Scientific Documentation

Peer-Reviewed Published Research

Brain-To-Brain Entrainment

- Synchrony via online interaction
- Brain-to-brain communication
- Inter-brain synchronization
- Synchrony in multi-user gaming
- Neural synchrony at a distance

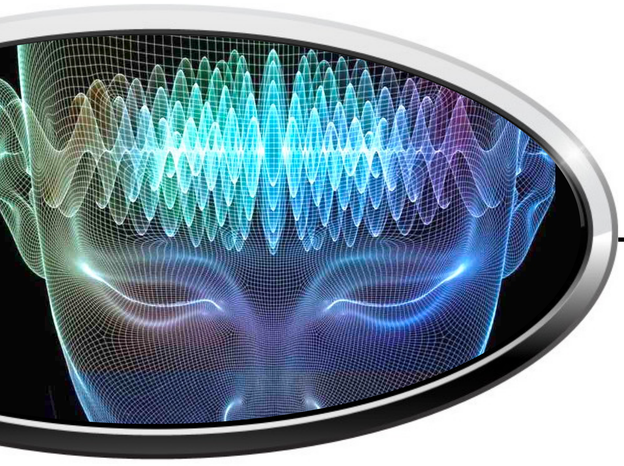
Multi-Sensory Stimulation

- Binaural music for synchrony
- Neural entrainment from haptics
- Beta and theta binaural audio
- Binaural effects on cognition

Brain Wave Entrainment

- Neural coherence via sensation
- Brain-to-brain synchronization
- Neuronal entrainment rhythms
- Inter-brain neural synchrony

PDFs of all papers can be accessed on the Published Research screen in the main menu

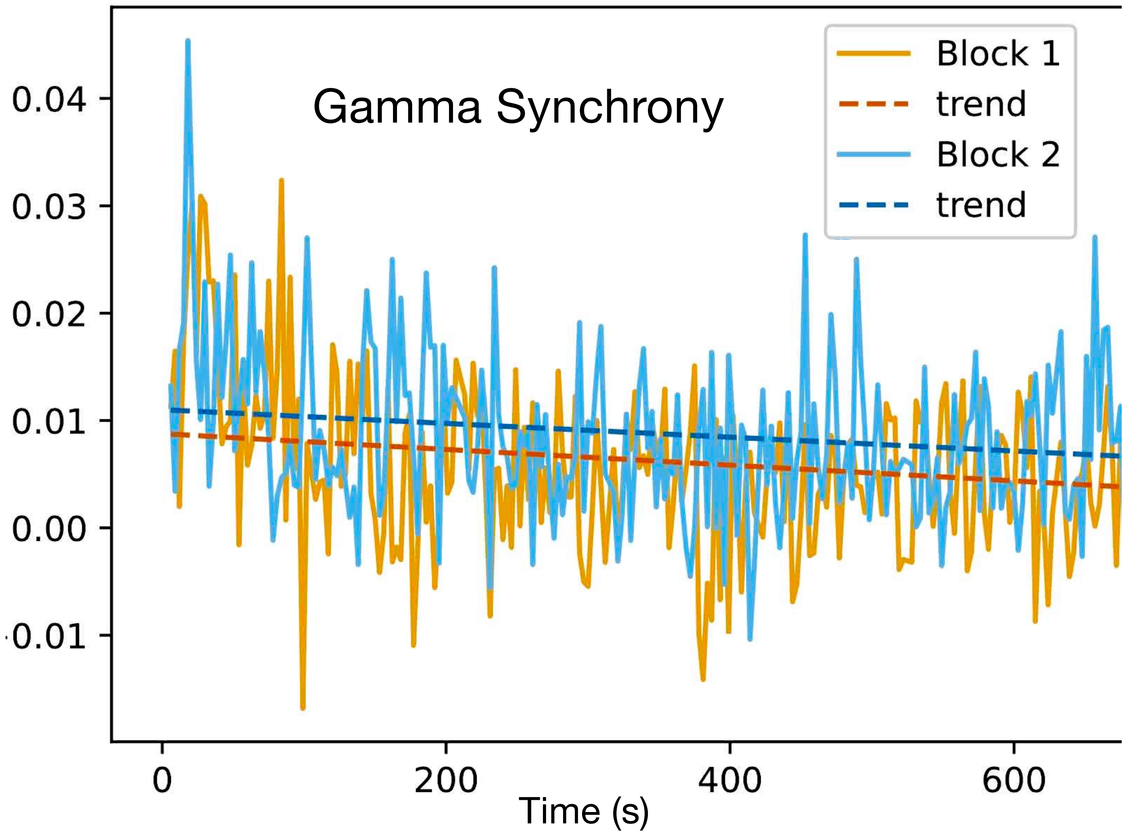


Inter-Brain Synchronization

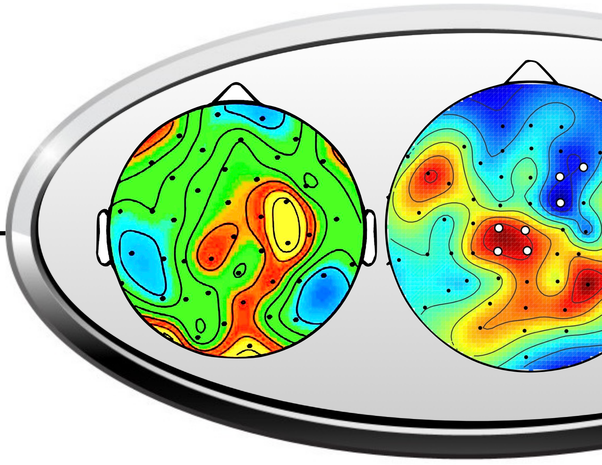
Inter-Brain Synchronization Occurs Without Physical Presence During Online Gaming

– Neuropsychologia Journal • July, 2022

This study measured EEG from 42 subjects who were physically isolated, but collaborating in a multiplayer game. Pairs working together were found to have elevated neural coupling in the higher gamma frequency bands, showing increased inter-brain synchrony during online interactions. These results are in line with our previous findings of increased inter-brain neural synchrony during collaborative online interactions, and show that complete phase synchronization of oscillatory activity occurs during real-time coordination without any physical presence or audio/video connection.



