

Effectiveness of Cognitive Stimulation Therapy for an Individual with Mild Cognitive Impairment: A Case Study

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Received: September 18, 2026; **Published:** October 13, 2026

DOI: 10.31080/ECNE.2026.18.01340

Abstract

Cognitive stimulation therapy (CST) is an evidence-based non-pharmacological intervention for cognitive decline, yet its application with individuals presenting with mild cognitive impairment (MCI) remains underexplored. This case study examined whether a brief, individually delivered CST protocol could produce measurable cognitive gains in a male adult in his late seventies with confirmed MCI. Eight weekly one-hour sessions were conducted, incorporating memory games, jigsaw puzzles, therapeutic coloring, and music-based activities. Cognitive functioning was assessed before and after the intervention using the Montreal Cognitive Assessment (MoCA). Pre-intervention score was 22 (MCI range: 18-25); post-intervention score was 25, representing a 3-point gain. Domain-level improvements were observed in visuospatial and executive function, delayed recall, and orientation. Findings suggest that a brief, activity-based individual CST protocol may produce meaningful cognitive gains in individuals with MCI. Replication with controlled designs and larger samples is needed.

Keywords: *Cognitive Stimulation Therapy; Mild Cognitive Impairment; Montreal Cognitive Assessment; Non-Pharmacological Intervention; Cognitive Rehabilitation*

Introduction

Mild cognitive impairment (MCI) is a condition that lies between normal age-related cognitive changes and dementia. People with MCI experience noticeable difficulties in cognitive abilities such as memory, attention, or thinking. However, these difficulties are not severe enough to significantly interfere with daily functioning [15]. Research suggests that MCI affects approximately 15% to 20% of adults aged 65 years and older, and its prevalence increases with age [9]. Individuals with MCI are also at a higher risk of developing dementia, with an estimated 10% to 15% progressing to dementia each year [7]. Therefore, MCI represents an important stage for early identification and intervention, as timely support may help maintain cognitive functioning and delay further decline.

Despite the importance of MCI as an early stage of cognitive decline, pharmacological treatments have shown limited success in slowing cognitive deterioration or preventing progression to dementia [16]. As a result, increasing attention has been given to non-pharmacological interventions, such as cognitive stimulation and cognitive training, as alternative or complementary approaches for supporting cognitive health. Among these, cognitive stimulation therapy (CST) has attracted particular attention given its strong evidence base in dementia populations and its emphasis on enhancing cognitive reserve through mentally engaging activities.

Cognitive Stimulation Therapy (CST) was developed in the United Kingdom by Professor Aimee Spector and colleagues at University College London (UCL). The intervention emerged from Spector's doctoral research, completed in 2001, which focused on developing an evidence-based psychological programme for people with dementia. The programme centred on cognitive stimulation and incorporated elements of reminiscence and multisensory stimulation [18]. CST was subsequently evaluated in a multicentre randomised controlled trial involving older people with dementia, with findings indicating benefits in cognitive functioning and quality of life [19]. The standard CST programme consists of 14 group sessions, generally delivered twice a week over seven weeks. In the United Kingdom, the National Institute for Health and Care Excellence (NICE) recommends offering group cognitive stimulation therapy to people living with mild to moderate dementia [11].

Individuals with MCI are in an early stage of cognitive decline, making them an important group for cognitive intervention. Research suggests that cognitive stimulation activities may improve cognitive abilities such as attention, executive functioning, and memory. Findings from studies involving individuals with dementia provide support for applying similar approaches to people with MCI [3]. Therefore, the present case study examined whether an adapted, individually delivered Cognitive Stimulation Therapy (CST) program could improve cognitive functioning in an older adult with MCI, as measured by the Montreal Cognitive Assessment (MoCA).

Literature Review

Cognitive stimulation therapy

Cognitive Stimulation Therapy (CST) is a structured, evidence-based intervention designed to improve cognitive functioning through engaging and meaningful activities. It developed from reality orientation and reminiscence therapy and combines cognitive exercises with person-centred care [19]. CST is also supported by the concept of cognitive reserve, which refers to the brain's ability to adapt cognitive processes and maintain functioning despite age-related changes or neuropathological burden [21]. Research on neuroplasticity further suggests that the brain retains the capacity to adapt and reorganize throughout later life, providing a theoretical basis for cognitive interventions in older adults [23].

The effectiveness of CST was first demonstrated by Spector, *et al.* [19] in a randomized controlled trial involving 201 individuals with mild to moderate dementia. Participants who received CST showed greater improvements in cognitive functioning and quality of life than those in the control group. Subsequent systematic reviews and meta-analyses have consistently supported these findings, establishing CST as one of the most effective non-pharmacological interventions for dementia [12,23].

