (240) Supramarginal Gyrus (8) Transverse Temporal Gyrus (18)

* Number in the parenthesis demonstrates the frequency of each case in all coordinates.

As can be seen in Table 1, in the experimental group task, there is a significant decrease in activities of delta, beta 2 and beta 3 waves compared to the control group task. The brain regions associated with the reduced activity of these three waves (mentioned in Table 1) are shown in Figure 2.
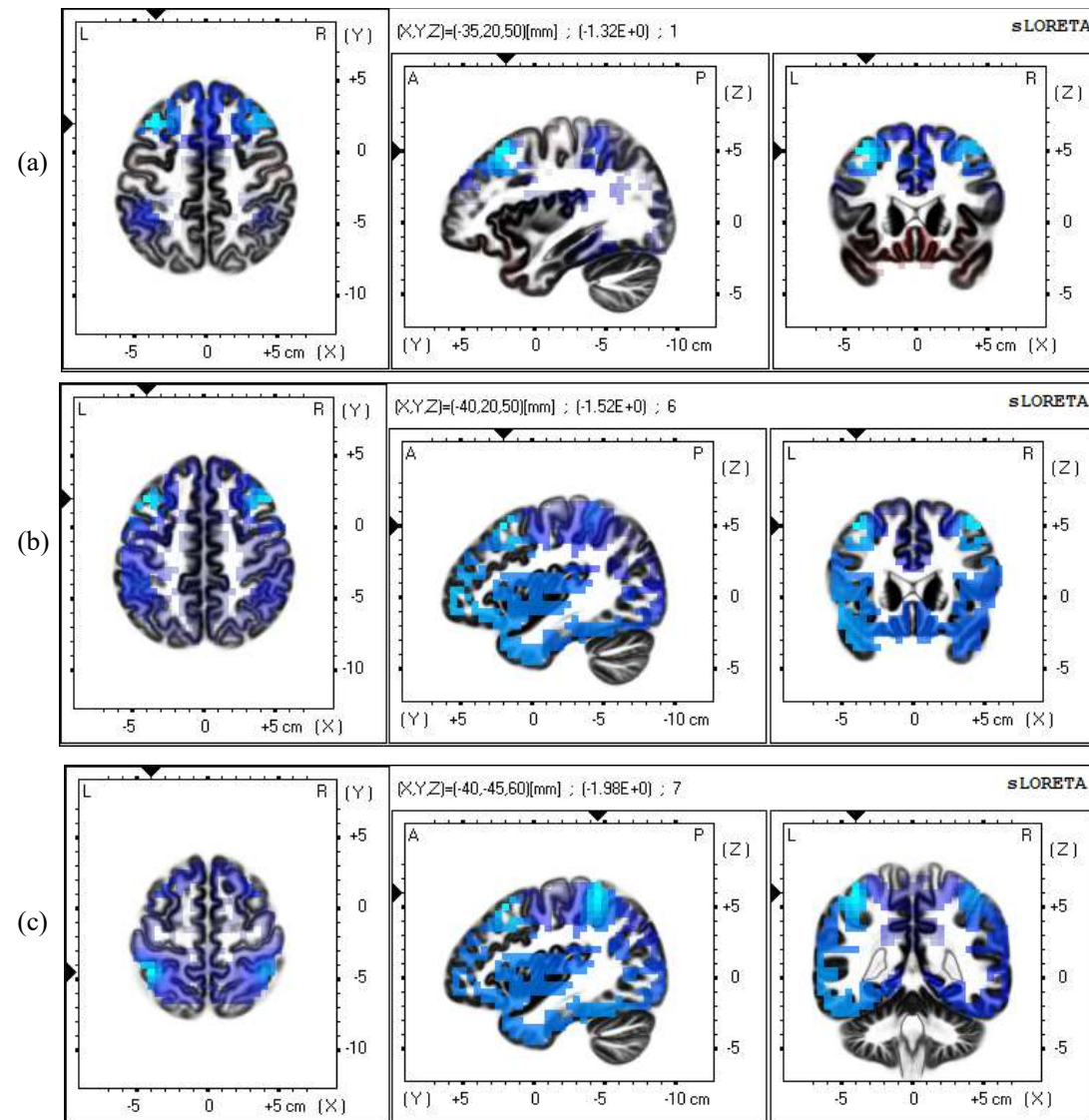

Figure 2. The transverse (left), sagittal (middle) and coronal (right) view of Faratherapists brain regions with decreased activity (in comparison with control) in (a) delta. (b) beta2 and (c) beta3 frequency bands during FCF connection.

