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RESEARCH ARTICLE (ORIGINAL)

# Individual intervention protocol based on cognitive stimulation therapy for older adults with mild neurocognitive disorder

*Protocolo de intervenção individual baseado na terapia de estimulação cognitiva em idosos com perturbação neurocognitiva ligeira*

*Protocolo de intervención individual basado en la estimulacíon cognitiva para ancianos con trastorno neurocognitivo leve*

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**Abstract**

**Background:** Cognitive stimulation (CS) is one of the recommended non-pharmacological therapies (NPTs) with the best evidence base for mild neurocognitive disorder (mNCD). It stimulates neuroplasticity and cognitive reserve and can reduce the progression of cognitive decline in older adults with mNCD.

**Objective:** To describe the structure and content of an individual CS intervention protocol for older adults with mNCD.

**Methodology:** Identification of the stages preceding the design of the intervention protocol.

**Results:** Individual CS therapy intervention protocol, consisting of a program implemented by trained therapists with six sessions, twice a week, each lasting around 45 minutes.

**Conclusion:** The detailed individual CS protocol facilitates its implementation and dissemination and can have significant implications for clinical practice and research on mNCD.

**Keywords:** dementia; aged; program development; cognitive dysfunction; cognitive stimulation; depression

**Resumo**

**Enquadramento:** A estimulação cognitiva (EC) é uma das terapias não-farmacológicas (TNF) recomendadas e com melhores evidências na perturbação neurocognitiva ligeira (PNCL), permitindo estimular a neuroplasticidade e a reserva cognitiva, podendo atenuar a progressão do declínio cognitivo no idoso com PNCL.

**Objetivo:** Apresentar detalhadamente a estrutura e o conteúdo de um protocolo de intervenção em idosos com PNCL, baseada na EC individual.

**Metodologia:** Identificação das fases preliminares ao desenho do protocolo de intervenção.

**Resultados:** Protocolo de intervenção individual baseado na EC, composto por esquema base de 6 sessões, com frequência bissemanal e com duração aproximada de 45 minutos por sessão, administrado por terapeutas treinados.

**Conclusão:** O programa de EC individual pormenorizado facilita a sua implementação e disseminação, podendo ter implicações relevantes na prática clínica e na investigação da PNCL.

**Palavras-chave:** demência; idoso; desenvolvimento de programas; disfunção cognitiva; estimulação cognitiva; depressão

**Resumen**

**Marco contextual:** La estimulación cognitiva (EC) es una de las terapias no farmacológicas (TNF) recomendadas y con mejores evidencias en el trastorno neurocognitivo leve (TNL), lo que permite estimular la neuroplasticidad y la reserva cognitiva y puede atenuar la progresión del deterioro cognitivo en los ancianos con PNCL.

**Objetivo:** Presentar detalladamente la estructura y el contenido de un protocolo de intervención en ancianos con TNL, basado en la EC individual.

**Metodología:** Identificación de las fases preliminares al diseñar el protocolo de intervención.

**Resultados:** Protocolo de intervención individual basado en la EC, compuesto por un esquema básico de 6 sesiones, quincenales y con una duración aproximada de 45 minutos por sesión, administrado por terapeutas formados.

**Conclusión:** El programa individual detallado de EC facilita su aplicación y difusión, y puede tener implicaciones relevantes para la práctica clínica y la investigación del TNL.

**Palabras clave:** demencia; anciano; desarrollo de programa; disfunción cognitiva; estimulación cognitiva; depresión

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## Introduction

The lack of detailed intervention protocols for older adults with mild neurocognitive disorder (mNCD) adapted to the Portuguese culture is often a limitation of research based on non-pharmacological therapies (NPTs) that suggest positive outcomes for older adults with mNCD. An individual intervention protocol based on medium and long-term cognitive stimulation therapy (CST) can improve cognitive function and reduce depressive symptoms in the target population.

This article aims to describe an individual CS intervention protocol for older adults with mNCD attending institutions for older people in Portugal (e.g., residential structures for older adults and day-care centers) that can be easily understood, adapted, and implemented by therapists (e.g., psychologists, other qualified professionals).