Although CST is traditionally delivered in groups, Individual Cognitive Stimulation Therapy (ICST) was developed for individuals who face barriers to group participation, such as mobility limitations or sensory impairments [24]. In a large randomized controlled trial, Orrell, *et al.* (2017) found that ICST was feasible and acceptable and improved quality of life, although cognitive outcomes were not significantly different from treatment as usual. More recent studies have shown that CST can be successfully adapted for populations with additional challenges, including visual impairment [22]. Similarly, Domenicucci, *et al.* (2025) reported that both standard and collaborative forms of CST produced positive cognitive and psychosocial outcomes in people with dementia. Together, these findings highlight the flexibility of CST and support its use across a variety of settings and populations.

Mild cognitive impairment

Mild cognitive impairment (MCI) is considered an intermediate stage between normal aging and dementia. Individuals with MCI experience noticeable cognitive difficulties while maintaining independence in daily activities [14]. Although memory problems are common, impairments may also occur in attention, executive functioning, language, and visuospatial abilities [1]. Because individuals with MCI are at an increased risk of developing dementia, early intervention is an important clinical priority.

The Montreal Cognitive Assessment (MoCA) is one of the most widely used tools for identifying MCI [10]. It assesses multiple cognitive domains, including memory, attention, language, executive functioning, abstraction, visuospatial skills, and orientation. Compared with the Mini-Mental State Examination (MMSE), the MoCA has greater sensitivity for detecting early cognitive changes, making it particularly useful for identifying MCI [10].

Research on non-pharmacological interventions for MCI has produced encouraging findings. Bahar-Fuchs, *et al.* (2019) reported that cognitive training can improve global cognition, memory, and learning abilities in individuals experiencing cognitive decline. Although much of the existing evidence comes from dementia populations, the cognitive domains targeted by these interventions are also affected in MCI. CST may be especially useful because it stimulates multiple cognitive abilities simultaneously and encourages active engagement in meaningful activities.

Gaps in the literature

Despite the strong evidence supporting CST in dementia care, several gaps remain. First, relatively few studies have examined the effectiveness of CST specifically for individuals with MCI. Second, most CST research has focused on group-based interventions, while evidence for individual CST remains limited. Third, the optimal number and frequency of CST sessions for individuals with MCI have not been established.

Most CST programmes for dementia involve 14 sessions delivered over seven weeks. The present case study used a shorter format consisting of eight individual sessions delivered over eight weeks. Examining the effectiveness of this adapted approach may help expand current knowledge about the use of CST in MCI populations. Therefore, this case study aimed to explore the cognitive outcomes of an individualized CST programme in an older adult with MCI.

Case presentation

Presenting Concerns

The participant was a male in his late seventies with a master's degree who was referred for psychological assessment due to concerns about progressive cognitive decline. Family members reported increasing memory difficulties, word-finding problems, and occasional episodes of disorientation that had developed over several months. The participant lived at home with the support of a caretaker and remained independent in most basic activities of daily living. However, family members noted an increased need for reminders and prompting for certain tasks. There was no reported history of stroke, traumatic brain injury, or dementia in the participant or his immediate family. At the time of referral, he had not received a psychiatric diagnosis and was not taking medication for cognitive symptoms.

Written informed consent was obtained from the participant and a family member before assessment and intervention. The intervention procedures, goals, and expected outcomes were explained to both parties, and participation was voluntary. All identifying information has been removed to protect confidentiality. The study was conducted in accordance with the Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association [2] and was prepared following the CARE Case Report Guidelines [6].

Assessment measures

Montreal cognitive assessment (MoCA): The MoCA (10) is a brief 30-item screening instrument assessing eight cognitive domains: visuospatial and executive function (5 points), naming (3 points), memory encoding (registered but not scored), attention (6 points), language (3 points), abstraction (2 points), delayed recall (5 points), and orientation (6 points). Administration time is approximately 10 minutes. Scores of 26-30 indicate normal cognitive function, 18-25 indicate MCI, and below 18 indicate moderate to severe impairment. The MoCA has demonstrated high sensitivity (90%) and moderate specificity (87%) for detecting MCI (10) and is recommended for use in research and clinical settings.

