

Social cognition and schizophrenia: a pilot intervention combining auditory processing, working memory, affect and theory of mind training

Demian Rose¹, MD, PhD, Christine Hooker², PhD, Sara Verosky², Asako Miyakawa², Sophia Vinogradov, MD¹

¹University of California at San Francisco, ²University of California at Berkeley



Introduction

-Schizophrenia is associated with deficits in social cognition (1-3).

-Our group has shown improvements on neuropsychological testing after computer-based cognitive remediation (4). These data suggest that we can harness neuroplastic mechanisms in the brain to remediate cognitive deficits in schizophrenia.

-We hypothesized that adding a training component that contained specific theory of mind and social cognition exercises (TASC) would lead to specific improvements on social cognitive performance in schizophrenic subjects.



Methods

-Clinically stable (n=4) subjects with schizophrenia completed neuropsychological and social cognitive testing both before and after 50 hours of intensive computer-based exercises, divided into 40 separate sessions over 8 weeks. Training consisted of:

HiFi - Auditory Processing and Working Memory by PositScience, Inc., 2005 (see demo)

TASC - Theory of Mind and Social Cognition
 Subtle Expression Training by Ekman, 2005
 -subtle facial emotional identification
 Mind Reading by Baron-Cohen, 2003
 -affect recognition training, social scenes



Mind Reading

Subjects access lessons and quizzes on various aspects of 20 basic emotions.

Subjects are also trained in social situations, with choices based on affect recognition, positional cues and mentalization



Subtle Expression Training Tool (SETT)

Subjects trained in subtle facial aspects of seven basic emotions (fear, anger, happiness, contempt, disgust, surprise, sadness)

Results

-Schizophrenic subjects who received TASC + HiFi show improvements in emotional recognition tasks, as measured by the BLERT, as well as generalized emotional I.Q., as measured by the MSCEIT. These tests measure aspects of social cognition not specifically trained in the TASC exercises (Figure 1).

BLERT = Bell and Lysaker Emotion Recognition Task,
 MSCEIT = Mayer, Salovey, Caruso Emotional Intelligence Test

-A comparison group of schizophrenic subjects who received HiFi alone did not show similar improvements on the BLERT or the MSCEIT, demonstrating specificity of TASC training for social cognitive outcome measures (Figure 2).

-TASC subjects showed similar improvements in executive functioning to those who received HiFi alone, suggesting that social cognitive training did not interfere with the benefits of HiFi (Figure 3).



Figure 1. Measures of Emotional Recognition and Emotional I.Q. before and after HiFi + TASC. Schizophrenic subjects received 8 weeks of HiFi + TASC. They were tested at baseline and after training on measures of emotional recognition (BLERT) and emotional I.Q. (MSCEIT).