## Background

The population is aging at an unprecedented rate. According to Statistics Portugal (Instituto Nacional de Estatística [INE]; 2018, 2019), 21.5% of the population living in Portugal was over 65 years old, placing it as the fourth country in the European Union with the highest percentage of older adults. This percentage is expected to increase over the next decades, possibly reaching 37.2% of the country's population by 2080.

In mental health, neurocognitive disorders (NCDs) are a new challenge associated with aging and one of the most common problems in people aged 65 years or more (Organização Mundial da Saúde [OMS], 2017a). mNCD is the initial and less severe level of cognitive impairment. It is defined by evidence of modest cognitive decline from a previous level of performance in one or more cognitive domains (complex attention, executive function, learning, and memory, language, perceptual-motor function, and social cognition) that do not interfere with the capacity for independence in everyday activities. Although these activities are preserved, greater effort, compensatory strategies, or accommodation may be required (American Psychiatric Association [APA], 2013). Data indicate that suffering from a mNCD increases the likelihood of developing a major neurocognitive disorder (MNCD), with 3% to 13% of cases every year (OMS, 2017b).

CS is a recommended intervention in patients with NCDs, consisting of several activities and exercises for improving cognitive and social function (Clare & Woods, 2004). In addition to being used as a complement to pharmacological therapy, CS is used worldwide to intervene in memory and other cognitive changes in patients with NCDs. It is indicated for patients with mild, moderate, and moderately severe decline in cognitive domains (e.g., memory, attention, language, executive functions) to improve cognitive performance. There is evidence on the effectiveness of CS programs in patients with NCD, regardless of medication effects (Woods et al., 2012).

Systematic reviews on the post-intervention effectiveness of CS (McDermott et al., 2019; Woods et al., 2012) found a significant, consistent benefit of CS on cognitive function over and above any anticholinergic medication effects up to 3 months after the end of treatment. They also found that CS significantly improved quality of life, well-being, communication skills, and social interaction. Reality orientation therapy (ROT) was also associated with a significant improvement in cognition. ROT consists of the presentation and repetition of temporal and spatial information throughout the day or regular sessions of orientation-related activities (Hsiao-Yean et al., 2018).

Considering the existence of cognitive reserve and neuroplasticity in older adults, evidence suggests that CS benefits the cognitive functions of patients with mNCD, preventing or delaying the progression to a MNCD (Justo-Henriques et al., 2019; Woods et al., 2012).

These interventions should occur as early as possible to increase the likelihood of preserving cognitive functions (Vernooij-Dassen et al., 2010) and reducing the impact on the costs associated with dementia and the quality of life of patients and their families (Nickel et al., 2018).

However, a common limitation of most studies on NPTs is the lack of detail of the intervention protocols to enable their implementation (Orrell et al., 2017). The protocol described in this article was developed bearing in mind this limitation and the evidence on the benefits of ROT and CS. It combines the benefits of both therapies to improve cognition and reduce depressive symptomatology in patients with NCDs.

The protocol described in this article was applied in a pretest-posttest pilot study with a nonequivalent control group. A group of participants who received the long-term individual CS intervention program (intervention group) was compared with another group who did not receive the intervention (control group). The study participants were not randomized to the intervention and control groups. The sample ($n$ = 30) was selected by the nonprobability convenience sampling technique. Users from an elderly care facility were successively selected and assigned to the intervention group ($n$ = 15). Community-dwellers from the same geographical area who were similar to the other participants in terms of gender, age, education level, etiological subtype, and cognitive function scores were assigned to the control group ($n$ = 15). The latter were identified with the collaboration of the Parish Council and the local Health Center. The 88 intervention sessions were conducted twice a week by trained therapists. They were based on this protocol, standardized in a detailed manual, and CS principles. The results confirmed the significant effect on cognitive function and depressive symptomatology. There was also a high adherence to the intervention, a high degree of collaboration during the intervention, and a low dropout rate (Justo-Henriques et al., 2019).