Case conceptualization

The participant was referred by his neuro-physician for psychological assessment following early cognitive concerns. Based on the intake interview, clinical observations, and MoCA results, he showed signs consistent with Mild Cognitive Impairment (MCI), with memory as the primary area of difficulty. He had notable trouble recalling information after a short delay and showed reduced ability to sustain attention, while his ability to name familiar objects and stay oriented to his surroundings remained largely intact. The cognitive difficulties were identified at an early stage. The researcher decided to offer a structured intervention. Cognitive Stimulation Therapy (CST) was selected as the approach. Eight weekly sessions were conducted with the aim of supporting and strengthening his cognitive functioning.

Cognitive stimulation therapy was selected as the intervention of choice for several reasons. First, CST has the strongest evidence base among non-pharmacological interventions for cognitive difficulties in older adults and has demonstrated benefits across domains directly implicated in this participant's profile [10,23]. Second, given the participant's age, the enjoyable and socially engaging nature of CST was considered well-suited to sustaining motivation and reducing performance anxiety, which is particularly relevant when working with older adults who may be distressed by cognitive changes. Third, an individual delivery format was chosen over group CST in view of the participant's home-based care setting and to allow activities to be tailored to his personal interests, and specific cognitive profile. Fourth, a structured home activity plan was incorporated to extend cognitive engagement beyond the weekly home visits and to involve the caretaker as an active participant in the rehabilitation process, thereby maximising ecological validity and daily practice.

Course of treatment

The intervention comprised eight individual CST sessions, each lasting one hour, delivered once a week over eight weeks. Sessions were structured around the core CST principles of mental stimulation, implicit learning, and person-centred engagement in a warm, supportive environment. Each session was designed to be enjoyable and mentally engaging, with activities carefully selected to stimulate memory, attention, and communication in a manner that did not cause the participant to feel pressured or overwhelmed.

Each session began with a brief orientation and grounding exercise to settle the participant and establish a calm, focused atmosphere. The main stimulation component followed and was built around four core activity types. Memory games, including picture-matching and card-recall tasks, were used to target encoding and retrieval processes in an enjoyable, low-pressure format. Jigsaw puzzles and simple picture puzzles were incorporated to engage visuospatial reasoning and sustained attention. Mandala colouring using structured mandala patterns was included to promote concentration, fine motor engagement, and a sense of calm accomplishment. Music-based activities, including listening to and discussing familiar songs from the participant's personal and cultural background, were used to stimulate autobiographical memory, emotional engagement, and verbal expression. All activities were introduced gradually, adapted to the participant's responses, and delivered in an unhurried, conversational manner. Brief breathing exercises were woven into each session to reduce performance-related anxiety and support full engagement.

In addition to the weekly home visits, a structured home activity plan was provided for daily practice between sessions. The home plan was aligned with the session activities and included: playing memory card games with the caretaker to reinforce recall and attention in a social setting; working on simple jigsaw or picture puzzles to maintain visuospatial engagement; spending time on therapeutic colouring sheets to support focus and a sense of calm; listening to familiar music daily to stimulate autobiographical memory and positive mood; performing simple breathing exercises to maintain the calming practices introduced in sessions; and repeating a set of positive affirmations ten times each in the morning and evening to reinforce a sense of self-efficacy and emotional wellbeing. The caretaker was oriented to the rationale for each activity and encouraged to offer support without prompting excessively, so as to foster independent effort. No pharmacological intervention was administered or modified during the study period.

Therapy outcomes

Given the single-participant design of this study, inferential statistical analyses were not conducted. Outcomes are interpreted descriptively, with changes in MoCA scores and domain performance reported as observed pre- to post-intervention differences.

The participant’s total MoCA score increased from 22 to 25, representing a 3-point improvement (13.64%). This exceeded the minimum clinically important difference of 2 points [17]. Although the post-intervention score remained within the MCI range, it reached the upper boundary of that classification. Table 1 presents domain-by-domain scores at both time points.

Cognitive Domain	Maximum Score	Pre-Intervention	Post-Intervention	Change
Visuospatial and Executive	5	4	5	+1
Naming	3	3	3	0
Attention	6	4	5	+1
Language	3	2	2	0
Abstraction	2	1	1	0
Delayed Recall	5	3	4	+1
Orientation	6	5	5	0
Total	30	22	25	+3

Table 1: Montreal cognitive assessment (MoCA) domain scores: Pre- and post-intervention comparison.

Note: The memory encoding trial is not included in the total MoCA score. Before the intervention, the participant independently recalled three words and retrieved two additional words with category cues. After the intervention, he independently recalled four words and re-retrieved additional one-word with a category cue, indicating improved delayed recall and less reliance on cueing.