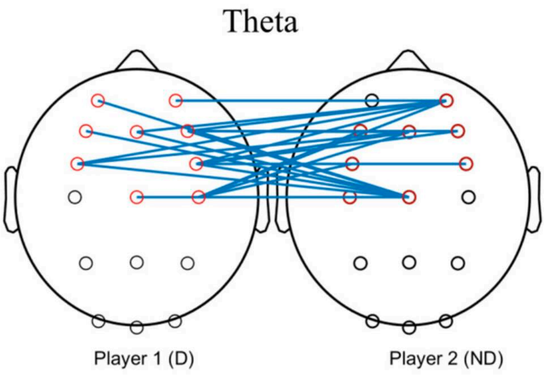
Synchrony During Multi-User Gaming

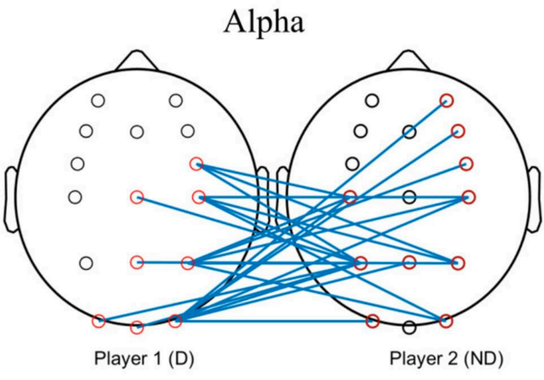


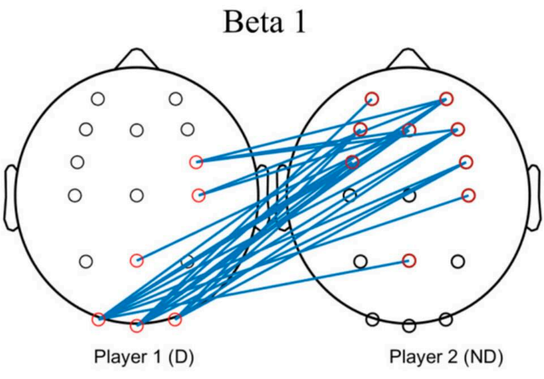
Brain Synchrony During Collaborative Multi-User Neurofeedback-Based Gaming

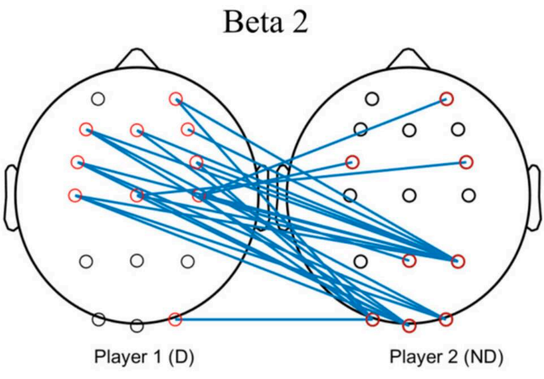
– Frontiers in Neuroergonomics • Oct, 2021

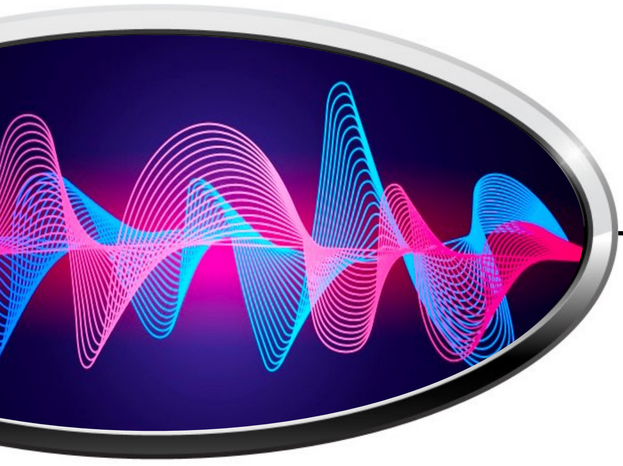
Twenty pairs of participants with no close relationships took part in 3 sessions of online collaborative multi-user neurofeedback. Spectral analysis and interbrain connectivity showed that in collaborative gaming, players with higher resting state alpha content were more active in regulating their alpha brain waves to match those of their partner. Moreover, interconnectivity was the strongest between homologous brain structures in theta and alpha bands, indicating strong degree of neural synchrony between players.









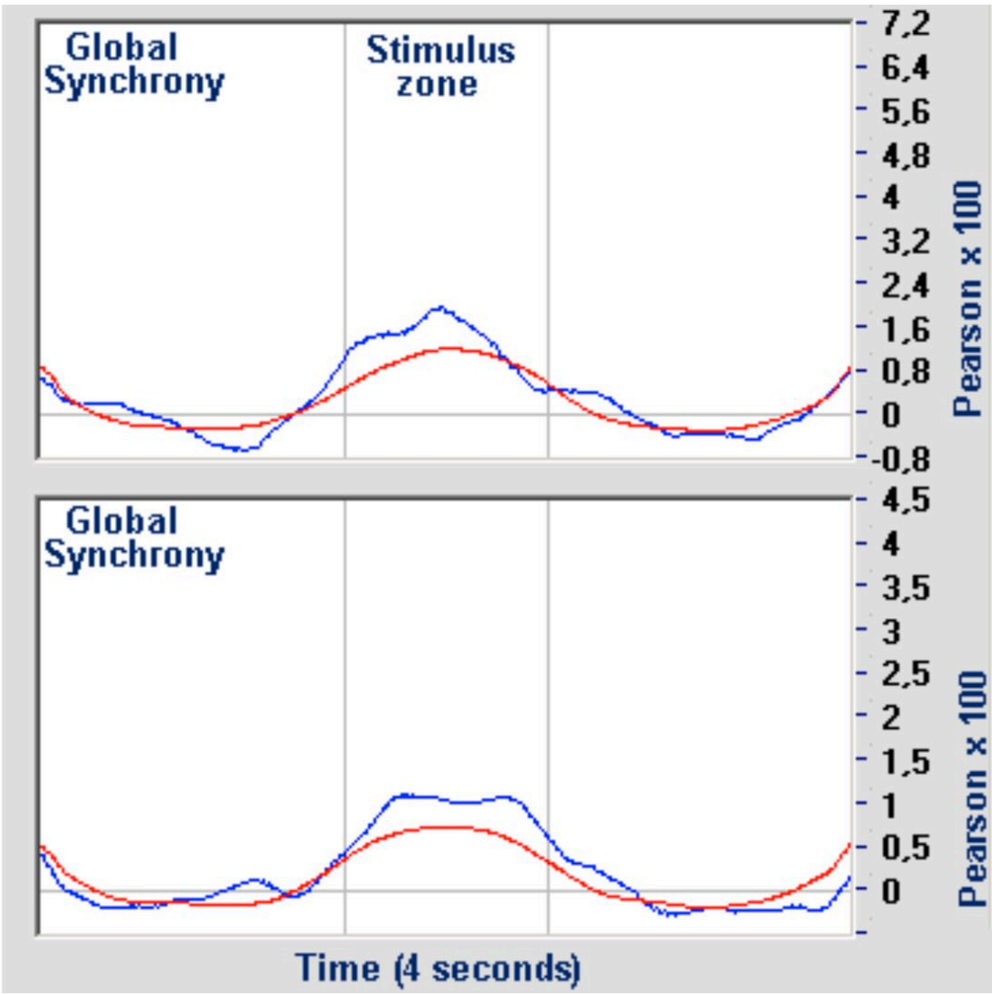


Neural Synchrony at a Distance

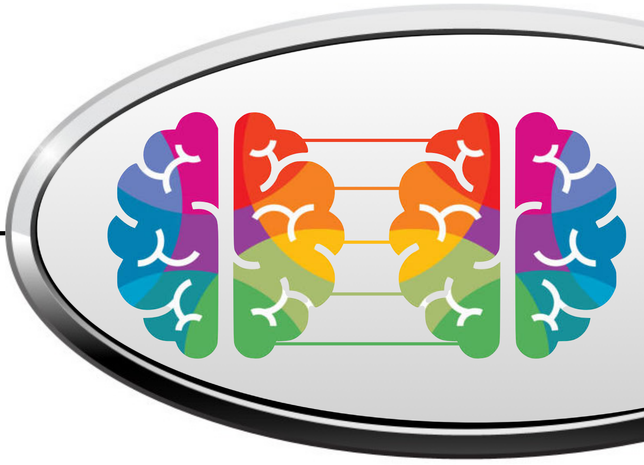
Brain-to-Brain Interaction at a Distance, A Study Based on EEG & MEG Analysis

– Journal of Consciousness • June, 2018

This paper presents a summary of research conducted between 2014 and 2018 regarding the possibility of a distant mental interaction between pairs of sensorially isolated subjects. A total of 85 experimental sessions were completed, during which the EEGs of each subject of the pair were recorded. Results confirm that two subjects who are mentally connected can display a significant transfer of information between them, with an average increase by about 12-18% over pure chance.