This protocol was applied in another pretest-posttest study with a nonequivalent control group and a similar sample (e.g., sociodemographic characteristics, etiological subtype, geographical area) to confirm the effectiveness of the intervention protocol. The sample consisted of 82 participants: 41 assigned to the intervention group and 41 to the control group. The same number of sessions,

frequency, and structure were implemented. The results confirmed the significant effect on cognitive function and depressive symptomatology. Regarding the etiological subtypes of mNCD, Alzheimer's disease was the most prevalent subtype. The dropout percentage was low, adherence to the intervention was high, and the degree of participant collaboration in the sessions was also high (Justo-Henriques et al., in press).

## Research question

What is the structure and content of the individual CS protocol developed for older adults with mNCD?

## Methodology

The intervention protocol was developed continuously in four phases.

The first phase was a literature review on CS to identify the most studied formats (e.g., individual, group) and their effects on cognition, the characteristics of the materials and/or support activities, and the participants' characteristics (e.g., age, gender, etiological subtypes). The *Making a Difference* program (Spector et al., 2006) was selected for adaptation because it was considered the most influential program in the theoretical reviews. CS revealed encouraging results for the next phase.

In the second phase, a search was conducted for materials adapted to the Portuguese culture (e.g., images, words, general historical knowledge facts) and content related to older people's daily lives to stimulate the cognitive domains. Two existing materials were selected because they followed CS-related principles. There was the need to develop complementary materials about ROT.

In the third phase, the structure and content of the sessions were established using the selected materials. The individual format was selected because it was considered more appropriate to the therapeutic objectives and the participants' needs, preferences, references, and pace. Strategies were outlined to prevent the loss of participants, such as those recommended by Grady et al. (2008). The following inclusion criteria were applied: presenting a mNCD, according to the DSM-5 criteria (APA, 2013) and confirmed by a psychiatrist or clinical psychologist, scoring between 18 and 26 in the Mini-Mental State Examination (MMSE), and being 65 years old or older. Exclusion criteria were being unable to communicate or having a severe hearing impairment, having received psychological or psychiatric support 60 days before the first session, and/or participating in another study. Then, ten older adults with mNCD were invited to participate in the sessions voluntarily and without any financial incentive. All participants gave their informed consent in writing. CS sessions were conducted by two therapists who received training in CS principles and the protocol's procedures. The therapists divided the sessions between them and distributed the participants based on a previously arranged schedule. Six sessions occurred twice a week, with approximately 45 minutes each. At the end of each session, the therapist completed the session evaluation sheet to assess the participants' level of acceptance of the selected material and degree of collaboration. Overall, the level of adherence to and acceptance of the intervention was good, which is relevant for the review to be performed in the final phase.

Based on each therapist's diagnosis and the SWOT analysis, the fourth phase consisted of reviewing the session's time structure, namely the duration of the main activity, and improving the complementary materials. The conditions of the site where the sessions took place were maintained to ensure accessibility and comfort.

This study followed the most recent version of the World Medical Association's Declaration of Helsinki (2013) and was approved by the Bioethics Committee of the University of Santiago de Compostela.

## Results

The basic intervention protocol consists of six sessions of 45 minutes each, occurs twice a week, and is repeatable. The next sessions follow the same sequence. All sessions follow the same structure (Table 1). The first 5 minutes are dedicated to welcoming the participant, and the next 10 minutes are dedicated to training reality orientation, with the participant being encouraged to complete the information about the current date and time using a time orientation chart. Then, the cognitive domains are trained for approximately 25 minutes using CS materials: Roletas da Memória© (Memory Roulettes) with Math and Portuguese exercises and practice of activities of daily living, and Bingos Seniores© (Senior Bingos), which include the fruit bingo, the journey to the past bingo, and the sounds with I bingo. The last 5 minutes of each session are dedicated to bringing the participant back to a state of calm, with a short dialogue between the therapist and the participant about the session's difficulties, interests, and benefits. Finally, the participant and the therapist say goodbye, and the participant is reminded of the date and time of the next session. After the session, the therapist completes the session evaluation sheet.