3.2.2 Functional connectivity analysis

The temporal coincidence of spatially distant neurophysiological events in the brain of control and experimental groups were measured and compared based on connectivity in the frontal network of the experimental task and control task as shown in Figure 3 and Table 2.
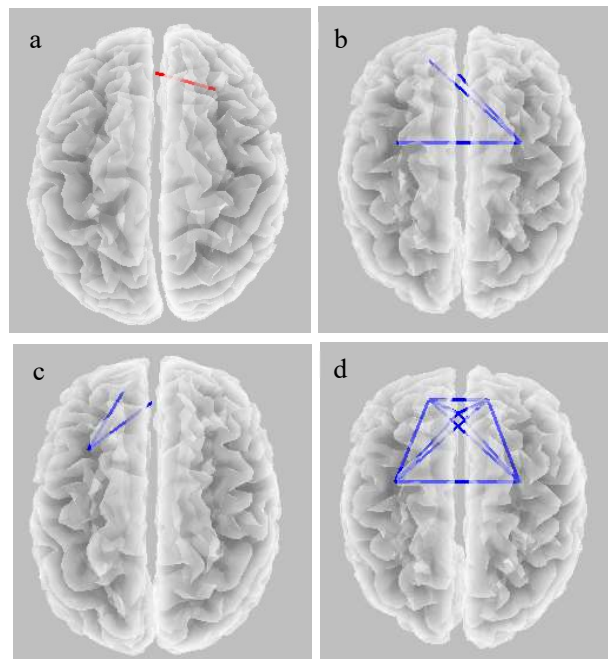

Figure 3. Increased (red) and decreased (blue) communication between different regions in the experimental group in comparison with control group in different frequency bands (a) alpha 1; (b) alpha 2; (c) beta 2, (d) beta 3.

Table 2. Changes in the connectivity between different regions of the frontal brain network of Faradarmangars in comparison with non Faratherapists (p-value<0.05, threshold=2.06).

Frequency band	Related regions	Change in the connectivity
Alpha1	rSFG-ACC	Increase
Alpha2	rSFG-ACC rSFG-lMFG rSFG-LSFG	Decrease
Beta 2	LSFG-ACC LSFG-LmFG	Decrease
Beta 3	All parts of the frontal network	Decrease

The connectivity differences in the delta, theta, beta1 and gamma frequency bands between two groups of the study is not significant. Moreover, as shown in the Table 2 and Figure 3, the only case of increased connectivity is the alpha 1 frequency band and the most decreased connectivity between different frontal brain regions can be seen in the case of beta 3 frequency band.

3.2.3 Effective connectivity results

In order to determine the changes in the direction of information transfer in different parts of the frontal network in the experimental task and control task groups, we examined effective connectivity as shown in Figure 4. The results suggest that only the delta wave frequency band had a reduced information flow from rmFG to LSFG regions (between the left and right cerebrum) in the experimental group compared to the control group.
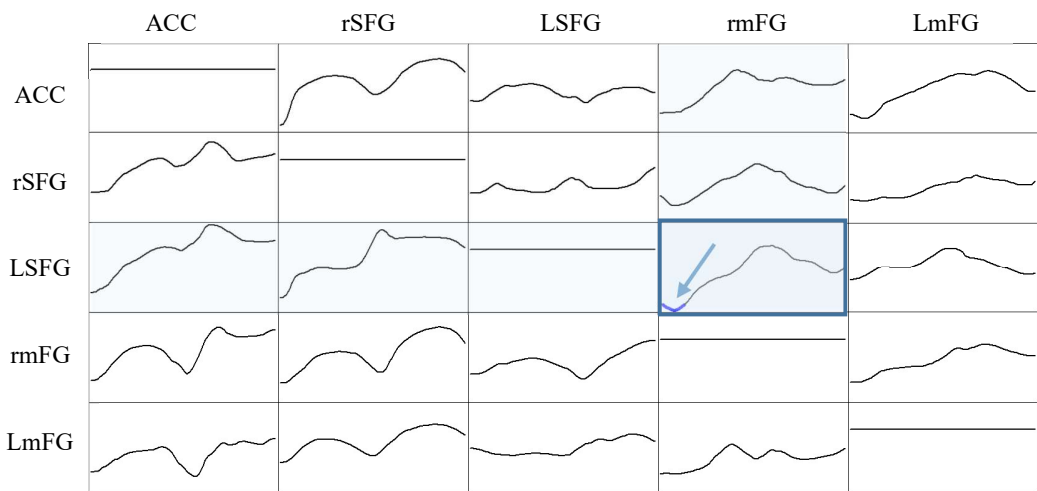

