Enhancing working memory in schizophrenia using 1ma and 2ma transcranial direct stimulation to the left dorsolateral prefrontal cortex

Irina Papazova, Wolfgang Strube, Benedikt Becker, Bettina Henning, Tobias Schwippel, Andreas Fallgatter, Frank Padberg, Ulrich Palm, Peter Falkai, Christian Plewnia, Alkomiet Hasan

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Discussion: This study supports the evidence that 1) FEP patients are more likely to present JTC and FER impairments than controls; 2) cognition and social cognition might represent transcultural features of psychotic disorders.

S78. EXAMINING SEMANTIC AND EPISODIC MEMORY IN SCHIZOPHRENIA USING THE HOPKINS VERBAL LEARNING TASK

Erica Neill*[,1], Susan Rossell[2]
[1]University of Melbourne; [2]Swinburne University

Background: Schizophrenia is associated with deficits in both episodic and semantic memory however, our understanding of how the deficits in each system independently contribute to overall memory performance is poorly understood.
The Hopkins Verbal Learning Task (HVLT) is a memory task using a single word list. To perform the task successfully, participants need to use both episodic and semantic abilities. Both episodic and semantic clustering scores can be calculated which provide nuanced information about the memory encoding and retrieval techniques used by those performing the task.
Methods: Sixty schizophrenia patients and sixty healthy controls were compared in their performance on the HVLT. In addition to analysing immediate recall, learning slope, delayed recall and recognition, semantic and episodic clustering were also compared. Further, given the link between thought disorder and semantic function, this symptom was correlated with memory performance measures.
Results: The schizophrenia group demonstrated worse performance across learning trials, delayed recall, and recognition indicating a generalised memory problem. Clustering scores were used to probe into semantic and episodic function specifically. The schizophrenia group demonstrated normal episodic clustering in the face of significantly impaired semantic clustering. Further, semantic clustering performance positively correlated with all general memory measures whilst episodic clustering did not. Finally, thought disorder did not correlate with any HVLT performance measure apart from semantic clustering.
Discussion: It is difficult to tease apart the contributions of semantic and episodic memory impairments to poor overall memory function in schizophrenia. In this study, we have first demonstrated intact episodic clustering in the face of impaired semantic clustering. Then, by correlating semantic and episodic clustering scores with general memory performance measures, we were able to demonstrate that semantic memory performance is more significantly related to overall memory performance than episodic performance. Finally, this result supports the specificity of the relationship between thought disorder and semantic memory impairment.

S79. ENHANCING WORKING MEMORY IN SCHIZOPHRENIA USING 1MA AND 2MA TRANSCRANIAL DIRECT STIMULATION TO THE LEFT DORSOLATERAL PREFRONTAL CORTEX

Irina Papazova*[,1], Wolfgang Strube[1], Benedikt Becker[1], Bettina Henning[1], Tobias Schwippel[2], Andreas Fallgatter[3], Frank Padberg[1], Ulrich Palm[1], Peter Falkai[1], Christian Plewnia[2], Alkomiet Hasan[1]
[1]Ludwig Maximilian University Munich; [2]University Hospital Tuebingen; [3]University of Tuebingen

Background: Cognitive impairment is a key symptom of schizophrenia, causing patients' occupational disability and worsening their life quality. Yet, the treatment options are still scarce. Recent research suggests that transcranial direct stimulation (tDCS) to the dorsolateral prefrontal cortex (DLPFC) could enhance a crucial cognitive process such as working memory. Here, for the first time we examined the effects of tDCS on simultaneous working memory performance in schizophrenia patients in regard of stimulation intensity and cognitive load.
Methods: Forty schizophrenia patients (N = 40) participated in two separate double-blind, sham-controlled experiments, both consisting of a prestimulation baseline, an active anodal and a sham tDCS single-session. Stimulation application was conducted to the F3 (anode) and to the right deltoid muscle (cathode) for 21 min. In Experiment 1 (N = 20) patients received tDCS at 1 mA and Experiment 2 (N = 20) – at 2 mA. In total, 120 experimental sessions were performed. Working memory was measured during stimulation using a verbal n-back task with three cognitive loads - 1-back, 2-back, 3-back. Applying the Signal Detection Theory, we estimated the discriminability index d prime, which together with reaction times served as study outcomes. Using several RM-ANOVAs we compared working memory performance during sham and active tDCS across all cognitive loads for each experiment. In a subsequent mixed-model RM-ANOVA, we pooled data from both experiments and analyzed differences in working memory performance in regard of stimulation intensity.
Results: Data analysis showed significant greater d prime values during active tDCS than during sham tDCS only in Experiment 1 ($F1, 19 = 4.48$, $p = .048$). In Experiment 2, there was a numeric improvement of d prime during tDCS that however did not reach significance ($F1, 19 = 2.31$, $p = .145$). The subsequent mixed-model RM-ANOVA revealed a significant overall effect of brain stimulation, prompting higher d prime values ($F1, 38 = 6.05$, $p = .019$), but no main of stimulation intensity ($p = .392$). Analysis on reaction times revealed no significant results.
Discussion: This is the first study comparing the online effects of 1mA and 2mA tDCS on working memory in schizophrenia patients. In line with previous research, tDCS improved working memory functioning in schizophrenia. However, this enhancement did not differ between stimulation intensities, implying that tDCS effects on cognition could be dose independent. Overall, our results provide further evidence that tDCS may be an effective and feasible intervention for cognitive impairment in schizophrenia and underline the need for future research on the specific stimulation parameters.

S80. NEUROCOGNITIVE FUNCTIONING IN YOUTH AT RISK OF SERIOUS MENTAL ILLNESS

Sylvia Romanowska*[,1], Glenda MacQueen[1], Benjamin I. Goldstein[2], JianLi Wang[3], Sidney H. Kennedy[4], Signe Bray[1], Catherine Lebel[1], Jean Addington[1]
[1]Hotchkiss Brain Institute, University of Calgary; [2]University of Toronto; [3]Institute of Mental Health Research, University of Ottawa; [4]University Health Network, Toronto

Background: Neurocognitive deficits are associated with many serious mental illnesses (SMI), including schizophrenia, bipolar disorder, and major depressive disorder, and have been found to negatively impact social and occupational outcomes, clinical prognosis, and overall quality of life. These deficits have also been observed in people in earlier phases of schizophrenia, specifically in young people at clinical high risk (CHR) of psychosis. In these youth, neurocognitive deficits present at a level intermediate to healthy controls and those with early psychosis, indicating that mild impairments in neurocognitive functioning may be early markers of illness development. It is possible that neurocognitive deficits may be present in young people at risk of a range of SMI beyond the psychosis-spectrum, including affective and anxiety disorders. The aim of this study was to compare neurocognitive functioning in a sample of youth at risk of SMI across the different clinical stages described by McGorry and colleagues and compare them to healthy controls (HCs). It was hypothesized that participants in the later stages of risk, characterized by the presence of subthreshold psychiatric symptoms or attenuated syndromes, would exhibit impairments in neurocognitive performance compared to HCs and asymptomatic youth at familial high risk.