Cognitive Remediation in Early Episode and Chronic Outpatients with Schizophrenia: Who Has More to Gain?

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BACKGROUND

- Individuals with schizophrenia experience impairments across a number of neurocognitive domains including attention, processing speed, memory, and executive functioning
- These deficits persist despite pharmacological intervention and serve to maintain functional disability (e.g., independent living, community involvement, or interpersonal behaviour)
- There is strong evidence that cognitive remediation therapy (CRT) produces robust improvements in neurocognition and adaptive functioning in chronic schizophrenia
- However, impairment is present in nearly all neurocognitive domains by the time of the first episode of psychosis (though typically not as severe as they are during the chronic phases)
- The typical age of onset is during a critical developmental window for acquiring adaptive living skills and interpersonal skills. These considerations highlight the importance of early intervention for cognitive functioning in schizophrenia.

PURPOSE: The purpose of this study is to compare the effects of cognitive remediation therapy on neurocognitive change and its generalization to behavior change in early episode versus chronic patients.

METHOD

Participants: 15 community-dwelling early episode patients (<5 years after first episode of psychosis; *M*=3.4, *SD*=1.1) and 15 chronic patients with schizophrenia (>5 years after first episode of psychosis; *M*=16.3, *SD*=8.6, who were matched on premorbid intelligence, baseline symptom severity, and total time hospitalized.

Procedure: Patients were randomized to cognitive remediation alone or with a skills intervention treatment. Treatment consisted of standard weekly CRT (Scientific Brain Training Pro) for 12 weeks in small group sessions. Participants were assessed before, and after treatment on a variety of neuropsychological, symptom, functional capacity and functional performance measures.

Measures:
Clinical symptoms were assessed with the PANSS and BDI (reported as mean item score)
Neurocognition was measured using the Brief Assessment of Cognition in Schizophrenia (BACS), which measures the following cognitive domains: verbal memory, psychomotor speed, processing speed, executive functioning, working memory, and verbal fluency, reported as a z-score
Functional Competence was measured using role-play laboratory-based measures, presented as percent of total score
- Interpersonal = Social Skills Performance Assessment (SSPA)
- Adaptive = UCSD Performance-Based Skills Assessment Battery (UPSA)

Real-world Performance was measured with three domains from a third-party rating scale: the Interpersonal behaviour, Community activities, and Work skills from the Specific Level of Function Scale (SLOF) reported as percent of total

Data Analysis:
We examined qualitative changes in neurocognition (% from each group that achieved neuropsychological "normalization") by comparing the proportion of patients who transitioned from impaired on a neurocognitive composite score at baseline (z-score < -1.0) to within normal limits (z-score > -1.0) and had at least a modest clinical effect (0.5 SD units)

Two-way Repeated Measures ANOVAs were conducted to examine overall treatment outcomes in neurocognition, symptoms, acquired skills, and real world performance, as well as between group differences and interaction effects.