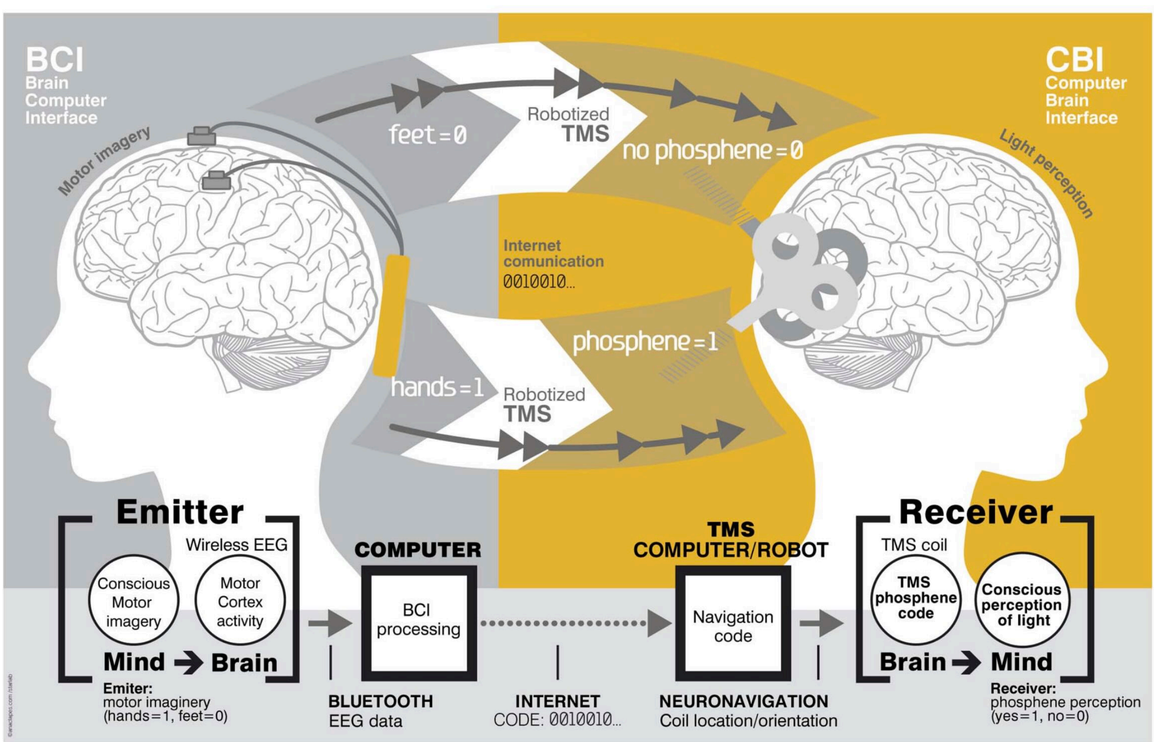
Brain-to-Brain Communication

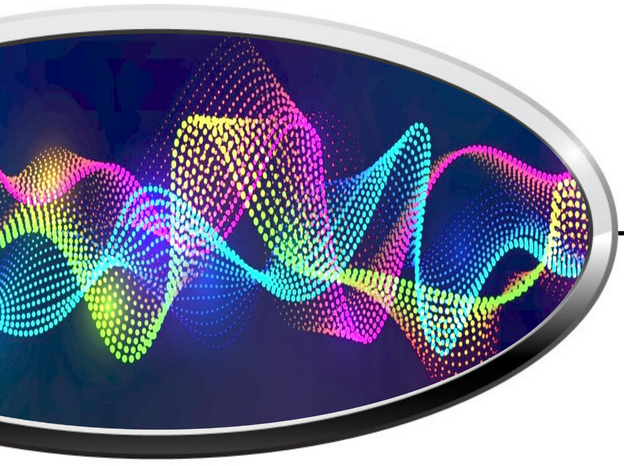


Conscious Brain-to-Brain Communication in Humans Using Non-Invasive Technologies

– Public Library of Science Journal • Aug, 2014

The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location. bilateral temporal and parietal regions related to auditory perception and sound location.



