



## **COGNITIVE REMEDIATION THERAPY APPLIED TO PSYCHIATRIC PATIENTS: AN EXPERIMENTAL STUDY**

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### **ABSTRACT**

Cognitive Remediation Therapy (CRT) is an evidence-based rehabilitative intervention aimed at improving cognitive functions impaired in major psychiatric disorders, promoting the generalization of acquired skills to daily life contexts and supporting psychosocial functioning recovery. The aim of this study is to assess the effectiveness of (CRT) as an integrated rehabilitative intervention for major psychiatric disorders, with a particular focus on schizophrenia and bipolar disorder. *Background:* In psychotic and bipolar disorders, cognitive deficits are one of the main factors that limit daily and psychosocial functioning, often persisting even after symptoms have remitted. In this context, (CRT) has established itself as an evidence-based intervention aimed at enhancing cognitive functions and promoting functional recovery.

*Method:* Two patients with different diagnoses (schizophrenia and bipolar disorder) underwent an individual CRT program consisting of 40 sessions. The protocol, organized into modules dedicated to cognitive flexibility, working memory, and planning, employed techniques such as errorless learning, scaffolding, verbalization, and positive reinforcement. Neuropsychological assessment, conducted using the ENB-2 battery before and after treatment, allowed for monitoring changes in the main cognitive domains. This study should be considered exploratory and pilot in nature, given the small sample size and case-based design.

*Results:* Both patients showed improvements in executive functioning and daily-life autonomy. ENB-2 scores increased from 57 to 67 in Case 1 and from 54 to 55 in Case 2. WHODAS 2.0 scores decreased from severe to moderate impairment in Case 1 WHODAS 3 to 2 and showed further functional improvement in Case 2 WHODAS 1.1 to 0.5. These gains were maintained at follow-up.

*Conclusion:* The results confirm the effectiveness of CRT as a rehabilitative tool supporting cognitive and psychosocial recovery in psychotic and mood disorders. Integrating CRT into multidisciplinary treatment programs represents a valuable approach to promoting functional recovery and enhancing patients' quality of life.

**Keywords:** *Neuropsychology, cognitive rehabilitation, executive functions, schizophrenia, bipolar disorder*

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## **Introduction**

Psychiatric disorders can affect multiple aspects of daily life, leading to cognitive impairments such as deficits in memory, attention, and executive functions. Although often overlooked, cognitive disturbances play a crucial role in the prognosis and course of psychiatric conditions, particularly in relation to the concept of recovery, defined as the process of living a fulfilling and satisfactory life despite the limitations imposed by illness (Ashcraft & Anthony, 2005; Liberman, 2008).

In major psychiatric disorders such as schizophrenia and bipolar disorder, cognitive deficits are not always immediately evident but profoundly affect everyday functioning. In schizophrenia, according to DSM-IV-TR, ICD-10, and DSM-5-TR, the core cognitive deficits concern attention, episodic memory, and executive functions (Green et al., 2019; Molina & Tsuang, 2020; Seidman & Mirsky, 2017). These impairments are associated with negative symptoms, disorganized thinking, and social dysfunction, and they represent significant predictors of prognosis (Bobes García & Saiz Ruiz, 2013; Ancín et al., 2013; Sawada et al., 2017).

Cognitive Remediation Therapy (CRT) fits within the framework of psychiatric recovery, distinguishing between clinical recovery (symptom reduction and cognitive improvement) and functional recovery (social reintegration and autonomy in daily activities) (Bellack, 2006). CRT aims to enhance basic cognitive functions and coping strategies, promoting social skills and real-world competencies through both restorative (bottom-up) and compensatory/strategic (top-down) approaches (Wykes & Reeder, 2005; Wykes & Reeder, 2013).

## **Method**

Neuropsychological assessment was conducted using the ENB-2 battery (Esame Neuropsicologico Breve-2), a standardized and validated instrument widely used in clinical settings to evaluate multiple cognitive domains, including attention, memory, executive functions, and visuospatial abilities. The ENB-2 has demonstrated good psychometric properties in terms of reliability and validity in both clinical and non-clinical populations (Mondini et al., 2003).

Functional status and disability were assessed using the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0), a standardized and internationally validated tool developed by the World Health Organization (2010). WHODAS 2.0 provides a comprehensive measure of functioning across six domains, including cognition, mobility, self-care, interpersonal relationships, life activities, and participation in society, and has shown strong reliability and cross-cultural validity. This study should be considered exploratory and pilot in nature, given the small sample size and case-based design.