**Table 1**

*Basic structure of the individual cognitive stimulation program*

| Duration | Content | Activities |
|---|---|---|
| 5 minutes | Session introduction | Greetings/welcome.<br>Mood check.<br>Communicate the objectives of the session. |
| 10 minutes | Reality orientation | Identify time elements and address spatial elements using a time orientation chart. |
| 25 minutes | Stimulation of cognitive domains | Explore cognitive stimulation materials regarding Portuguese language, mathematics, activities of daily living, fruit, the past, using printed and digital images, stories, and sounds. |
| 5 minutes | Session closure | Analyze the difficulties, interests, and benefits of the session.<br>Return to calm.<br>Goodbye.<br>Complete the session evaluation sheet. |

Intervention sessions are individual and should be conducted by therapists with previous training in the CS intervention protocol and principles. The activities carried out in each session follow the contents of the CS program (Table 3). The content of the intervention program, using both printed (e.g., cards with letters, numbers, and images) and digital (e.g., sounds) materials, is organized around the topics associated with the Portuguese language, mathematics, and activities of daily living.

The sessions should occur in a comfortable, accessible, and private place that allows the activities to occur without interruptions (Justo-Henriques et al., 2020).

The principles of CS therapy formulated by Spector et al. (2006; Table 2) should be followed throughout the intervention.

At the beginning of each session, the therapist should greet the participant, orient them toward insight, and communicate the objectives of the session. Then, using a time orientation chart (including the day of the week, month, day of the month, year, season and time of year, weather, and clock), the therapist conducts the reality orientation training; that is, completes the table with the time elements and addresses spatial elements (Table 1).

Then, according to the topic of each session (Table 3), the therapist develops the main activity to stimulate the cognitive domains. More specifically, the Portuguese language activity stimulates domains such as attention, language, short-term memory, and semantic memory. The Mathematics activity stimulates domains such as reasoning, calculus, and executive functions. The exercises about daily living activities stimulate domains such as attention, declarative memory, and language. The fruit activity stimulates domains such as short-term memory and semantic memory. Regarding the reminiscence-focused activity, the journey to the past activity stimulates episodic memory. Finally, using sounds and their cards, it is possible to train sensory and declarative memory, gnosis, attention, and eye-hand coordination. Besides presenting and explaining the activity's objective, the therapist also teaches information processing strategies and techniques (e.g., mnemonic strategies to enhance memory storage capacity, organized learning strategies, and synthesis strategies).

At the end of each session, the therapist should ask the participant's opinion about the session and mention the topic, date, and time of the next session.

**Table 2**

*Principles of cognitive stimulation therapy*

| Principle | Description |
|---|---|
| Person-centered | Therapy should focus on the person rather than the NCD and associated cognitive decline. |
| Respect | Show respect for each participant, promote their identity, and maintain their dignity. |
| Inclusion | Avoid the participant's isolation and promote a working environment where all contributions are valued; if isolation is due to sensory deficits, appropriate compensatory measures should be taken. |
| Choice | The intervention protocol should not be rigid, and participants should have the opportunity to choose according to their preferences. |
| Fun | Promote a pleasant learning environment, using humor and avoiding a demanding and formal environment. |
| Maximizing potential | Promote learning through appropriate stimuli, providing the necessary time, avoiding overloading participants with information, and providing them with the appropriate and adequate support and assistance to carry out the activity by themselves. |
| Building and strengthening social relations | Promote a true one-on-one relationship with participants, in which therapists should not present themselves as teachers or experts but rather as people close to the participants who support them so that the activity is enjoyable for everyone. |

*Note.* Adapted from "Making a difference: An evidence-based group program to offer cognitive stimulation therapy (CST) to people with dementia" by Sector et al., 2006.

**Table 3**

*Contents of the activities, objectives, and materials of the intervention program sessions*