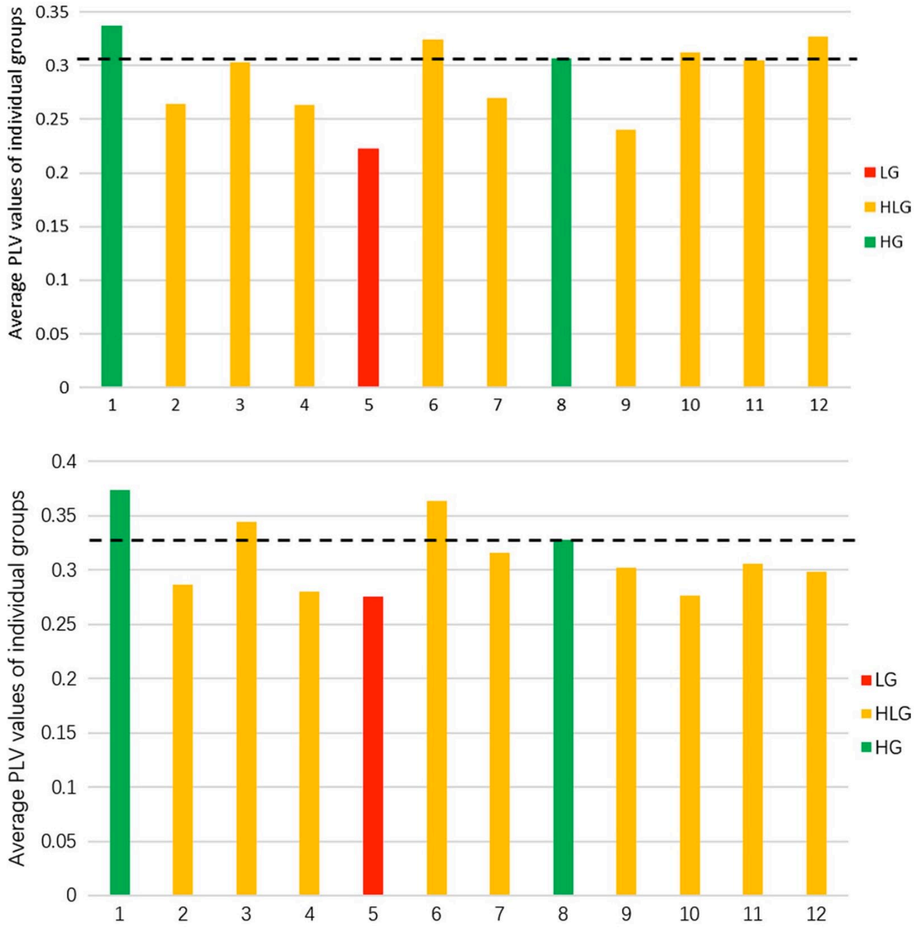


Synchrony Via Online Interaction

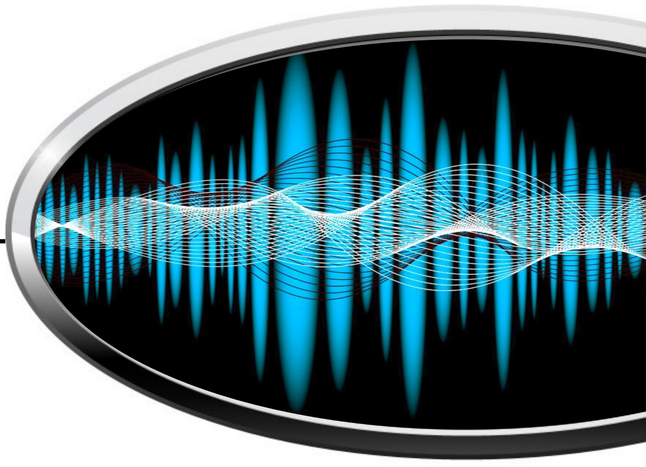
Collaborative Brain-to-Brain Synchrony: Cognitive States of Online Group Interaction

– Journal of Educational Technology • Sept, 2022

The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location. Results showed significant power differences for binaural stimulation compared to resting state on Results showed significant power.



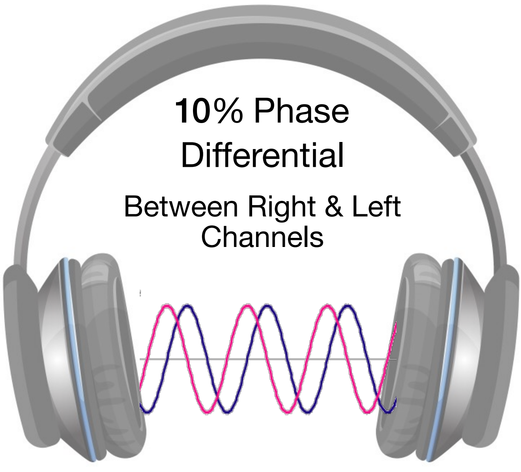
Binaural Music For Synchrony

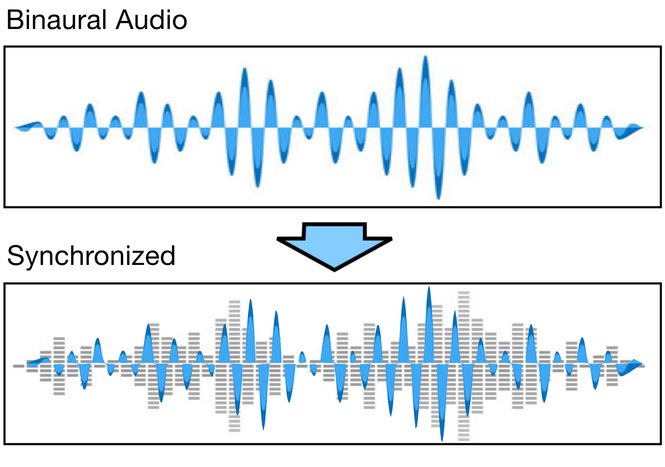


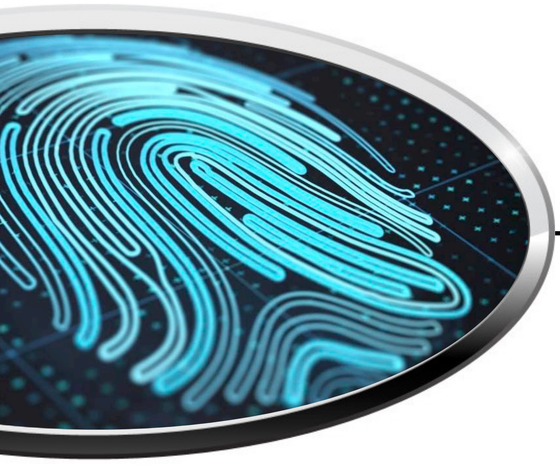
An Investigation of Binaural Beats for Brain Wave Entrainment and Enhancing Attention

– Nature: Scientific Reports Journal • Feb, 2025

This study experimentally tested the effects of binaural beats on both attention and brain entrainment. 80 Undergraduate participants were randomized across 12 trial blocks, and EEG data were analyzed to assess brain entrainment at the target beta and gamma frequencies. Overall, brain wave entrainment occurred in every condition but was particularly pronounced for gamma frequencies, which aligns with the findings that gamma binaural beats had stronger behavioral effects on participants than beta frequency beats.





