



Specific vs general cognitive remediation for executive functioning in schizophrenia: A multicenter randomized trial

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ABSTRACT

Background: This study assesses the benefits of an individualized therapy (RECOS program) compared with the more general cognitive remediation therapy (CRT).

Methods: 138 participants took part with 65 randomized to CRT and 73 to RECOS. In the RECOS group, participants were directed towards one of five training modules (verbal memory, visuo-spatial memory and attention, working memory, selective attention or reasoning) corresponding to their key cognitive concern whereas the CRT group received a standard program. The main outcome was the total score on BADS (Behavioural Assessment of Dysexecutive Syndrome) and the secondary outcomes were: cognition (executive functions; selective attention; visuospatial memory and attention; verbal memory; working memory) and clinical measures (symptoms; insight; neurocognitive complaints; self-esteem). All outcomes were assessed at baseline (T1), week 12 (posttherapy, T2), and follow-up (week 36, i.e., 6 months posttherapy, T3).

Results: No difference was shown for the main outcome. A significant improvement was found for BADS' profile score for RECOS at T2 and T3, and for CRT at T3. Change in BADS in the RECOS and CRT arms were not significantly different between T1 and T2 (+0.86, $p = 0.108$), or between T1 and T3 (+0.36, $p = 0.540$). Significant improvements were found in several secondary outcomes including cognition (executive functions, selective attention, verbal memory, and visuospatial abilities) and clinician measures (symptoms and awareness to be hampered by cognitive deficits in everyday) in both treatment arms following treatment. Self-esteem improved only in RECOS arm at T3, and working memory improved only in CRT arm at T2 and T3, but there were no differences in changes between arms.

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Conclusions: RECOS (specific remediation) and CRT (general remediation) globally showed similar efficacy in the present trial.

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1. Introduction

Recovery is a major challenge in the care of people with schizophrenia. It entails consideration of variables that underlie disabilities associated with schizophrenia, in particular cognitive deficits. These deficits are a core feature in schizophrenia (Heinrichs and Zakzanis, 1998). Attention, memory, executive functions, and social cognition deficits have a negative impact on patient's adaptive and social competences and, as a result, on their ability to achieve personal autonomy and normal social functioning (Green, 1996; Green et al., 2000; Bowie and Harvey, 2005; McGurk et al., 2007; Bowie et al., 2010; Hoe et al., in press). Conventional treatments (antipsychotic medication and psychological treatments) have limited effects on cognitive deficits; hence, cognitive remediation (CR) programs were designed not only to alleviate the problems but also to promote the transfer of cognitive gains to functional improvements (Wykes and Reeder, 2005).

CR programs have shown moderate gains for patients with a diagnosis of schizophrenia (Wykes et al., 2011). Interventions typically involve a variety of exercises in a paper and pencil or a computerized format with a growing number of specialized computer programs now being developed. However, many programs lack specificity, which does not allow an individual's specific needs to be addressed. Silverstein and Wilkness (2004), Demily and Franck (2008), as well as Levaux et al. (2009) underlined the need to develop more individualized cognitive rehabilitation treatments to take into account the cognitive heterogeneity characterizing this disorder. More targeted interventions might increase the benefits of therapy so RECOS – cognitive remediation for schizophrenia – was developed to fill this gap (Vianin et al., 2010).

The RECOS and the cognitive remediation therapy – CRT (Wykes et al., 1999, 2003) are two programs that pair drill and practice style paper and pencil and/or computerized exercises and a strategy coaching approach. Therapists make use of techniques known to benefit the rehabilitation of dysexecutive syndromes. To facilitate generalization of cognitive gains to everyday life, interventions are aimed at concrete goals defined according to the patient's difficulties and discussed regularly during the course of the therapy. Finally, homework allows what was trained during sessions to be applied to everyday life. These aspects of therapy, in conjunction with a psychoeducation session at the beginning of the procedure, enhance the participant's metacognitive skills, one of the key factors involved in functional repercussions of cognitive deficits in schizophrenia (Wykes and Reeder, 2005; Koren et al., 2006).

Both programs target cognitive functions that are more frequently impaired in schizophrenia (verbal memory, visuospatial memory and attention, working memory, selective attention, and reasoning). However, in the CRT program, cognitive targets are embedded in three modules, whereas in the RECOS program, they are separately identified in the computer program as five independent modules, and these modules are chosen according to the patient's key cognitive difficulties (see Table 1). Each module of RECOS targets a single impaired cognitive area, within the limits of cognitive domains' overlapping.

Despite the conclusions of meta-analyses that cognitive remediation is effective in terms of both cognition and functional outcomes; there is still debate about the usefulness of a specific compared to a more general approach to remediation. This study addresses this issue by comparing the benefits on executive functions and on clinical, neuropsychological, and psychosocial criteria of the specific cognitive training given by RECOS to those of the already validated program CRT (Wykes et al., 1999, 2003, 2007). As the remedial phase is designed to improve the

cognitive performances while promoting the transfer and generalization of skills learned in therapy to everyday life, the Behavioural Assessment of the Dysexecutive Syndrome (BADS) (Wilson et al., 1996) total score has been chosen as the main outcome. BADS evaluates executive functions in ecological conditions and is therefore more likely to indicate the easy translation of cognitive improvements into functioning (Krabbendam et al., 1999).

2. Method

2.1. Study design

Clinically stable patients were recruited to a group parallel-randomized clinical trial with two active treatment groups – RECOS and CRT. Assessments, blind to group allocation, were carried out at baseline (T1 = week 0), posttreatment (T2 = week 12), and follow-up (T3 = week 36). The main treatment outcome measure was the BADS profile score. Secondary measures included clinical ratings, cognitive measures, and psychosocial evaluation.

The study was approved by a local ethics authority (CPP Lyon Sud-Est IV, project no. 08/058) and declared to the national authority (AFSSAPS: project no. 2008-A00830-55) and on clinicaltrials.gov (NCT01607424). After a complete description of the study procedures and objective, each participant provided a written consent.

2.2. Participants

One hundred and fifty-one outpatients with schizophrenia were referred to the trial from the 8 French and Swiss psychiatric departments participating in the study. They were included if they met the following criteria: DSM-IV-TR criteria for schizophrenia (APA, 2000) confirmed with a semi-structured interview (M.I.N.I., Lecrubier et al., 1997); age

Table 1
Characteristics of RECOS and CRT.

	RECOS	CRT
Similarities	<ul style="list-style-type: none"> • Intensive and targeted cognitive training • Therapist and patient relationship: interactive process • Learning modalities: <ul style="list-style-type: none"> – Active, reflective processing in addition to practice – Verbal mediation techniques, categorization, organization, and planning – Training of processes implicated in executive functions – Reduction of information and forming associations – Problem-solving techniques • Concrete goals 	
Differences	<ul style="list-style-type: none"> • Content: 5 independent modules: selective attention, verbal memory, visuo-spatial attention and memory, working memory, and reasoning • Modalities: paper & pencil + computerized training • Model of care: collaborative, development of patient's own strategies • Target: each patient's deficits • Adaptability: 10 levels of difficulty for each computer exercise • Exercises adapted with patient's improvement • Home exercises 	<ul style="list-style-type: none"> • Content: 3 embedded modules: cognitive flexibility, memory, and planning • Modalities: paper & pencil training • Model of care: directive, use of strategies proposed by the therapist • Target: main deficits associated with schizophrenia

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