| Session | Topic/objectives/stimulated domains | Materials |
|---|---|---|
| 1 [7, 13, 19, 25, ..., 85] | ***Activity(ies)***<br>Place cards with incomplete words on each of the eight sectors of the roulette wheel. To the participant: give individual cards with the letters of the alphabet; ask questions; select and place the cards with the missing letters; identify synonyms or associated words; put in alphabetical order; memorize words; develop a topic.<br><br>*Examples:*<br><br>- Place cards with incomplete words on each of the eight sectors of the roulette wheel. Then, give the participant individual cards with all of the letters of the alphabet. Ask which letter is missing from each card with incomplete words on the roulette wheel, select the card with the missing letter, and stick it next to the roulette sector with that word. After this exercise, ask the participant about synonyms and associated words.<br><br>- Place the cards with the incomplete words on the eight sectors of the roulette wheel, then place cards with individual letters, and ask the participant to identify possible word cards for the letter concerned.<br><br>- Place several cards with different letters of the alphabet on the eight sectors of the roulette wheel and ask the participant to say words that begin with, contain, or end with each of those letters.<br><br>- Ask the participant to put the words in alphabetical order.<br><br>- Select a word and ask the participant to point out certain aspects of it to promote discussion.<br><br>- Choose a topic and ask the participant to select the word card(s) associated with it.<br><br>- Lay out some cards with words and ask the participant to memorize them for a few minutes. Then, remove one of the words and ask the participant to identify the missing word. Instead of removing the word, switch, for example, the first word with the last word.<br><br>***Objective*:** to stimulate, in particular, attention, language, short-term memory, and semantic memory. | Printed roulette and cards with letters and incomplete words on the topic "Portuguese language." E.g., check the material *Roletas da Memória*© (*Memory Roulettes* - RM). |

| | | |
|---|---|---|
| 2<br>[8, 14, 20, 26, ..., 86] | ***Activity(ies)***<br>Place cards with Math exercises with missing numbers on each of the eight sectors of the roulette wheel. To the participant: give the individual cards with different numbers to put in the equation; ask questions about Math operations; put the numbers and results in order; memorize cards and results; simulate buying transactions.<br><br>*Examples:*<br><br>- Place cards with Math exercises with missing numbers on each of the eight sectors of the roulette wheel. Then, give the participant the individual cards with different numbers to place them on the corresponding sector of the roulette wheel and missing on the Math card.<br><br>- Place the cards with the number so that the participant can identify the Math operation in which the number shown corresponds to the missing number.<br><br>- Select a card and ask the participant to suggest a Math operation to reach that digit.<br><br>- To make the activity more dynamic, after the participant identifies the result of a Math operation, ask them questions, for example, "If you add five, you'll get…?", "If you multiply by two?", "If we subtract half?".<br><br>- Ask the participant to arrange the selected numbers or results in ascending or descending order.<br><br>- Lay out some cards with numbers and ask the participant to memorize them for a few minutes. Then, remove some card(s) and ask the participant to identify the changes to facilitate short-term memory training.<br><br>- Give the participant a set of cards with Math operations and shopping receipts where the total amounts paid match the result in each card. Ask the participant to match them to increase the activity's level of difficulty. The participant can also be given cards with pictures of money to simulate giving change or paying the excess amount. This exercise trains executive functions.<br><br>***Objective*:** to stimulate, in particular, attention, reasoning, calculus, and executive functions. | Printed roulette cards with Math operations and results on the topic "Mathematics." E.g., check the material RM. |
| 3<br>[9, 15, 21, 27, ..., 87] | ***Activity(ies)***<br>Based on the topics related to activities of daily living (e.g., clothing, footwear, food, medication, technical aids, personal hygiene products, kitchen utensils, and rooms in a house), ask the participant to group each of the categories in the different sectors of the roulette wheel; find the odd image; compare images according to certain categories (e.g., weight, cost); memorize, remove, and add cards so the participant can identify the changes.<br><br>*Examples:*<br><br>- Assign one of the topics (e.g., clothing, footwear, food, medication, technical aids, personal hygiene products, kitchen utensils, and rooms in a house) to each sector of the roulette wheel by placing on it only one of the three images available for each topic. Then, give the participant the remaining images and ask them to place them in the corresponding sector of the roulette wheel.<br><br>- Place two images on the same topic and an odd one on each of the eight sectors of the roulette wheel. Ask the participant to identify the odd one and place it in the correct sector.<br><br>- Select a few cards strategically and ask the participant to identify the most and the least expensive item. Ask them to arrange the cards in ascending order from the lightest to the heaviest.<br><br>- Strategically lay out some cards and ask the participant to identify the card that contains the image corresponding to the question asked by the therapist, e.g., "What do I need when I'm sick?", "What do I wear when I'm cold?", "What do I need to take a bath?".<br><br>- Show the roulette wheel with some cards, ask the participant to memorize them for a few minutes, and then change the order, remove, or add some cards and ask the participant to identify the changes.<br><br>***Objective*:** to stimulate, in particular, attention, semantic memory, language, and gnosis. | Printed roulette and cards with images on the topic "activities of daily living." E.g., check the material RM. |

