

CERTIFICATE OF POSTER PRESENTATION

is to certify that

Ioulietta Lazarou

presented a poster entitled

**Brain network analysis of people with Subjective Cognitive
Decline related to Alzheimer's Disease: A Novel High-density
EEG Study**

at the

12 FENS
Forum of Neuroscience

11-15 July 2020



Brain network analysis of people with Subjective Cognitive Decline and Alzheimer's Disease: A Novel High-density EEG Study

Lazarou Ioulietta ^{1, 2}, Georgiadis Kostas ^{1, 3}, Nikolopoulos Spiros ¹,
Tsolaki Anthoula ^{1, 4}, Kompatsiaris (Yiannis) Ioannis ¹, Tsolaki Magda ^{1, 2, 4}

¹ Information Technologies Institute, Centre for Research and Technology
Hellas (CERTH-ITI)

² 1st Department of Neurology, G.H. "AHEPA", School of Medicine, Faculty of
Health Sciences, Aristotle University of Thessaloniki (AUTH)

³ Informatics Department, Aristotle University of Thessaloniki (AUTH)

⁴ Greek Alzheimer's Association and Related Disorders (GAARD)

E-mail: {iouliettalaz, kostas.georgiadis, nikolopo, ikom}@iti.gr,
{tsolakianthoula, tsolakim1}@gmail.com

Aim: To investigate for the first time network disruption in all stages of Alzheimer's Disease (AD) spectrum by using a high-density EEG (EGI GES 300) with 256 channels.

Methods: 20 participants with Subjective Cognitive Decline (SCD), 30 with Mild Cognitive Impairment (MCI), 20 with AD and 22 healthy controls (HC) underwent a detailed neuropsychological assessment and 10 minutes resting state EEG. We extracted correlation matrices by using Pearson Correlation Coefficient for each subject and constructed weighted undirected networks for calculating clustering coefficient (CC) and strength (S) at global (256 electrodes) and local level (29 parietal electrodes).

Results: One-way ANOVA showed statistical significant difference among the four groups at local level in CC: [F (3, 88) = 4.76, p = 0.004] and S: [F (3, 88) = 4.69, p = 0.004]. However, no statistical significant difference was found at global level. According to the Independent Sample t-test, local CC was higher for HC [M (SD) = 0.79 (0.07)] compared with SCD [M (SD) = 0.72 (0.09)]; t (40) = 2.39, p = 0.02, MCI [M (SD) = 0.71 (0.09)]; t (50) = 0.41, p = 0.004 and AD [M (SD) = 0.68 (0.11)]; t (40) = 3.62, p = 0.001 as well. These findings provide evidence that disruptions in brain networks at parietal organization may potentially represent a key factor in the progression of AD.

Conclusions: The above findings reveal a dynamically disrupted network organization of preclinical stages, showing that SCD exhibit network disorganization with intermediate values between HC and MCI.

KEY WORDS

Electroencephalography, Brain Connectivity, Alzheimer's Disease, Subjective Cognitive Decline, Mild Cognitive Impairment, Resting State, Network Analysis