Figure 4. The effective connectivity matrix of brain frontal network in Faratherapist group (in comparison with control group) shown reduced information flow between highlighted area in the case of delta band (blue arrow) (p-value= 0.022, threshold=2.1).

3.2.4 Graph analysis

Graph analysis of experimental group brain activity in comparison with control group can be seen in Table 3 and Figure 5.

Table 3. The main characteristics of the Faradarmangars brain graph during FCF connection in comparison with the control.

Measure	Experimental	Control	difference	p(1-tailed)
Char. path length	2.0854	2.3921	-0.3067	0.005
Global efficiency	0.5696	0.5092	0.0603	0.005
Local efficiency	1.4695	1.1839	0.2855	0.004
Clustering	0.518	0.4329	0.0851	0.001
Transitivity	0.7759	0.6494	0.1265	0.002

For the global network topology, results show a significant decrease in the characteristic path length and an increase in global efficiency, clustering coefficient and transitivity in experimental group compared with control. At regional level, the nodal degree was significantly different between two groups. The normal functional network as a small-world architecture is characterized by a high clustering coefficient (index of functional segregation) between neighboring nodes and short path length (index of functional integration) between any pair of nodes. In other words, there must be a suitable balance between local specialization and global integration.
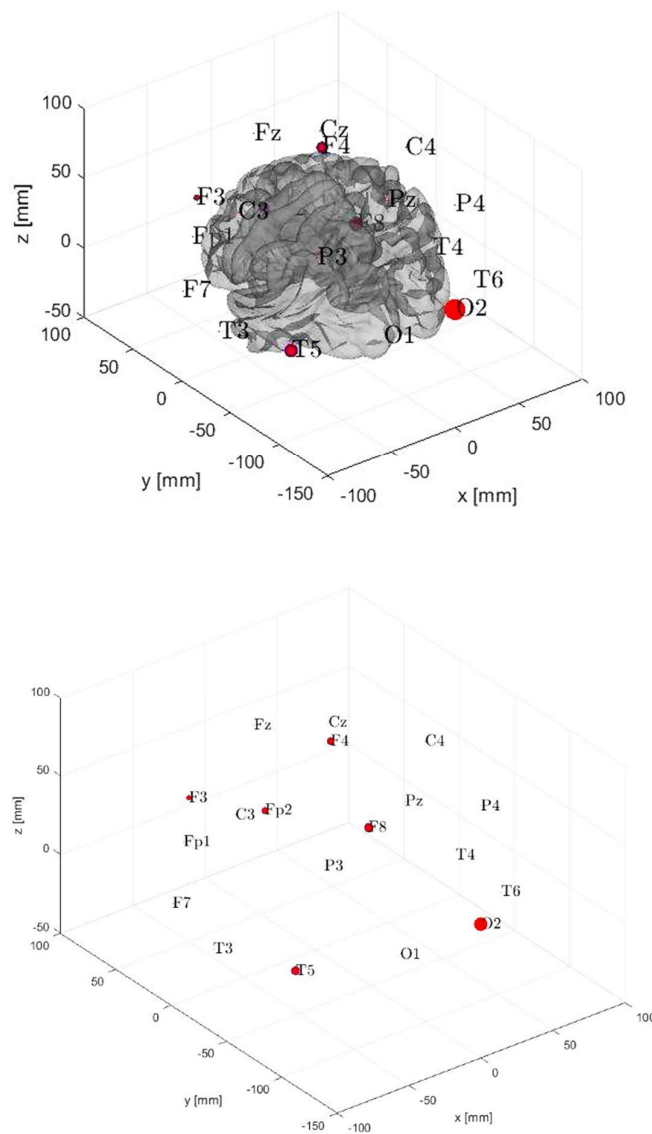
Figure 5. Graph analysis that indicates increased activity (in comparison with the control group) in the marked area in the experimental group.