| | | |
|---|---|---|
| | ***Activity(ies)***<br><br>Give the participant a card with images from the past (e.g., the journey to the past bingo). Ask the participant to identify each of the images and the differences between them and the present day. Read a story associated with the past (e.g., the journey to the past), and identify the images that match the story. Ask the participant to build a story from an image, reporting in the first person how they experienced a given moment. | |
| 4<br>[10, 16, 22, 28, ..., 88] | *Examples:*<br><br>- Give the participant the card with images from the past and markers corresponding to the number of images. Ask the participant to identify each image, the differences between them and the present time, and contextualize them. Then, the therapist reads the story associated with the past (e.g., journey to the past) and asks the participant to place the marker over the images as they are mentioned throughout the story.<br><br>- Remove or add the parts of the story that correspond to some of the images on the card to increase the level of difficulty.<br><br>- Select one of the images on the card and ask the participant to build a story from it, or tell in the first person how they experienced a given moment, or talk about the object in the photo (e.g., what it means to you; what memories does it bring you).<br><br>- Give the participant a card and place more recent images of the same category or content next to it to train the concept of old/recent.<br><br>***Objective*:** to stimulate, in particular, episodic memory. | Markers and a card with images from the past. E.g., check the material *Bingos Seniores*© (*Senior Bingos* - BS). |
| | ***Activity(ies)***<br>Give the participant the card with images of different fruits (e.g., fruit bingo). Ask the participant to identify each of the fruits on the card and then read an associated story (e.g., the fruit dialogue), identifying the corresponding images. Add new images, match the fruits to the seasons, build a new story, solve riddles about the fruits. | |
| 5<br>[11, 17, 23, 29, ..., 83] | *Examples:*<br><br>- Give the participant the card with the images of different fruits (e.g., fruit bingo) and markers corresponding to the number of images. Ask the participant to identify each of the fruits on the card. Then, the therapist reads the story that corresponds to the topic (e.g., the fruit dialogue) and asks the participant to place the marker on the fruit images as they are mentioned throughout the story.<br><br>- Remove or add the parts of the story that correspond to some of the fruit images on the card to increase the level of difficulty.<br><br>- Give the participant repeated cards with the four seasons of the year and ask them to put on top of each fruit the card corresponding to its harvest season.<br><br>- Place the marker over the image of one or several fruits and, based on this selection, ask the participant to build a story.<br><br>- Replace the narrative of the previous story (e.g., fruit dialogue) with the activity – find the fruit – in which the participant will taste several pieces of fruit, identify the fruit, and then place the marker over the corresponding image on the card. The therapist can also use the activity "Find out what's in the bag", in which the participant will have to guess which fruit is in the bag or box using their touch.<br><br>- Replace the narrative of this story with riddles corresponding to the topic in question.<br><br>***Objective*:** to stimulate, in particular, short-term and semantic memory. | Markers and a card with images on the topic "Fruit." E.g., check the material BS. |

| | | |
|---|---|---|
| 6 [12, 18, 24, 30, ..., 84] | ***Activity(ies)*** Place cards with several images on the table (e.g., sounds with I bingo) and ask the participant to point out the card that matches the sound. Play the sounds associated with the images, identify the missing sounds, group the cards by topic (e.g., animals, musical instruments).<br><br>*Examples:*<br><br>- Ask the participant to arrange the images on the table. Then, ask the participant to point out the card that matches the sound played by the therapist.<br><br>- Select some cards and ask the participant to reproduce the sounds corresponding to the images.<br><br>- Select four cards, play only three sounds, and ask the participant to identify the missing sound.<br><br>- Ask the participant to group the cards by topic (e.g., animals, musical instruments, means of transportation).<br><br>***Objective*:** to stimulate, in particular, sensory and semantic memory, gnosis, attention, and eye-hand coordination. | Cards with images and associated sounds. E.g., check the material BS. |

*Note*. RM = *Roletas da Memória*© (*Memory Roulettes*); BS = *Bingos Seniores*© (*Senior Bingos*).