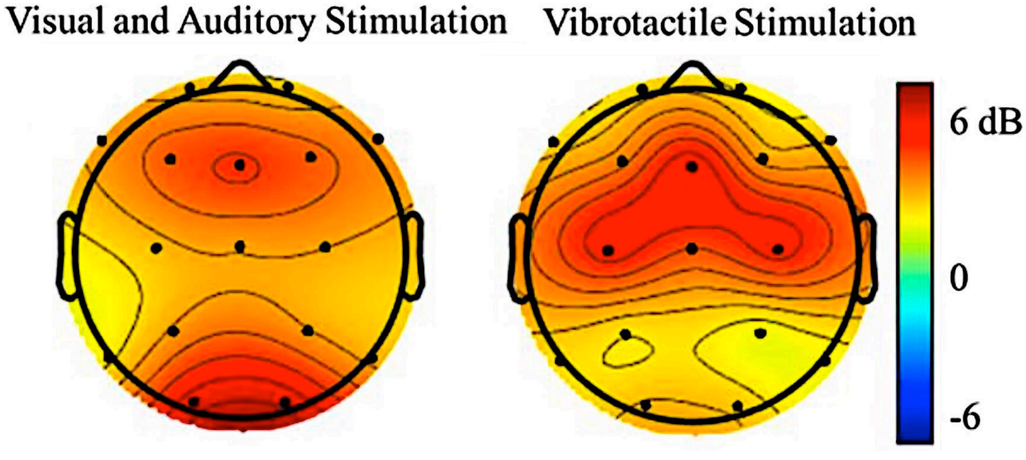


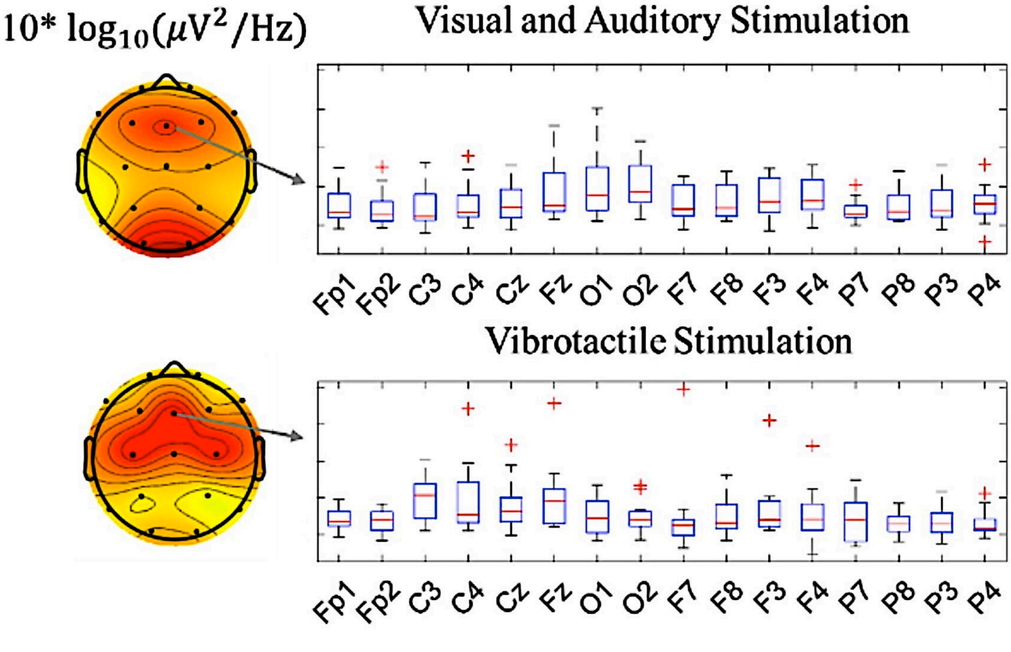
Neural Entrainment with Haptic Stimuli

Haptic Stimulation vs Visual and Auditory Stimulation for 40 Hz Gamma Entrainment

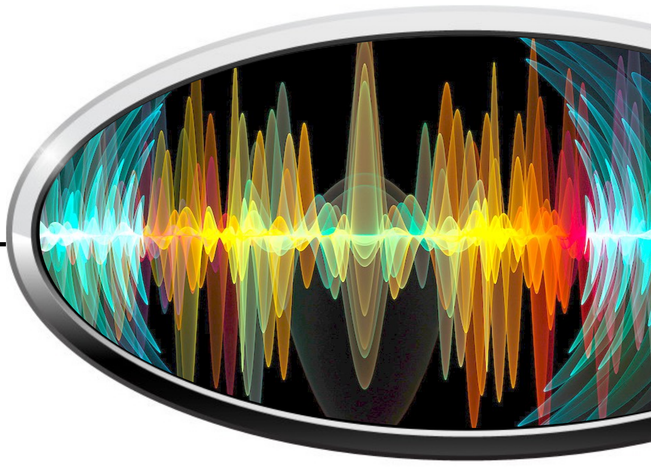
– BioRxiv Biology Journal • March, 2025

In this work, we evaluated haptic vibrotactile stimulation delivered to the fingertips of 15 participants measured by EEG analysis.
We found that haptic stimulation of fingertip neurons could evoke 40 Hz neural entrainment in the central, frontal and occipital cortices.
Our study supports future investigations with other types of vibrotactile stimulation to induce neural synchrony within the brain.





Theta and Beta Binaural Audio

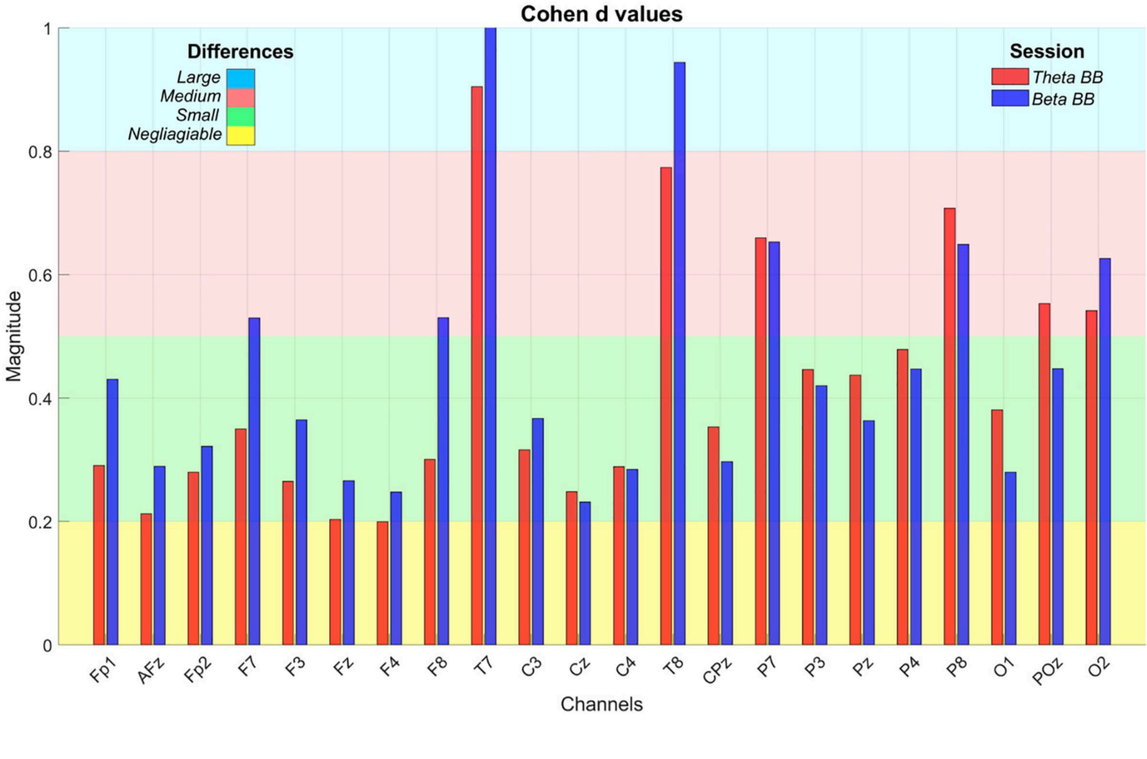


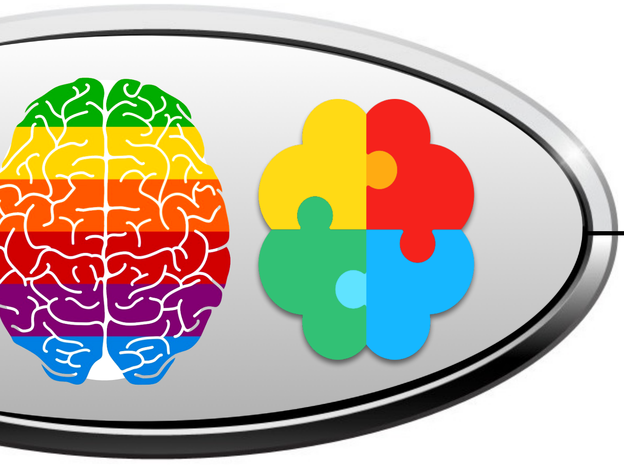
8

"Brain-to-Brain Interaction at a Distance, A Study Based on EEG & MEG Analysis"

– Journal of Consciousness • June, 2017

The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location. Results showed significant power differences for binaural stimulation compared to resting state on Results showed significant power.