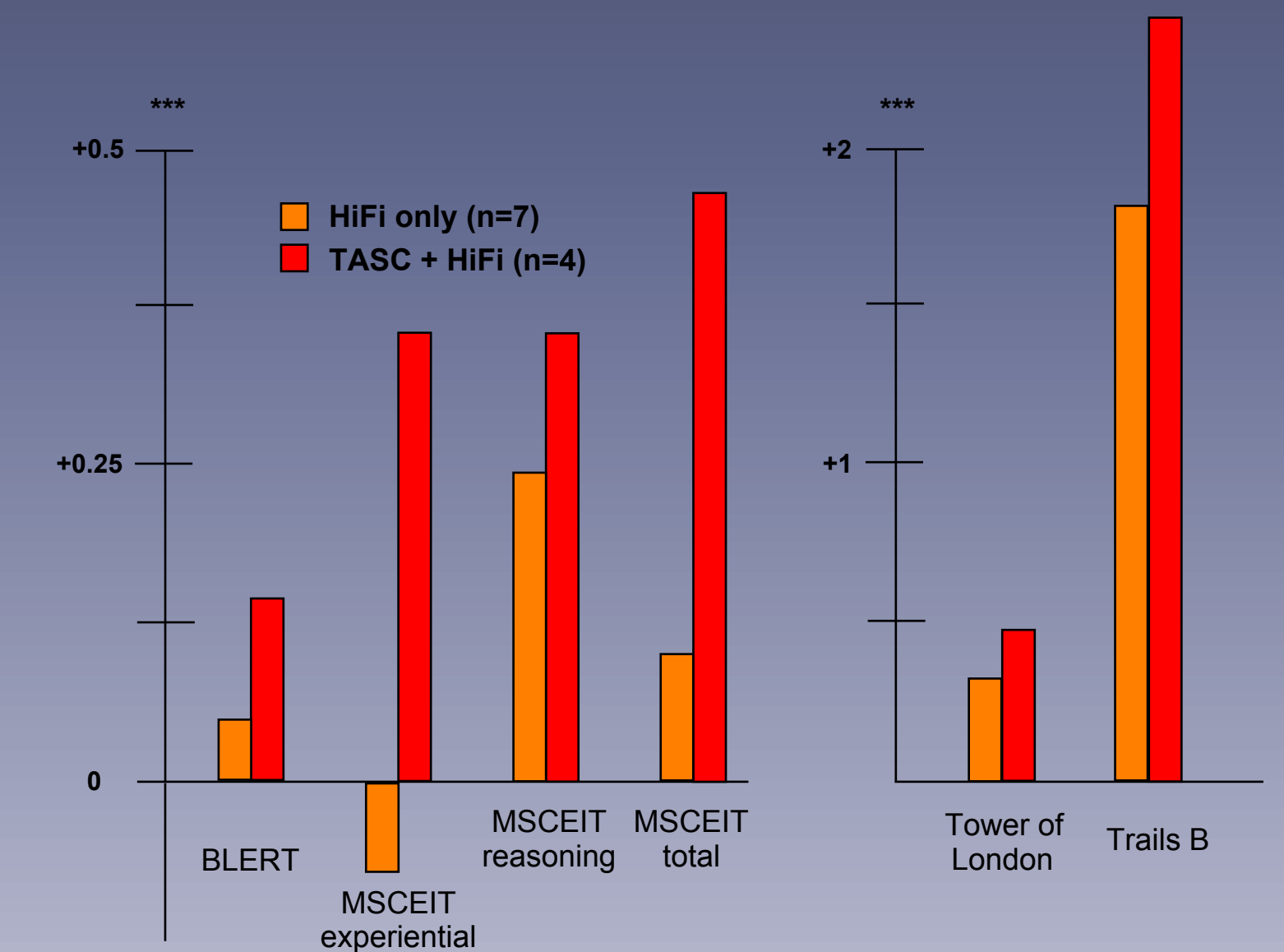


Figure 2

***Scaling represents absolute change scores for BLERT and z-score changes for MSCEIT, Tower of London and Trails B, before and after training

Figure 2. Specificity of TASC + HiFi Compared to HiFi alone. Schizophrenic subjects who received 8 weeks of TASC + HiFi show more improvement on tests of emotional recognition and generalized emotional I.Q. than subjects who receive HiFi alone.

Figure 3. Improvements in Executive Functioning. Schizophrenic subjects who received TASC + HiFi show similar improvements in executive functioning to those who received HiFi alone.

Conclusions

-These pilot behavioral data suggest that training on specific aspects of affect recognition, social scenes and theory of mind can improve performance on general measures of social cognition and emotional intelligence in schizophrenic subjects.

-These improvements are not seen in schizophrenic subjects who receive cognitive training without these specific social and emotional components.

-As previously hypothesized (5), these results suggest brain plasticity at the level of social processing, indicating that targeted computer-based remediation may be an effective treatment for some of the social cognitive deficits seen in schizophrenia.

References

- Hall, et al (2004), Br J Psych 185:169
- Pinkham, et al (2003), Am J Psych 160:815
- Frith, CD (2004), Psychol Med 34:385
- Vinogradov, et al (2005) poster presented at ACNP
- Buonomano, DV (1998), Ann Rev Neurosci 21:149