## Discussion

mNCDs are clinically silent in their evolution. The progression of mNCDs is estimated to last seven years (National Institute on Aging, 2019), and several more years pass before cognitive skills decline to the functionally disabling degree of a MNCD (Caselli & Reiman, 2013). Individual interventions are associated with better outcomes because they facilitate access to the intervention, provide closer contact with the participant, and use tailored activities, which tend to increase adherence to the intervention. They promote a stronger therapeutic relationship and adjust the rhythm of the intervention to the participant, based on a person-centered care approach that recognizes the person as a unique individual (Justo-Henriques et al., 2020).

Besides being a technical guide for therapists, the detailed description of an intervention protocol can reduce the relevance of the heterogeneity of the participants and institutions where it is implemented (Justo-Henriques et al., 2020).

CS materials are adapted to the participant's characteristics (i.e., an older adult with cognitive decline) and used in cognitive training activities (e.g., attention, memory, language).

Based on CS and ROT principles, an individual intervention program was developed for older adults diagnosed with a mNCD who attended Portuguese elderly care institutions (e.g., residential structures, day-care centers for older people, home care services). The literature demonstrates that these therapies benefit this population by improving cognitive function and mood (Clare & Woods, 2004).

The basic individual intervention protocol consists of six sessions, twice a week, each lasting around 45 minutes. The length of the program can be adjusted (i.e., short, moderate, and long term). This program should be implemented by the therapists of elderly care institutions to reduce the progression of cognitive decline by stimulating cognitive domains. The program improves not only cognitive function but also mood, which is important given that depression has been identified as a risk factor for cognitive decline (Leyhe et al., 2017).

For being a multicomponent program that uses different materials in a repeated sequence, it facilitates stable neural reorganization to maintain long-term learning.

Although this program contributes to mitigating a common research limitation and the results of its application showed a significant improvement in the participants' cognitive function and mood, particularly in older adults diagnosed with probable Alzheimer's disease, further studies are recommended to assess the effectiveness of the intervention protocol in other etiological subtypes, geographic contexts, and literacy levels. The use of this protocol in older adults with a distinct cognitive condition (e.g., older adults with moderate to severe cognitive decline) may require an adjustment.

## Conclusion

The results present an individual intervention program with a detailed structure and content that can be easily understood and replicated.

This intervention program may have important implications for clinical practice and research. It can be implemented in elderly care institutions (e.g., residential structures and day-care centers) and used as a starting point for new programs and scientific studies (e.g., a multicenter, randomized controlled trial, using repeated measures, a larger sample, and a large geographical area; a study on the effectiveness of a short-term version of the intervention program).

**Author contributions**

Conceptualization: Justo-Henriques, S. I.
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Methodology: Justo-Henriques, S. I.
Investigation: Justo-Henriques, S. I.
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## References


American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Caselli, R. J., & Reiman, E. M. (2013). Characterizing the preclinical stages of Alzheimer's Disease and the prospect of presymptomatic intervention. *Journal of Alzheimer's Disease, 33*(1), S405-S416. https://doi.org/10.3233/JAD-2012-129026

Clare, L., & Woods, R. T. (2004). Cognitive training and cognitive rehabilitation for people with early-stage Alzheimer's disease: A review. *Neuropsychological Rehabilitation, 14*(4), 385-401. https://doi.org/10.1080/09602010443000074

Grady, D., Cummings, S. R., & Hulley, S. B. (2008). Alternative trial design and implementation issues. In S. B. Hulley, S. M. Cummings, W. S. Browner, D. G. Grady & T. B. Newman (Eds.), *Designing clinical research* (3rd ed., pp. 163-181). Lippincott Williams & Wilkins.