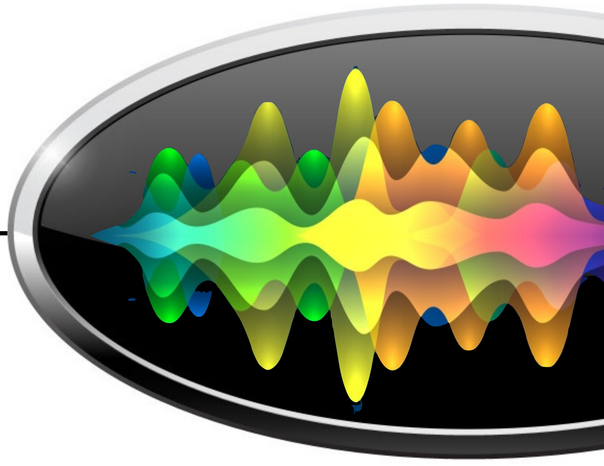
Binaural Effects on Cognition

"Brain-to-Brain Interaction at a Distance, A Study Based on EEG & MEG Analysis"

Journal of Consciousness – June, 2017

The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location.
bilateral temporal and parietal regions related to auditory perception and sound location.

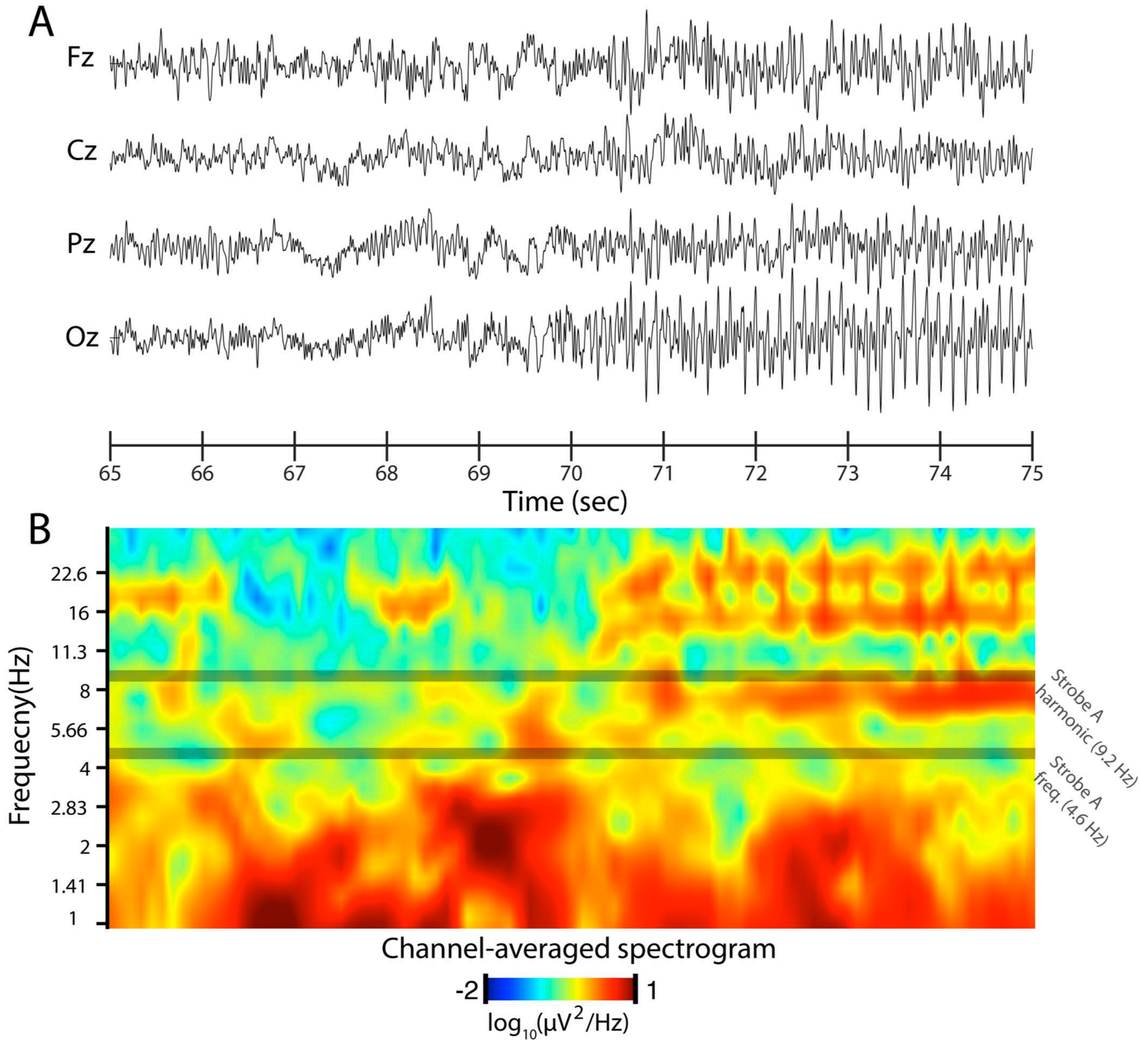
Neural Coherence
Via Sensation

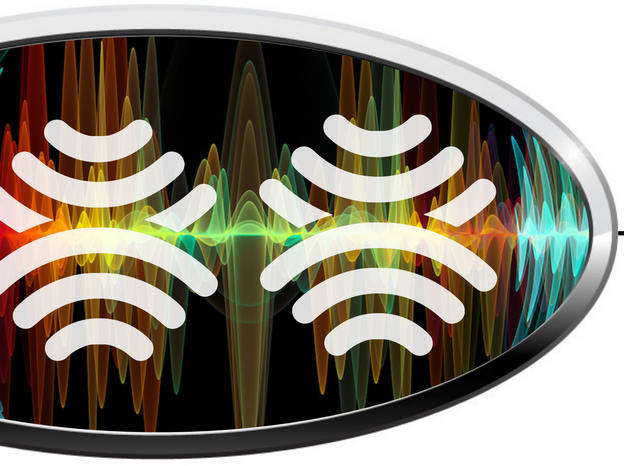


"Brain-to-Brain Interaction at a Distance, A Study Based on EEG & MEG Analysis"

Journal of Consciousness – June, 2017

The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location. bilateral temporal and parietal regions related to auditory perception and sound location.