Clinically meaningful improvements were observed across three of the eight scored domains. Visuospatial and executive function improved from 4/5 to 5/5. This was consistent with engagement in puzzle and mandala colouring activities requiring spatial planning and sustained visual attention. Attention improved from 4/6 to 5/6. This suggested that the structured and calm nature of session activities supported sustained concentration over the intervention period. Delayed recall improved from 3/5 to 4/5. The participant required cuing for two words pre-intervention compared to one-word post-intervention. This reduction in cue dependence indicated that structured memory and recall activities supported more independent access to recently encoded material. Naming remained at ceiling (3/3). Orientation scored 5/6, language 2/3, and abstraction 1/2. These domains showed no change, suggesting a longer intervention period or more targeted approaches may be needed to produce measurable gains. The overall post-intervention score of 25 remained within the MCI range. The 3-point improvement and the participant’s position at the upper boundary of the MCI classification are clinically encouraging findings.

Discussion

This case study documents a clinically meaningful improvement in MoCA scores following eight individual weekly CST sessions. The participant was a male in his late seventies with a confirmed diagnosis of MCI. His pre-intervention score was 22. Following the intervention, his score increased to 25, a gain of 3 points. This places him at the upper boundary of the MCI classification range. The post-intervention score did not cross into the normal cognitive range. However, observable improvement was noted across multiple domains. The participant’s engagement and responsiveness during sessions also reflected a positive shift. These gains were achieved through a brief, eight-session protocol built around accessible everyday activities. This is clinically encouraging and supports the value of early intervention at the MCI stage. The study did not include a control condition. As a result, the observed changes cannot be attributed solely to the intervention. The pattern of improvement across specific domains is, however, notable and merits closer examination.

The improvements observed in visuospatial and executive function are consistent with the nature of the activities employed. Puzzle tasks and mandala coloring require spatial planning, figure-ground discrimination, and sustained visual attention, all of which engage prefrontal and parietal circuits associated with executive function. These are domains known to respond positively to structured cognitive activity [19,23], and the improvement from 4/5 to 5/5 on this subscale suggests that even a brief, activity-based protocol can generate measurable gains in this area.

The improvement in delayed recall, coupled with reduced cue dependence, is particularly noteworthy and aligns well with the structured memory and recall activities used as a core session component. Cue dependence in memory testing reflects weakened encoding or consolidation rather than absolute retrieval failure; the shift from requiring two cues to one cue post-intervention suggests that repeated, structured recall practice strengthened encoding processes and facilitated more independent access to stored information. This is consistent with CST's reported benefits for memory function [19] and with research demonstrating that structured recall practice enhances memory consolidation in older adults [3].

Orientation scores remained stable throughout the intervention, with the participant maintaining a high level of performance from pre- to post-assessment. Although no measurable improvement was observed in this domain, the maintenance of orientation abilities over the intervention period is noteworthy given the progressive nature of cognitive decline associated with MCI. The regular review of temporal and spatial information incorporated into CST sessions may have contributed to preserving orientation skills, consistent with principles derived from reality orientation approaches [8].

No improvement was observed in the language and abstraction domains following the intervention. Language difficulties, particularly word-finding problems, are common in individuals with cognitive impairment and may be less responsive to brief interventions [3]. Similarly, abstraction involves higher-order reasoning and conceptual thinking, which may require more intensive or longer-term intervention to demonstrate measurable change. These findings suggest that future CST programs for individuals with MCI may benefit from incorporating additional activities specifically designed to target language and abstract reasoning skills.

The findings of the present case are consistent with previous research demonstrating the potential benefits of Cognitive Stimulation Therapy (CST) and other non-pharmacological interventions for cognitive functioning in older adults [3,22]. Improvements observed in this case suggest that CST may be beneficial not only for individuals with dementia but also for those with Mild Cognitive Impairment (MCI). In addition, positive outcomes were observed following an individualized eight-session program delivered once weekly, which is shorter and less intensive than the standard CST format. Although conclusions cannot be drawn from a single case, these findings provide preliminary support for the feasibility and potential effectiveness of brief, individualized CST interventions for individuals with MCI. Further research is needed to compare the cognitive outcomes of individual and group-based CST delivery formats.

It is also important to consider the role of therapeutic alliance and engagement in the observed outcomes. Individual CST delivery, unlike group formats, allows for close tailoring of activities to the participant's interests, premorbid experience, and cognitive profile. This may have enhanced engagement and motivation, thereby amplifying the stimulation effect. Future research should examine whether individualised activity selection produces superior outcomes compared to standardised CST protocols.

