Cognitive Neuroscience Test Reliability and Clinical Applications for Schizophrenia

James Gold[*]

Maryland Psychiatric Research Center, University of Maryland School of Medicine, Baltimore, MD

*To whom correspondence should be addressed; tel: 410-402-7871, fax: 410-402-7198, e-mail: jgold@mprc.umaryland.edu

Cognitive impairment has been a central topic in schizophrenia research for nearly a century and the past 30 years has seen an increasing focus on neurocognitive approaches. The vast majority of studies in this enormous research literature have utilized assessment methods borrowed from clinical neuropsychology. Those clinical tools have been useful in documenting clear evidence for this impairment. However, the interpretation of that evidence has remained a challenge because most clinical neuropsychological measures are polyfactorial—requiring the operation of multiple cognitive functions in generating the response that is evaluated and compared with the performance of healthy subjects. This may serve to increase the sensitivity of traditional measures to the presence of many different kinds of impairments but decreases the resolution of these measures at the level of specific cognitive functions linked to specific neural systems. The National Institute of Mental Health funded the Cognitive Neuroscience Treatment Research in Cognition in Schizophrenia (CNTRICS) initiative to build consensus among different stake holders in the field on the most promising constructs and potential measures drawn from the basic cognitive neuroscience literature that might serve as sensitive assays of the specific cognitive and neural systems implicated in schizophrenia. The empirical work of the Cognitive Neuroscience Test Reliability and Clinical Applications for Schizophrenia (CNTRACS) consortium followed from the CNTRICS recommendations and involved optimizing measures so that they could be used in the clinic and serve as potential endpoints for treatment development research. We selected several constructs and corresponding measures for the study that ranged from early aspects of visual processing (gain control and visual integration[1,2]), episodic memory (specifically, relational encoding and retrieval[3]), and goal maintenance,[4] a critical aspect of higher order executive control. Thus, the combination of measures "cover" a widely distributed set of neural systems implicated in the illness.

The articles in this theme issue are the first empirical products of the CNTRACS consortium. For each construct of interest, we report on the performance of a large sample of patients with schizophrenia and demographically matched healthy volunteers as well as the psychometric features of the tasks including test-retest reliability. In addition, the relationships among the tasks and the clinical correlates of the tasks are found in the last article in the series.[5] As might be expected in a measure development and clinical validation project, there were some surprises along the road from basic cognitive neuroscience laboratory into the clinic with some measures faring better than others. The evidence presented in these articles should allow other investigators to make informed decisions about whether the tools developed by the CNTRACS consortium would be useful in their own work. These measures can be downloaded at no charge from cntrics.ucdavis.edu.

References

1. Barch DM, Carter CS, Dakin S, et al. The clinical translation of a measure of gain control: the Contrast-Contrast Effect. *Schizophr Bull*. 2012;38:135–143.
2. Silverstein SM, Keane BP, Barch DM, et al. Optimization and validation of a visual integration test for schizophrenia research: the Jittered-Orientation Visual-Integration Task (JOVI). *Schizophr Bull*. 2012;38:125–134.
3. Ragland JD, Ranganath C, Barch DM, et al. Relational and Item-Specific Encoding (RISE): task development and psychometric characteristics. *Schizophr Bull*. 2012;38:114–124.
4. Henderson D, Poppe AB, Barch DM, et al. Optimization of a goal maintenance task for use in clinical applications. *Schizophr Bull*. 2012;38:104–113.
5. Gold JM, Barch DM, Carter CS, et al. Clinical, functional and intertask correlations of measures developed by the Cognitive Neuroscience Test Reliability and Clinical Applications for Schizophrenia consortium. *Schizophr Bull*. 2012;38: 144–152.