## **Clinical Case 1**

The patient, a 33-year-old man, presented in March with a diagnosis of schizophrenia associated with severe anxiety. He reported spending most of his time at home playing video games and avoiding going outside due to persistent anxiety and worry. He experienced difficulty performing daily tasks such as grocery shopping, struggling to organize what he needed; even when using a list, he required extended time, as he followed a rigid and non-logical selection criterion. Relationally, he reported difficulty conversing with others, including family members, due to challenges understanding dialogue. Consequently, he displayed an absence of social participation and a marked lack of friendships. The family also reported significant disorganization and a daily absence in mental presence and communication.

Following initial interviews, the patient underwent assessment using the ENB-2 neuropsychological battery and the WHODAS 2.0 questionnaire for quality-of-life evaluation. He then began a CRT program with two 1-hour weekly sessions, following an individualized protocol based on neuropsychological findings. Initially, participation was limited due to anxiety, which was managed with supportive techniques and informal verbalization.

## **Clinical Case 2**

The second case involves a 53-year-old patient diagnosed with Bipolar Disorder with psychotic features, presenting with moderate-to-severe cognitive deterioration due to illness. The patient presented in January with significant difficulties in daily functioning. He reported being unable to perform his work tasks due to challenges remembering appointments, calculations, theories, and job-specific procedures. Relationally, he experienced difficulty expressing himself and collaborating with colleagues, as understanding conversations, metaphors, and jokes was challenging. According to his family, the patient appeared mentally absent in everyday life, demonstrated poor listening orientation, and exhibited impaired metacognitive abilities and executive functions.

After several interviews, he was assessed with the ENB-2 neuropsychological battery and the WHODAS 2.0. As in the first case, he followed a CRT program with two 1-hour weekly sessions, using a gradual and supportive approach designed to enhance motivation, self-esteem, and treatment adherence.

## **Results – Case 1**

At t0, before treatment, WHODAS 2.0 showed a score of 3, indicating severe difficulties, particularly in understanding, mobility, daily activities, and interpersonal relationships. The ENB-2 battery revealed a global score of 57 (cut-off 77), with deficits in executive functions, planning, and memory with interference.

During therapy, significant improvements emerged: the patient exhibited reduced anxiety during tasks, greater fluency in speech, and a louder, more confident tone of voice. Motivation increased substantially, allowing him to attend sessions three times per week and complete the protocol in just five months.

At t1, following treatment, the ENB-2 and WHODAS 2.0 were re-administered. WHODAS yielded a score of 2 (moderate difficulty), while the ENB-2 score increased to 67, demonstrating meaningful improvement. Post-treatment results indicated a substantial reduction in perceived difficulties, especially in understanding, mobility, daily activities, and social participation, shifting from severe to moderate impairment. Cognitive testing showed clear improvements in executive and cognitive functioning. These gains were maintained at a 30-day follow-up. (See Figures 1 and 2).