The inclusion of brief breathing exercises at the beginning of each session may also have contributed to participant engagement. Although breathing exercises are not a standard component of Cognitive Stimulation Therapy (CST), they were incorporated to promote relaxation and improve readiness for cognitive activities. Reducing anxiety and physiological arousal may help older adults engage more effectively in cognitively demanding tasks. Previous research has shown that chronic stress can negatively affect memory and cognitive functioning, particularly processes associated with the hippocampus [9]. Therefore, incorporating simple breathing exercises may serve as a useful complementary strategy to support cognitive stimulation interventions in older adults.

The activities included in the intervention may have contributed to the observed outcomes. Music-based activities were incorporated into each session because they are associated with autobiographical memory and emotional processing and may support memory retrieval and engagement in older adults [9]. Mandala coloring activities were also included to promote sustained attention, concentration, and active participation. Although coloring is not a standard component of Cognitive Stimulation Therapy (CST), it provided a structured and engaging activity that complemented other cognitive exercises. In addition, the home activity plan encouraged continued cognitive engagement between sessions. The participant completed activities such as memory games, puzzles, music listening, and coloring with the support of a caretaker. This ongoing practice may have reinforced the skills addressed during the intervention and promoted regular cognitive stimulation. The caretaker's involvement may also have enhanced motivation and adherence to the program. Future research should examine the specific contribution of individual activities, including music and mandala coloring, to cognitive outcomes in individuals with Mild Cognitive Impairment (MCI).

Clinical implications

The findings of this case study have several implications for clinical practice. First, they suggest that Cognitive Stimulation Therapy (CST) can be delivered effectively in an individualized, community-based format, making it a practical option for older adults who may be unable to participate in group programs. Second, the positive changes observed in cognitive functioning support the use of structured cognitive stimulation during the MCI stage rather than waiting until cognitive difficulties progress to dementia. Early intervention may help maintain cognitive functioning and support cognitive reserve. Third, the involvement of family members and caregivers throughout the intervention highlights the importance of a collaborative approach to cognitive rehabilitation. Caregiver support may enhance participation, encourage adherence to home-based activities, and promote continued cognitive engagement between sessions. Finally, the inclusion of brief breathing exercises appeared to support relaxation and engagement during sessions. Although further research is needed, incorporating simple relaxation strategies alongside cognitive stimulation may be beneficial when working with older adults who experience anxiety or stress-related difficulties.

Conclusion

This case study provides preliminary evidence that an individualized Cognitive Stimulation Therapy (CST) program may support cognitive functioning in older adults with Mild Cognitive Impairment (MCI). Following eight weekly sessions, the participant's total MoCA score increased from 22 to 25, representing a clinically meaningful improvement. Although the post-intervention score remained within the MCI range, gains were observed in visuospatial and executive functioning and delayed recall. The participant also demonstrated good engagement with the intervention and home-based activities throughout the study period.

The findings suggest that a brief CST program incorporating everyday cognitive activities, such as memory games, puzzles, mandala coloring, and music-based activities, may be a feasible and accessible intervention for individuals with MCI. The involvement of the caretaker and the use of structured home activities may have further supported ongoing cognitive engagement between sessions.

Given the increased risk of progression from MCI to dementia, identifying effective and practical early interventions remains an important clinical goal. Although the findings from a single case cannot be generalized, they support the potential value of CST as an early intervention for cognitive decline. Further research using larger samples, randomized controlled designs, and longer follow-up periods is needed to evaluate the effectiveness of CST for individuals with MCI and to determine the long-term sustainability of treatment outcomes.

Limitations

Several limitations should be considered when interpreting the findings of this case study. First, the study involved a single participant, which limits the generalizability of the results. In addition, the absence of a control condition makes it difficult to determine whether

the observed improvements were due to the intervention, practice effects, natural variation in cognitive performance, or other non-specific factors. Second, the participant was an older adult male with a relatively high level of education. Therefore, the findings may not be applicable to individuals with different demographic characteristics or types of Mild Cognitive Impairment (MCI). Third, the intervention consisted of eight weekly sessions, which differs from the standard CST protocol. It is unclear whether a longer or more intensive intervention would produce greater or more sustained improvements. Fourth, no follow-up assessment was conducted. As a result, the long-term maintenance of the observed cognitive gains could not be evaluated. Finally, cognitive outcomes were assessed using the Montreal Cognitive Assessment (MoCA), which provides a global measure of cognitive functioning. The use of a comprehensive neuropsychological assessment battery would have provided more detailed information about changes across specific cognitive domains. Future research should include larger samples, control groups, follow-up assessments, and comprehensive neuropsychological measures to further evaluate the effectiveness of Cognitive Stimulation Therapy for individuals with MCI.

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Volume 18 Issue 9 September 2026

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