As can be seen in Figure 5, the activity of the O2-T5-F4-F3-FP2-F8 areas in the experimental group is more than the control group. In fact, the areas in the experimental group have the most contact with their neighboring areas.

4. Discussion

The study of brain activity is of great importance in consciousness researches. Studies that have been done in this category to date measure brain activity during the specific tasks in cognitive science, behavioral sciences and neuroscience. Due to the functional role of the Faradarmangar's mind as a mediator in the onset of Consciousness Fields function according to Taheri, in this study, their brain activity was compared with the brain activity of non-Fara therapists (as control) under the same conditions with the aim of the observing possible represented differences due to the effects of this role at the brain level.

In Taheri's approach, the human brain is like a detector in relation to the FCF, and a result of this connection is to repair the system under treatment. To begin this connection, the presence of a person in the role of Faradarmangar is required. Previously, in a study conducted by the authors of this article, the electrical activity of the brains of Faradarmangars has been studied (Taheri et al 2020a). In the Taheri et al (2020a) study, there was an increase in the gamma frequency band in the fronto-parietal and DMN regions of the brain in Faradarmangars in comparison to control. Since connection with the Consciousness Fields is possible for all humans through the Faradarmangars, the effects were interpreted in both "subjects in relation to the FCF " and "Faradarmangar as a subject".

On the other hand, what is seen in the comparison of the brain manifestations in connection with the FCF between two random and larger populations than the previous study, from Faradarmangars and non Faradarmangars, is simply the result of being a Faratherapist in the mind mediation of the FCF function. In the present study, according to the Taheri et al (2020a) study, not only is there no increase in activity in the frequency bands and regions related to other methods of meditation and mindfulness, but also a significant decrease in the activity of delta, beta 2 and beta 3 frequency bands in the different brain regions can be seen. Moreover, in comparison with the previous mentioned study, it can be concluded that the seen increased

activity in the gamma frequency band is the result of a connection with the FCF in humans, regardless of being Faratherapist or not.

Delta waves are the slowest recorded brain waves. They are frequently found in infants and young children and are associated with the deepest levels of relaxation and restorative healing sleep (Priyanka et al 2016). Reduction in delta waves are suggested to correspond with the conscious state of emptiness in meditation (Hinterberger et al 2014). In contrast beta 2 waves (mid-range beta waves:15–20 Hz) are associated with increases in energy, anxiety, and performance and beta 3 (high beta waves:18–40 Hz) wave is associated with significant stress, anxiety, paranoia, high energy, and high arousal (Priyanka et al 2016). Reduction of beta 2 and beta 3 frequency bands in the Faradarmangar group during the FCF function mind mediation indicates the separation from the activated and stimulated state of the brain and a general decrease in conscious brain activity during this task.

Continuing to study the changes caused by the FCF function mind mediation in the present study caused to the finding of the various decreased and a single increased connectivity pattern between different regions of the brain during this task. The FCF function mind mediation in the connectivity study indicates an increase in the functional connectivity only between two regions (ACC and rSFG) in the case of alpha1 frequency band and multiple decreased functional connectivity between different regions of frontal network in the case of alpha2 and beta 2/3 frequency bands (in all frontal network) and the decreased information flow in the case of delta band between left and right cerebrum also in the frontal network, which is generally associated with cognitive and motor activities during human evolution (Leisman et al 2016). Moreover, the brain graph analysis in the FCF function mind mediation, shows a distinct brain graph with higher global efficiency associated with specific task and six node areas that can all characterize and manifest the relationship with the FCF function mind mediation at the of the Faradarmangar's brains.

In conclusion, by considering five out of eight brain frequency bands as well as 39 out of 52 BA regions, our data shows a reduction of most frequency band activities, and a significant reduction of connectivity in the frontal lobe. Along with these reductions and in addition to the increased graph global efficiency, it is hypothesized that the human brain in the role of a Faradarmangar can be considered as a passive powerful detector or marker of the FCF function mediation rather than an operator or initiator. According to the results, investigation of the effect of other CFs on the brain as well as the use of other neuroimaging techniques, including fMRI, is strongly recommended.

Acknowledgments

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