Hsiao-Yean, C., Pin-Yuan, C., Yu-Ting, C., & Hui-Chuan, H. (2018). Reality orientation therapy benefits cognition in older people with dementia: A meta-analysis. *International Journal of Nursing Studies, 86*, 20-28. https://doi.org/10.1016/j.ijnurstu.2018.06.008

Instituto Nacional de Estatística (2018). *Estatísticas Demográficas 2017.* Instituto Nacional de Estatística, I.P. https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_publicacoes&PUBLICACOESpub_boui=348174760&PUBLICACOESmodo=2

Instituto Nacional de Estatística (2019). *Portal de Estatísticas Oficiais.* https://www.ine.pt

Justo-Henriques, S. I., Marques-Castro, A. E., Otero, P., Vázquez, F. L., & Torres, Á. J. (2019). Long-term individual cognitive stimulation program in patients with mild neurocognitive disorder: A pilot study. *Revista de Neurología*, *68*(7), 281-289. https://doi.org/10.33588/rn.6807.2018321

Justo-Henriques, S. I., Otero, P., Torres, Á. J., & Vázquez, F. L. (in press). Effect of long-term individual cognitive stimulation program for people with mild neurocognitive disorder. *Revista de Neurología.*

Justo-Henriques, S. I., Pérez-Sáez, E., & Apóstolo, J. L. (2020). Individual intervention protocol based on reminiscence therapy for older people with neurocognitive disorders. *Revista de Enfermagem Referência, 5*(3), e20043. https://doi.org/10.12707/RV20043

Leyhe, T., Reynolds, C. F., Melcher, T., Linnemann, C., Klöppel, S., Blennow, K., Zetterberg, H., Dubois, B, Lista, S., & Hampel, H. (2017). A common challenge in older adults: Classification, overlap, and therapy of depression and dementia. *Alzheimer's and Dementia*, *13*(1), 59-71. https://doi.org/10.1016/j.jalz.2016.08.007

McDermott, O., Charlesworth, G., Hogervorst, E., Stoner, C., Moniz-Cook, E., Spector, A., Csipke, E., & Orrell, M. (2019). Psychosocial interventions for people with dementia: A synthesis of systematic reviews. *Aging & Mental Health, 23*(4), 393-403. https://doi.org/10.1080/13607863.2017.1423031

National Institute on Aging. (2019). *Symptoms and diagnosis of Alzheimer's Disease. What is mild cognitive impairment?* https://www.nia.nih.gov/health/what-mild-cognitive-impairment

Nickel, F., Barth. J., & Kolominsky-Rabas, P. L. (2018). Health economic evaluations of non-pharmacological interventions for persons with dementia and their informal caregivers: A systematic review. *BMC Geriatrics*, *18*(1), 69. https://doi.org/10.1186/s12877-018-0751-1

Orrell, M., Hoe, J., Charlesworth, G., Russell, I., Challis, D., Moniz-Cook, E., Knapp, M., Woods, B., Hoare, Z., Aguirre, E., Toot, S., Streater, A., Crellin, N., Whitaker, C., d'Amico, F., & Rehill, A. (2017). Support at home: Interventions to Enhance Life in Dementia (SHIELD): Evidence, development and evaluation of complex interventions. *Programme Grants for Applied Research, 5*(5). https://doi.org/10.3310/pgfar05050

Spector, A., Thorgrimsen, L., Woods, B., & Orrell, M. (2006). *Making a difference: An evidence-based group programme to offer cognitive stimulation therapy (CST) to people with dementia*. Hawker Publications.

Vernooij-Dassen, M., Vasse, E., Zuidema, S., Cohen-Mansfield, J., & Moyle, W. (2010). Psychosocial interventions for dementia patients in long-term care. *International Psychogeriatrics, 22*(7), 1121-1128. https://doi.org/10.1017/S1041610210001365

Woods, B., Aguirre, E., Spector, A. E., & Orrell, M. (2012). Cognitive stimulation to improve cognitive functioning in people with dementia. *Cochrane Database of Systematic Reviews, 2*, CD005562. https://doi.org/10.1002/14651858.CD005562.pub2

World Health Organization. (2017a). *Mental health and older adults*. http://www.who.int/mediacentre/factsheets/fs381/en/

World Health Organization. (2017b). *Global action plan on the public health response to dementia: 2017–2025*. https://apps.who.int/iris/bitstream/handle/10665/259615/9789241513487-eng.pdf;jsessionid=A7F83FBB1D648061C9C62B5C79871E4F?sequence=1