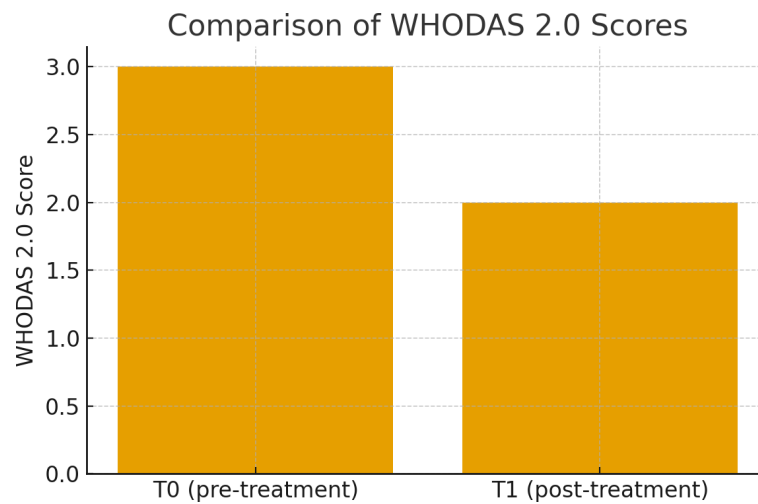


Figure 1. Comparison of t0 and t1 Scores on the WHODAS 2.0 Scale

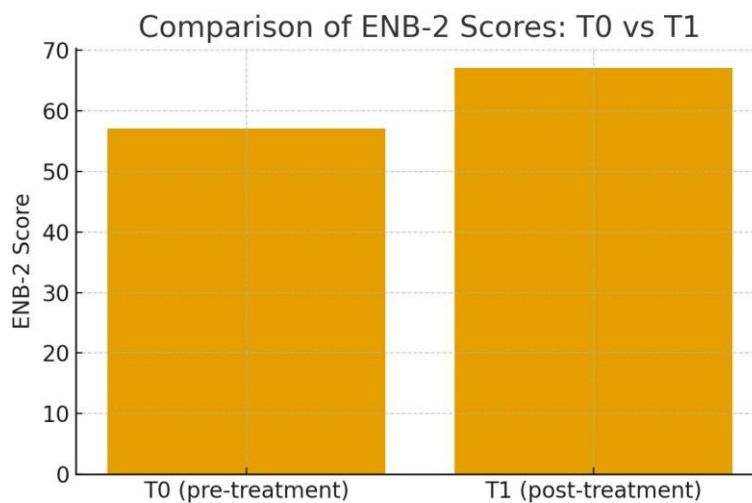


Figure 2. Comparison of t0 and t1 Scores on the ENB-2 Test

## Results – Case 2

At t<sub>0</sub>, WHODAS 2.0 showed a score of 1.1, with difficulties in cognitive, metacognitive, and executive domains. The ENB-2 battery revealed below-normal scores, including an unscorable Trail Making Test B (score = 999). Over the course of therapy, the patient demonstrated increased confidence in performing cognitive exercises and reduced frustration and demoralization. Motivation progressively improved, enabling consistent attendance and completion of the protocol in approximately seven months.

At treatment completion, both ENB-2 and WHODAS 2.0 were re-administered. WHODAS showed a decreased score of 0.5, indicating reduced perceived difficulties, particularly in understanding, social participation, and daily activities. The ENB-2 global score increased from 54 to 55, with two additional areas falling within the normal range, and the Trail Making Test B, previously incomplete, was successfully completed. (See Figures 3 and 4).

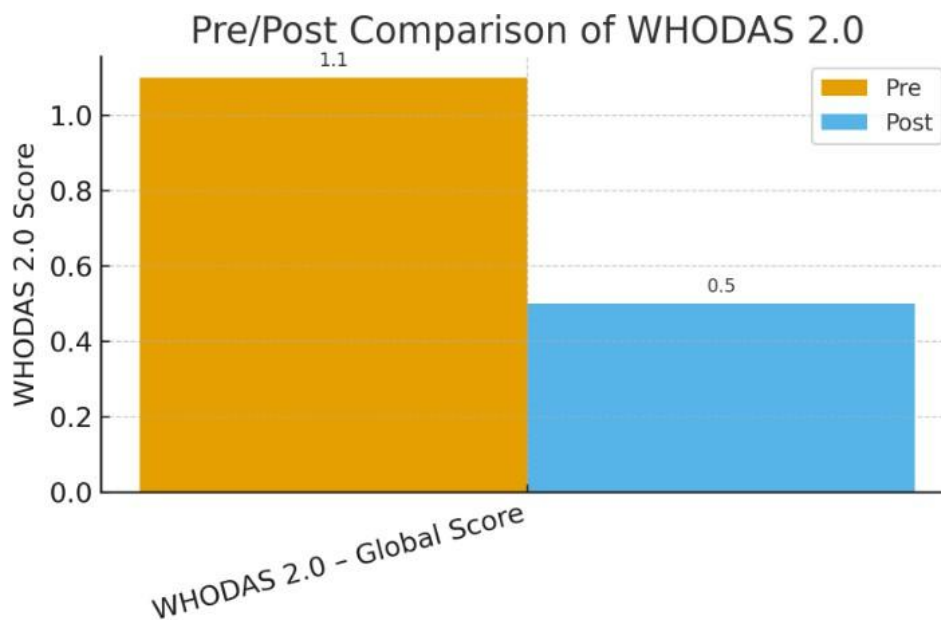


Figure 3. Comparison of t<sub>0</sub> and t<sub>1</sub> Scores on the WHODAS 2.0 Scale

