



Compensatory cognitive training for people with first-episode schizophrenia: Results from a pilot randomized controlled trial



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ABSTRACT

Cognitive training or remediation now has multiple studies and meta-analyses supporting its efficacy in improving cognition and functioning in people with schizophrenia. However, relatively little is known about cognitive training outcomes in early psychosis. We conducted a pilot randomized controlled trial of Compensatory Cognitive Training (CCT) compared to Treatment as Usual (TAU) in 27 participants with first-episode psychosis who had received treatment for psychosis for less than six months. Assessments of cognition (MATRICS Consensus Cognitive Battery; MCCB) and functional capacity (UCSD Performance-Based Skills Assessment-Brief; UPSA-B) were administered at baseline and following the 12-week treatment. The CCT condition, compared to TAU, was associated with significant improvements on the MCCB composite score, as well as MCCB subtests measuring processing speed (Trail Making) and social cognition (Mayer–Salovey–Caruso Emotional Intelligence Test), with large effects on these three outcome measures. There were no significant CCT-associated effects on the UPSA-B or on positive, negative, or depressive symptoms. CCT treatment of cognitive impairments in first-episode schizophrenia is feasible and can result in large effect size improvements in global cognition, processing speed, and social cognition.

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1. Introduction

The cognitive impairments associated with schizophrenia and their negative effects on functional outcomes are well-established in the psychiatric literature (e.g., Heinrichs and Zakzanis, 1998; Green et al., 2000). Current efforts are therefore focused on empirically supported treatments to improve cognitive functioning among affected individuals. Cognitive remediation, or cognitive training, is one such treatment and is defined as “a behavioral, training-based intervention that aims to improve cognitive processes (attention, memory, executive function, social cognition, or metacognition) with the goal of durability and generalization” (Wykes et al., 2011). Recent evidence suggests that cognitive remediation has a moderate effect on cognitive measures and psychosocial functioning, and a small effect on psychiatric symptom severity; it has proven more effective in clinically stable patients and when combined with other psychiatric rehabilitation programs (Wykes et al., 2011). On average, however, most published trials of cognitive remediation include middle-aged, chronically ill individuals with

a confirmed diagnosis of schizophrenia, limiting conclusions about its efficacy for those in the prodromal phase or first-episode of psychotic illness.

Few studies have examined cognitive remediation in the early course of schizophrenia, but there are numerous reasons to pursue this line of investigation. Cognitive impairment is evident before the onset of overt psychosis, continues during the early phase of illness, and may even worsen during the first episode (Saykin et al., 1994; Bilder et al., 2006; Eastvold et al., 2007). Further, first episode participants have shown inconsistent trajectories of cognitive performance, where some cognitive abilities improve over time and others deteriorate (Jahshan et al., 2010). At the same time, young individuals early in the course of illness may have greater brain plasticity and more limited structural and functional brain changes than those with chronic psychotic illness, which could lead to better results of cognitive remediation treatment (Keshavan and Hogarty, 1999; Berger et al., 2007). Indeed, there is some evidence to suggest that cognitive remediation may have a neuroprotective effect against gray matter loss in early schizophrenia (Eack et al., 2010a). People enduring a first episode of schizophrenia, therefore, may be uniquely positioned to capitalize on neural plasticity and bypass some cognitive deficits through cognitive remediation treatment.

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In light of this rationale, some researchers have begun to explore cognitive remediation in early schizophrenia. A recent review of eight published manuscripts concluded that preliminary results are positive, but more empirical research is needed to confirm the efficacy of cognitive remediation (Barlatti et al., 2012). For example, one study of cognitive remediation in adolescents with early onset psychosis initially found no superior effect of cognitive remediation compared to psychoeducation, but at one year follow-up there appeared to be an effect on early visual information processing (Ueland and Rund, 2004; Ueland and Rund, 2005). Other studies have found positive effects of cognitive remediation for early course schizophrenia on global cognition (Eack et al., 2009; Fisher et al., 2015), learning (Fisher et al., 2015), executive functioning (Wykes et al., 2007; Fisher et al., 2015), social cognition (Eack et al., 2009), psychiatric symptoms (Eack et al., 2009), and social adjustment (Eack et al., 2009, 2010b). A recent comparison of early-course (<5 years illness duration) and chronic (>15 years illness duration) cognitive remediation participants showed that the early-course participants had larger improvements in processing speed, executive functioning, and functional capacity (Bowie et al., 2014). Overall, cognitive remediation treatment in early schizophrenia shows promise, but more empirical evidence is required. Additionally, the studies of cognitive remediation in early course schizophrenia have all employed restorative, drill-and-practice interventions; compensatory training approaches have not been investigated.