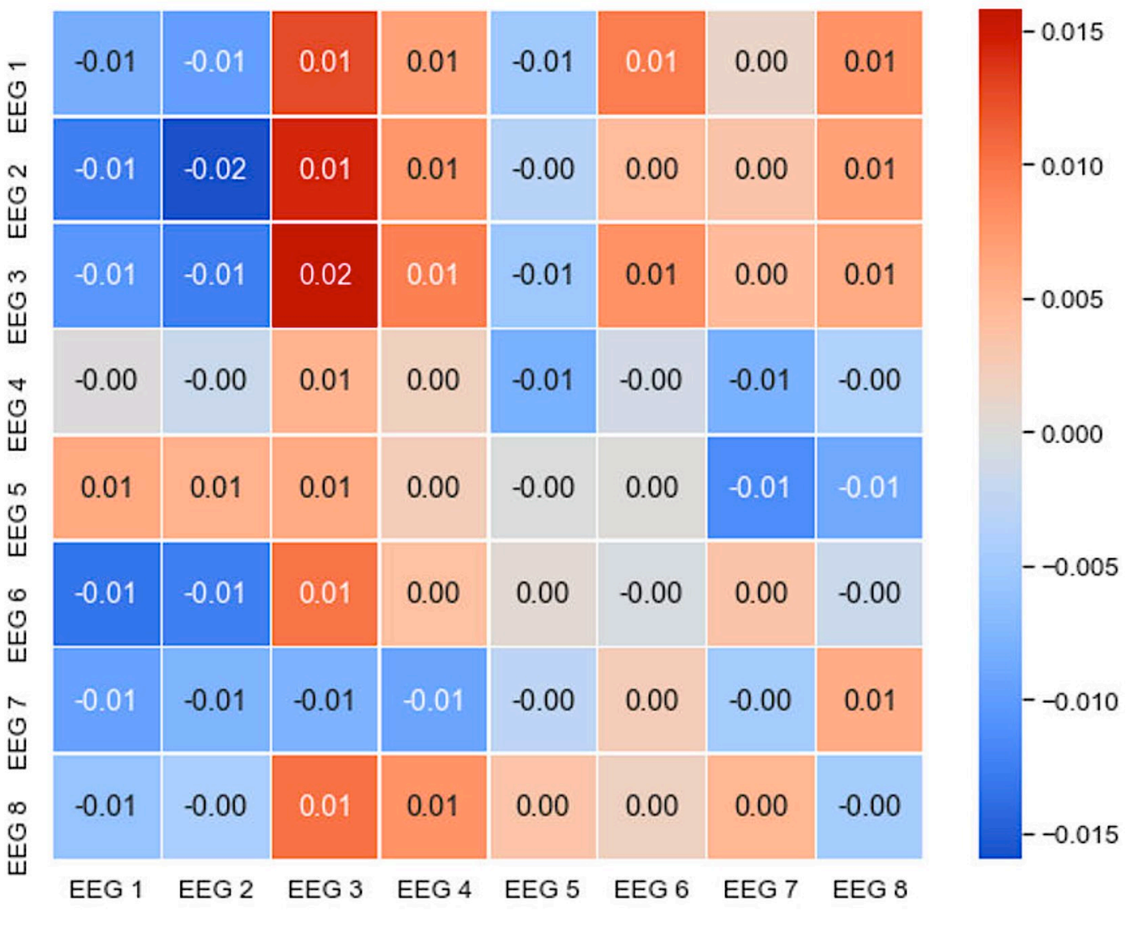


Brain-to-Brain Synchronization

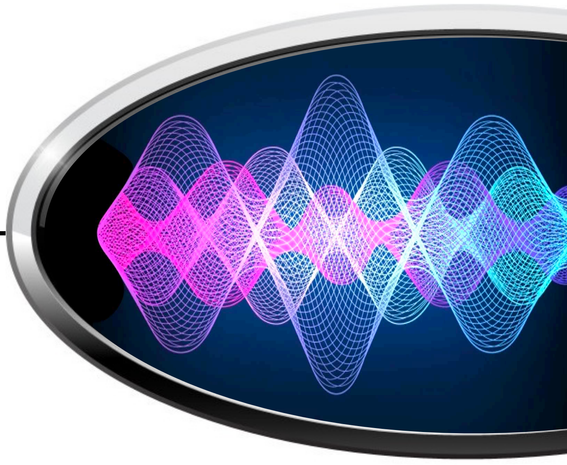
"Brain-to-Brain Interaction at a Distance, A Study Based on EEG & MEG Analysis"

Journal of Consciousness – June, 2017

The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location.
bilateral temporal and parietal regions related to auditory perception and sound location.



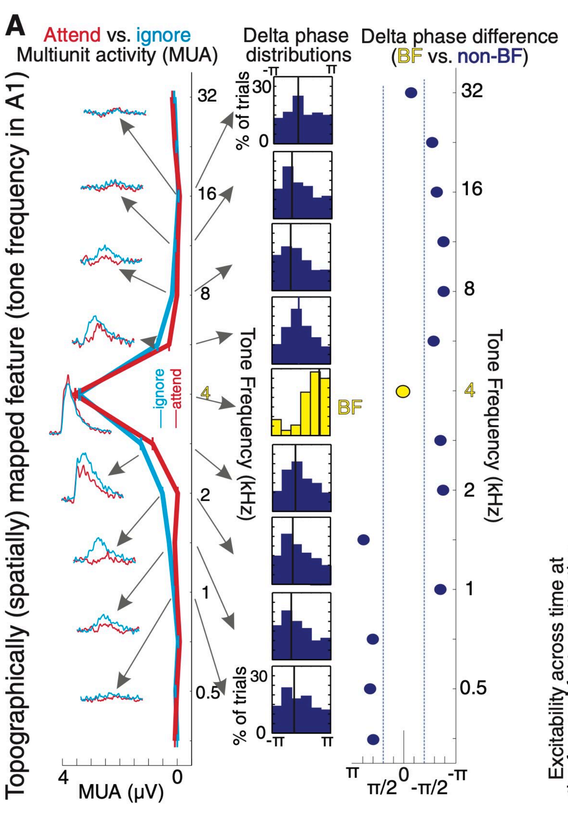
Neural Entrainment Rhythms

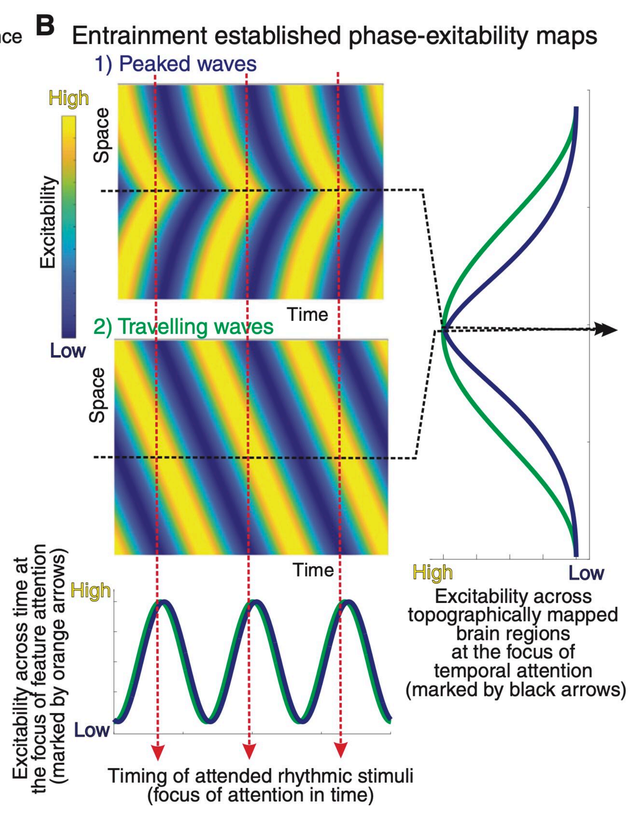


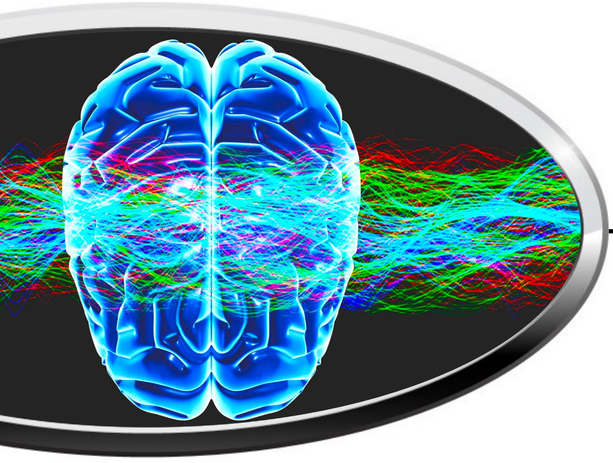
"Brain-to-Brain Interaction at a Distance, A Study Based on EEG & MEG Analysis"

Journal of Consciousness – June, 2017

The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location. bilateral temporal and parietal regions related to auditory perception and sound location.





