

P-1285 - DELUSIONS IN SCHIZOPHRENIA INTERPRETED AS COGNITIVE HALLUCINATIONS ACCORDING TO A NEUROCOMPUTATIONAL MODEL OF THE THALAMUS

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Introduction: A neuro-computational model of the thalamus was developed exhibiting pattern completion and noise filtering capabilities. Pattern completion of sensory inputs in the thalamus might explain a plethora of phenomena like the "filling-in" effect in the blind-dot, visual and auditory Charles-Bonnett syndromes, phantom limbs phenomenon, visual hallucinations like those produced by Lysergic Acid Diethylamide consumption, and musical hallucinations like when propranolol is dropped in the auditory channel.

Objectives and aims: The aim of this work is to propose the theory that delusions in schizophrenia are the consequence of thalamic pattern completion of defective cortical and hippocampal cognitive patterns. In this way, delusions in schizophrenia might be interpreted as a cognitive hallucination.

Methods: A computational model of the thalamus was developed with a grid of 9x9 neurons in its thalamo-cortical layer and 9x9 neurons in its reticular layer. A number of 13122 synapses were altered each iteration during the presentation of 36 alfa-numerical patterns. To test the artificial thalamus, 36 noisy and uncompleted patterns were presented to the network. For assessing the consistency of our work with the existing literature in the area, post-mortem and fMRI studies were collected.

Results: The thalamus model reconstructed 36 testing uncompleted patterns with and without background noise. Post-mortem and fMRI studies in non-medicated patients exhibit defective hippocampal and prefrontal projections to the thalamus as predicted by our theory.

Conclusions: Preliminary neurocomputational studies suggest that delusions in schizophrenia might be the result of pattern completion of defective cortical and hippocampal inputs to the thalamus.