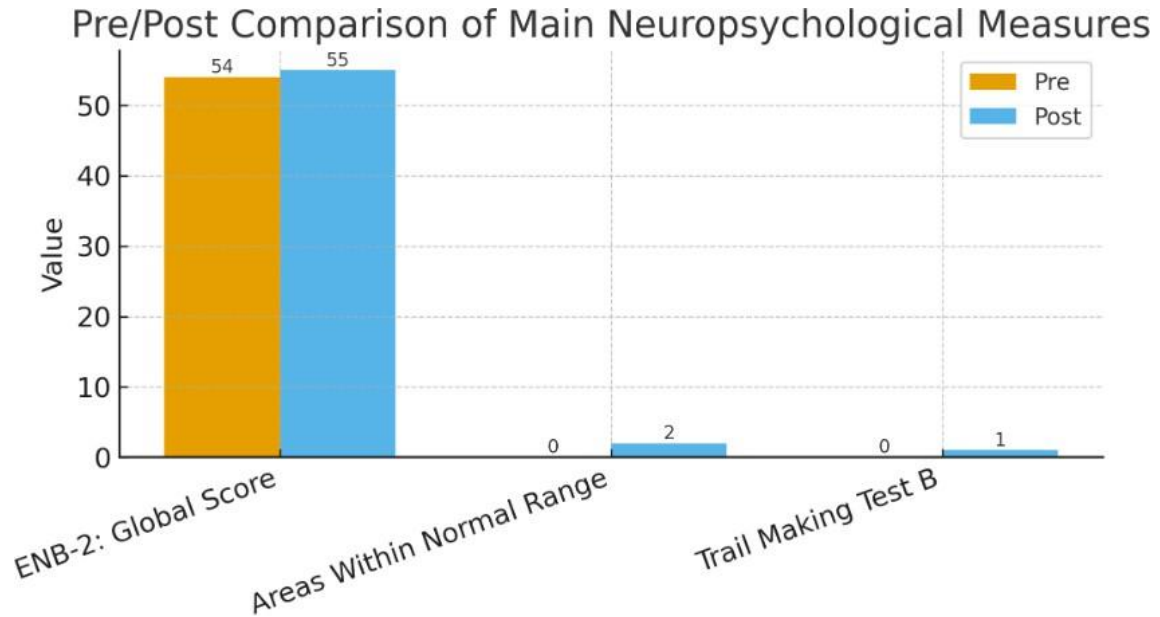


Figure 4. Comparison of  $t_0$  and  $t_1$  Scores on the ENB-2 Test

## Discussion

The results of this study align with findings reported by Bowie et al. (2020), who highlight CRT as a solid foundation for subsequent rehabilitative interventions in schizophrenia, particularly when combined with other therapeutic approaches and technological supports. Similarly, recent research (Wagner & Bandeira, 2023), through systematic review and meta-analysis, documented significant improvements in cognitive functioning and employment outcomes among patients with schizophrenia undergoing CRT. Quantitative improvements were observed in both cases, particularly in functional outcomes measured by WHODAS 2.0, supporting the clinical relevance of CRT beyond test performance.

Integrated approaches such as these support not only cognitive enhancement but also improved global functioning, reduced anxiety, increased social participation, and strengthened daily-life skills. The collected data suggest that CRT can have a lasting and transferable impact on patients' real-world functioning, confirming its effectiveness as a rehabilitative intervention focused on improving quality of life and functional abilities. Quantitative improvements were observed in our sample, quantitative pre-post measures further support the effectiveness of CRT in both cases. In Case 1, the ENB-2 global score increased from 57 at baseline ( $t_0$ ) to 67 post-treatment ( $t_1$ ), indicating a clinically meaningful cognitive improvement. Similarly, WHODAS 2.0 scores decreased from 3 (severe disability) to 2 (moderate disability), reflecting better functioning in daily activities and social participation.



In Case 2, although the increase in ENB-2 global score was modest (from 54 to 55), relevant qualitative changes were observed, including the ability to complete the Trail Making Test B, which was previously unscorable. Moreover, WHODAS 2.0 scores decreased from 1.1 to 0.5, indicating a substantial reduction in perceived disability. These findings highlight that functional improvements may occur even when changes in neuropsychological test scores appear limited, emphasizing the ecological validity of CRT outcomes.

However the present findings should be interpreted cautiously, as this exploratory pilot study included only two clinical cases.

### **Conclusions**

In recent years, psychiatric research has progressively developed integrated rehabilitative interventions aimed at improving both cognitive deficits and social competencies. (CRT) has demonstrated high efficacy in enhancing specific cognitive functions such as memory, attention, and cognitive flexibility, while also highlighting the need to promote social skills, which are frequently impaired in psychiatric disorders. This integrated approach represents a paradigm shift: the goal is no longer limited to reducing stressors or increasing protective factors but focuses on the active development and restructuring of patients' cognitive and social competencies (Frith & Frith, 2007).

The clinical cases presented confirm the effectiveness of CRT in improving daily functioning, social participation, interpersonal relationships, and self-efficacy. Enhancements in cognitive functions—particularly memory and executive functions—enabled patients to resume work activities, strengthen social relationships, and develop a sense of competence and self-esteem. It is important to emphasize that improvement in the ENB-2 score is not the primary goal of CRT; the focus remains on enhancing daily functioning and quality of life.

Future research should explore individual factors that influence CRT response—including demographic, clinical, cognitive, and functional characteristics—to identify which patients benefit most from specific therapeutic pathways. Such a personalized approach would enable increasingly targeted, effective, and efficient interventions, optimizing the cost-benefit ratio.

Finally, theoretical models and rehabilitative interventions must consider the complexity of psychiatric functioning and the interactions among cognitive, social, and environmental processes. The evidence indicates that integrated, flexible, and patient-centered interventions support the development of adaptive strategies, improve quality of life, and facilitate social and occupational reintegration. Only through this multidimensional perspective can sustainable and lasting rehabilitation be achieved, enhancing individual resources and promoting meaningful recovery.

### **Declaration of Conflicting Interests**

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