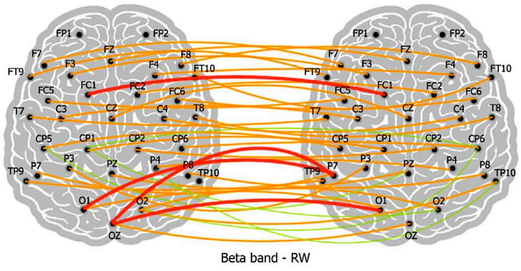


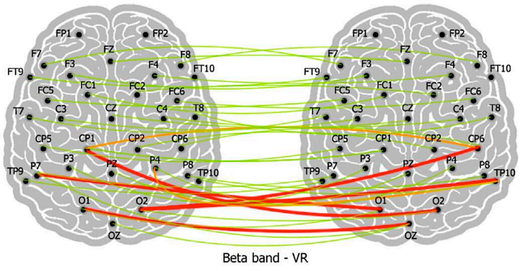
Inter-Brain Neural Synchrony

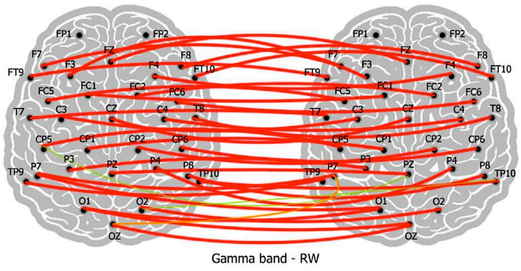
"Brain-to-Brain Interaction at a Distance, A Study Based on EEG & MEG Analysis"

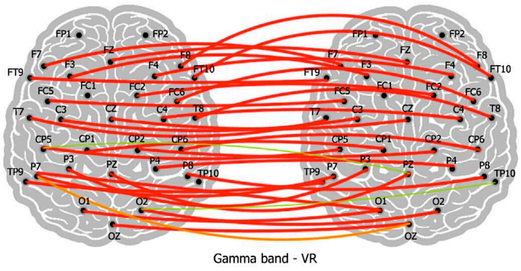
Journal of Consciousness – June, 2017

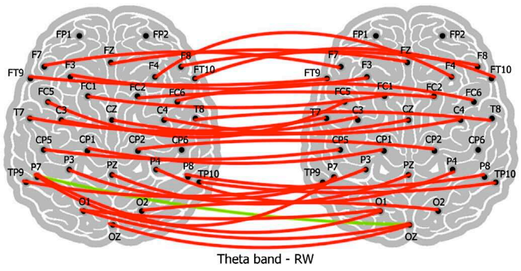
The aim of this research was to investigate whether binaural audio improved brain wave entrainment, and 20 volunteers were stimulated with theta and beta frequencies during EEG analysis. Results showed significant power differences for binaural stimulation compared to resting state on bilateral temporal and parietal regions related to auditory perception and sound location. bilateral temporal and parietal regions related to auditory perception and sound location.

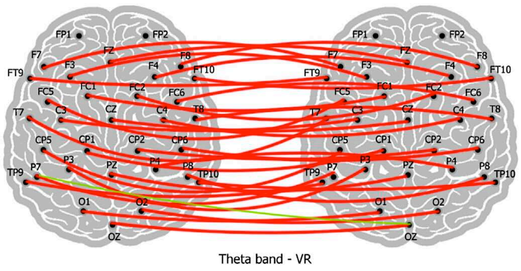


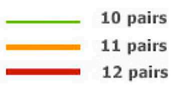




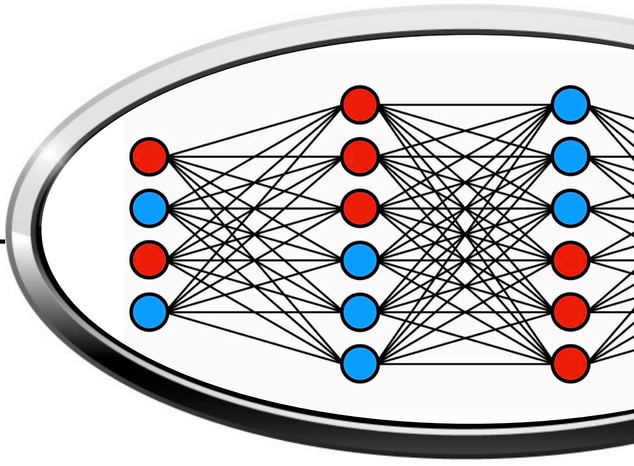








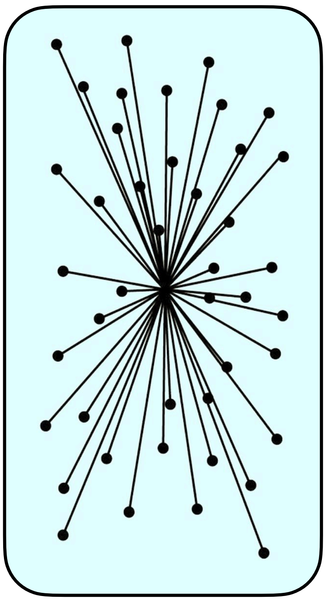
Scientific Testing Protocols



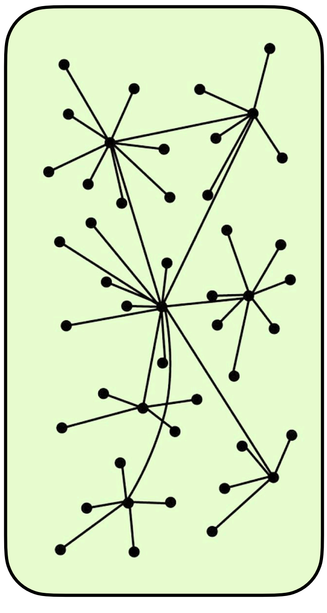
True ESP was developed to adhere with the protocols for standardized test methodology

Standardized testing allows performance results to be empirically documented, and test scores can be shown to have a relative degree of validity and reliability, as well as results that are generalizable and replicable. True ESP was developed with infinitely-scalable architecture and deployed on high-performance servers in redundant data centers, enabling the simultaneous testing of an unlimited number of study participants.

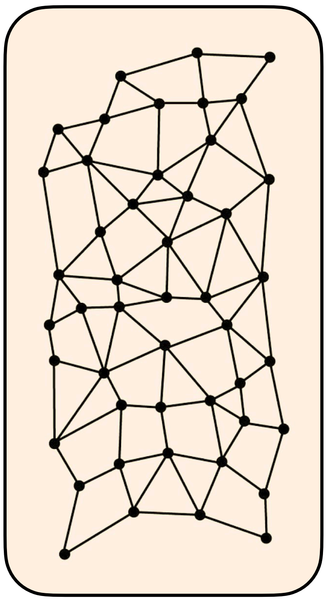
Centralized



De-Centralized



Distributed



True ESP