This study aimed to pilot-test a manualized Compensatory Cognitive Training (CCT) intervention in a sample of first episode schizophrenia participants. In contrast to restorative approaches to cognitive remediation, which rely on drills and practice to improve cognition, compensatory cognitive training approaches teach cognitive strategies as ways of working around cognitive impairments, with the goal of developing new cognitive habits that generalize to cognitive performance and meaningful real-world outcomes (Wykes et al., 2011). CCT has demonstrated efficacy in participants with chronic schizophrenia (Twamley et al., 2012) and targets cognition in four domains: prospective memory, attention and vigilance, learning and memory, and executive functioning. CCT is a brief (24 h over 12 weeks), group-based intervention that teaches strategies in the domains above via interactive, game-like activities to maintain interest and increase focus and motivation. Therapists elicit clients' personal goals and link the strategies taught to their specific goals in order to enhance intrinsic motivation (e.g., "You told me that dating is important to you, and these skills for paying attention during conversations will help you have conversations on your dates."). Home exercises are assigned weekly to promote cognitive habit learning and strategy use in the real world. Each session follows the same general format of reviewing the home exercises, establishing a rationale for new skills to be taught, demonstrating the skill, having participants practice the skill, planning for implementation in daily life, and assigning home exercises for the coming week. The CCT manual is provided free of charge at www.cogsmart.com.

It was hypothesized that, compared to a control group receiving treatment as usual (TAU), the CCT participants would demonstrate improvements in a cognitive composite score and functional capacity (co-primary outcomes) at post-treatment. We also examined change on individual cognitive test scores and psychiatric symptom ratings (secondary outcomes).

1.1. Method

1.1.1. Participants

Participants were outpatients enrolled at On Track, the Champlain District Regional First Episode Psychosis Program, of The Ottawa Hospital. On Track provides clinical services to individuals who are experiencing their first psychotic episode, and who have received treatment for less than six months prior to enrollment in the program. In addition to

being enrolled as a patient at On Track, inclusion criteria for enrollment in the study consisted of the following:

- 1) Individuals must be diagnosed with a primary psychotic disorder (i.e., schizophreniform disorder, schizophrenia, or schizoaffective disorder). Diagnoses were made by the treating psychiatrist on the basis of a clinical interview.
- 2) Recruitment was limited to individuals between the ages of 18 and 35, in order to increase group homogeneity.
- 3) Only English speakers were included in the study because the therapist and patient manuals for CCT were available in English only.

Potential participants were excluded from the study if:

- 1) The individual was clinically unstable to the degree that weekly group therapy was not feasible.
- 2) The individual had previously been diagnosed with an underlying neurological condition affecting cognition (e.g., significant traumatic brain injury; seizure disorder).
- 3) There was evidence of significant, active substance abuse.

Thirty-one participants were enrolled. One was too old to meet inclusion criteria and was dropped; one withdrew consent; two in the TAU group were lost to follow-up. In the final sample, there were 27 participants (16 CCT; 11 TAU).

1.1.2. Procedure

Individuals who were identified as potential participants by their On Track psychiatrists, social workers, or nurses were approached for possible enrollment in the study. Written informed consent to participate in the study was obtained from each participant, and the study was approved by the Ottawa Hospital Research Ethics Board.

Following informed consent and baseline assessment, participants were randomized into the experimental (Compensatory Cognitive Training; CCT) or control (Treatment as Usual; TAU) group via computerized randomization. The randomization was carried out by an independent staff member who was given subject identification numbers only; thus, the research associate was not aware of the random assignments until after they occurred. After 12 weeks, each participant was re-administered the outcome measures. All participants were compensated for their time during the assessments, but not for attending treatment. The examiner was not blind to group assignment, but was not involved in providing treatment.

1.1.3. Experimental and control conditions

Participants in CCT attended a weekly 2-hour group treatment session with 7–8 participants per group. They were also supplied with patient manuals outlining each session. Each session was facilitated by the therapists (PDM and LSL), except on a few occasions when one of the facilitators was not available due to scheduling conflicts or illness. In such cases, the group was led by the remaining facilitator. Participants in the CCT group continued to receive standard treatment at On Track while they were enrolled in the study. Participants in the TAU group received standard treatment during the duration of the study, which included routine psychiatric care provided by a program psychiatrist, as well as regular access to treatment providers from other disciplines represented in the program (e.g. psychology, social work, nursing, occupational therapy).

1.1.4. Measures

The following outcome measures were administered to each participant at baseline and post-treatment. The Wechsler Test of Adult Reading was administered only during the baseline assessment, in order to obtain an estimate of general intellectual functioning.

- 1) Wechsler Test of Adult Reading (WTAR; *The Psychological Corporation, 2001*): A measure that assesses an individual's ability to read single words. This task is used to estimate pre-morbid, general intellectual functioning.

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