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NAMI National Convention

Combining Cognitive Training and Brain Stimulation: A Feasibility Study

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Outline

- Background & Rationale
- Study Design
- Preliminary Findings
- Next Steps
What is ‘cognitive’ or ‘neuropsychological’ functioning?

Thinking Skills

Attention

Processing speed

Working memory

Learning

Memory

Language

Visuospatial abilities

Executive functioning
Cognitive functioning in mental health conditions

- Schizophrenia: Up to 66%
- Bipolar Disorder: Up to 60%
- Major Depression: 10-50%
Cognitive functioning in mental health conditions

The graph illustrates the effect size (Cohen's d) for various cognitive domains in different mental health conditions. The x-axis represents different cognitive domains: Psychomotor speed, Verbal memory, Attention, Fluency, Visual memory, and Executive function. The y-axis represents the mean standardized score. The conditions include Schizophrenia, Schizoaffective, Psychotic Depression, and Psychotic Bipolar, each represented by different symbols.

6/19/2019
Making the case for cognitive impairment

• At least for schizophrenia, there is growing evidence that it is a cognitive disorder that produces psychiatric symptoms
  • Deficits show up early, and among those who have not had antipsychotics
Why does cognitive impairment matter?

• Cognitive deficits interfere with community functioning, even more than symptoms
• Contributes to chronic problems like difficulty getting & keeping a job, maintaining social relationships, etc.
• Creates barriers to benefitting from psychiatric rehabilitation & recovery programs
What do we do about it?

• Rise of cognitive training or remediation
  • “Brain training” originally developed for those who suffered neurological injuries
  • Later adapted for use with people with mental health conditions

Cognitive remediation is a behavioral training intervention targeting cognitive deficit (attention, memory, executive function, social cognition, or metacognition), using scientific principles of learning, with the ultimate goal of improving functional outcomes.

Cognitive Remediation Experts Workshop
Types and methods galore

- Computer-based
- Individual
- Therapist led
- Outcome of Interest?
- Group
- Mechanism?
The evidence: good, could be better

• In large meta-analyses, cognitive remediation has shown ‘medium’ effects on cognitive abilities and everyday functioning
• So how can we do better?
• Can we identify a ‘cognitive enhancer’ to boost training?
The study: Combining computerized cognitive training and tDCS

To test whether combining a type of non-invasive brain stimulation with cognitive exercises is **feasible** and **helpful** in improving a type of memory skill among people who experience mental health symptoms and difficulty with those memory skills.

- Age 18-65
- Diagnosed with schizophrenia, schizoaffective disorder, or bipolar disorder
- Low performance on working memory tasks
Participant flow

Baseline assessment
- At-home cognitive training
- tDCS + cognitive training

Mid-point assessment
- tDCS + cognitive training
- At-home cognitive training

Final assessment
Computerized cognitive exercises

- Commercially available web-based program
- Tasks selected to specifically target working memory
Transcranial Direct Current Stimulation

- Involves attaching two electrodes to the scalp, one “excitatory” and one “inhibitory”, and passing a small electrical current between them to stimulate brain activity.
Enrollment

Consented
- Yes
- No

Confirmed Eligible
- Yes
- No - cognitive
- No - diagnosis
Participant Characteristics (n=7)

- 48 years old (range 27-62)
- 15 years education (range 12-18)
Retention

Study Completion Rate

0 Withdrawals
Missed assessments

Completed  In Progress
tDCS experience

Sessions stopped: 0
Current reduction: 1
At-home cognitive training experience

- More challenging than expected!
- Barriers: time and symptoms
What we have learned so far

• Will people sign up for this treatment?
  • YES!

• Can they actually come to the clinic and complete tDCS?
  • YES!

• Can they complete the at-home cognitive training?
  • MAYBE NOT…
Next steps

• Design changes
  • Remove requirement for cognitive impairment?
  • Remove at-home training component?
  • Add ‘sham’ stimulation as a control condition
  • Add one-month follow-up

• Funding!
How can you learn more?

• American Psychological Association, Division 12 (Society of Clinical Psychology)
  • https://www.div12.org/treatment/cognitive-remediation-for-schizophrenia/

• Cure Alliance for Mental Illness
  • http://curealliance.org/research-focus-cognitive-impairment-in-schizophrenia/

• Cogsmart.com

• Dealing with Cognitive Dysfunction: Handbook for Family and Friends

• Clinicaltrials.gov NCT03338673
Thank you!

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