RESULTS

Figure 1. Neuropsychological Normalization by Course Group

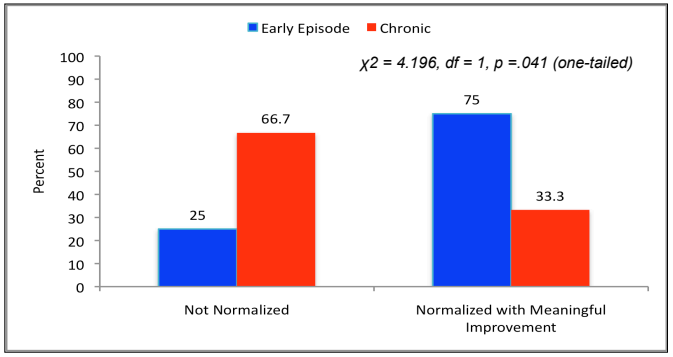


Table 1. Pre- and post-treatment by group; Main effect of treatment

	Pre-treatment				Post-treatment				Main Effect of Treatment	
	Early Episode		Chronic		Early Episode		Chronic			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Cognition										
Digit Symbol	-2.166	0.934	-2.120	0.829	-1.237	0.784	-1.615	0.784	114.325	<.001
Verbal Memory	-0.943	1.047	-1.416	1.139	-0.187	1.203	-0.890	1.095	53.780	<.001
Token Motor Task	-1.796	2.065	-1.082	1.045	-1.388	1.581	-0.879	1.086	11.397	.002
Digit Sequencing	-1.010	1.152	-2.038	1.657	-0.110	0.712	-0.878	1.255	47.308	<.001
Tower of London	-2.342	2.193	-1.865	1.964	-1.178	1.668	-0.936	1.763	60.210	<.001
Verbal Fluency	-0.311	0.977	-1.342	0.822	0.068	0.926	-0.661	0.849	27.967	<.001
Neurocognition Composite	-1.473	0.748	-1.644	1.048	-0.607	0.758	-0.917	0.987	138.878	<.001
Clinical Symptoms										
Positive Symptoms	2.513	0.933	2.267	0.419	2.423	0.997	2.220	0.667	0.347	.561
Negative Symptoms	2.571	0.876	2.856	0.613	2.459	0.705	2.696	0.611	1.947	.174
Depressive Symptoms	8.357	4.567	7.600	5.342	8.516	3.722	6.267	4.906	2.002	.168
Functional Competence										
Adaptive Skills	0.614	0.146	0.551	0.148	0.688	0.130	0.564	0.145	14.114	.001
Social Skills	0.689	0.062	0.746	0.116	0.722	0.064	0.777	0.105	10.299	.003
Third-party ratings										
Interpersonal Behaviour	0.691	0.095	0.764	0.109	0.736	0.069	0.794	0.059	10.020	.004
Activity	0.808	0.043	0.783	0.104	0.820	0.032	0.798	0.094	3.890	.059
Work	0.576	0.090	0.557	0.089	0.630	0.094	0.565	0.088	9.291	.005

Figure 2. RM ANOVA interaction for Digit Symbol Test

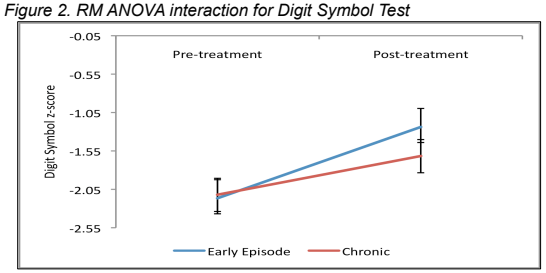


Figure 3. RM ANOVA interaction for Adaptive Competence

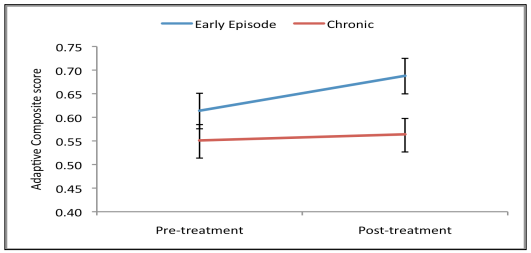
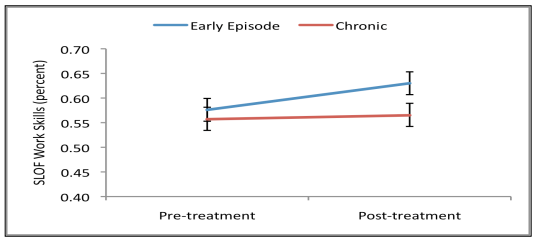


Figure 4. RM ANOVA interaction for SLOF Work



REPEATED-MEASURES ANOVAs

Patient groups had similar symptom severity and were marginally and non-significantly different on age-corrected cognitive scores, with the exception of less working memory impairment in the early episode group (p<.05).

Following treatment, early episode patients demonstrated greater improvement in information processing speed (p<.01) but minimal differences were observed in other domains.

Early episode patients demonstrated a greater generalization to performance-based measures of adaptive skills (p<.05) but not interpersonal competence compared to the chronic group.

Larger improvements in case manager ratings of real world work skills were observed in the early episode group (p<.05).

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CONCLUSIONS

- Treatment of cognitive impairments is feasible in both early episode and chronic schizophrenia,
  - The clinical meaningfulness and generalization to functioning appear to be more substantial when delivered early in course the illness.
  - These findings that suggest generalization to functioning, alongside previous work demonstrating a neuroprotective effect in the early course of illness (Eack et al., 2010), put CRT in a position to enter best practices for early intervention.
- Chronically ill patients improve in cognition but might require supplemental skill-based treatments to foster generalization to everyday functioning.