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Effects on Language and Verbal Fluency of a Cognitive Stimulation Program in Older Adults: Randomized Controlled Trial

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Abstract: The efficacy of cognitive stimulation programs for the elderly is sufficiently documented. However, few studies have addressed the effectiveness of language stimulation programs by cognitive levels in this population. This randomized controlled trial was conducted on 308 participants from a primary care center and followed the CONSORT guidelines. A stratified randomization was carried out. The primary variable was the MEC-35, validated Spanish version of the Mini-Mental State Examination (MMSE). The secondary outcome variable was set-test, which evaluates verbal fluency in four categories. These tests were assessed for all outcome measures at baseline, at 10 weeks, at 6 months, and 1 year after the intervention. The intervention consisted of 10 sessions of 45 min/week for 10 weeks through mental activation notebooks that comprehensively work on the different cognitive functions. The results show that the comparisons between the control and intervention group turn out to be significant ($p < 0.05$) at the three time points. The comprehensive cognitive stimulation program has made it possible to improve the global aspects of cognition, language proficiency, and verbal fluency. To optimize and maintain these results, it is necessary to consider other clinical, functional, psychological, and occupational aspects, as well as related educational aspects, which prevent mild cognitive impairment.

Keywords: cognitive stimulation; older adults; language; verbal fluency; subjective memory complaint

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1. Introduction

The number of elderly people worldwide will approach 2.1 billion by the year 2050 [1]. Longevity represents a great achievement for humanity and a challenge for aging populations. Older people often look for novel ways to contribute after retirement. However, their contribution depends on their physical health, mental health, and well-being [2,3].

These challenges are even more concerning given that normal cognitive aging is associated with declines in key brain regions that are vital for cognitive function [4]. These are characterized by near-linear declines from early adulthood in speed and inhibitory control in task switching [5], and accelerating declines in memory and reasoning. However, vocabulary knowledge increases until the subjects are in their 60s [6].

Recent studies suggest that the link between action and language decreases with age [7]. Although lexicosemantic deficits are not typically seen in older adults, some studies indicate that age-related changes can occur in semantic processing [8]. It must be taken into account that impairment of language skills affects the level of functioning of an individual, interferes with effective communication, and can result in the development of disruptive behavior [9].

Verbal fluency is one of the first and most important cognitive functions to deteriorate during the aging process. Verbal fluency is defined as the skill and speed of finding words and finding semantic and phonetic connections between words [10]. The semantic verbal fluency test is generally administered by asking participants to generate words from a semantic category such as animals, fruits, or vegetables [11].

The findings from the Canadian Longitudinal Study on Aging indicate subtle changes in the way people perform this verbal fluency task as they age up [12]. Previous research had already suggested that verbal fluency is a function of people's age regardless of cognitive functioning, and younger populations performed better on these verbal fluency tests compared to older adults [11]. However, it has been shown that people with mild cognitive impairment (MCI) achieve a lower verbal fluency score than the healthy population and also their score decreases more rapidly in the same time period [13]. Additionally, the linguistic deficit is the most frequent cognitive disturbance after memory disorders in Alzheimer's disease (AD) semiology [14].

The findings emphasize the contribution of the right hemisphere regions to the performance of the fluency task [15]. This approach supports the value of introducing time-based measures to the assessment of verbal fluency in the context of this generative task differentiating subjects with MCI from those with intact cognition [16].

However, population studies indicate that between 50% and 80% of older people who perform within normal ranges on cognitive tests report subjective memory complaints (SMC). These are usually very common and have a risk of transformation to MCI and AD. Therefore, there is a need to develop an efficient and cost-effective therapeutic method for SMC in older adults [17].

Finally, cognitive stimulation programs for elderly people show positive results; however, few are the studies that have investigated the effectiveness of language stimulation programs for the health of this population [18]. In this regard, the cognitive reserve hypothesis has received much attention regarding how to avoid cognitive deterioration [19].

Statement of the Study

The aim of this study was to analyze, through a randomized clinical trial, the effects produced on language and verbal fluency over time, with a cognitive stimulation program by cognitive levels and with specific language activities, in older adults with SMC living in the community.

2. Materials and Methods

2.1. Design and Participants

This randomized controlled trial was conducted on elderly people in a primary care center in the city of Zaragoza (northeastern Spain). The reasons for choosing a primary care health center were firstly the fact that, in Spain, the figure of the occupational therapy professional is not yet included in the public health services, and somehow it was a pilot experience in our city. The initial sample consisted of 367 participants. After applying the inclusion criteria, the final sample consisted of 308 participants that were allocated into two groups: 131 participants in the intervention group and 177 participants in the control group. These participants were recruited in primary healthcare consultations and received normal medical and nursing care. The flow of participants and dropouts in the different phases of the study is shown in Figure 1.

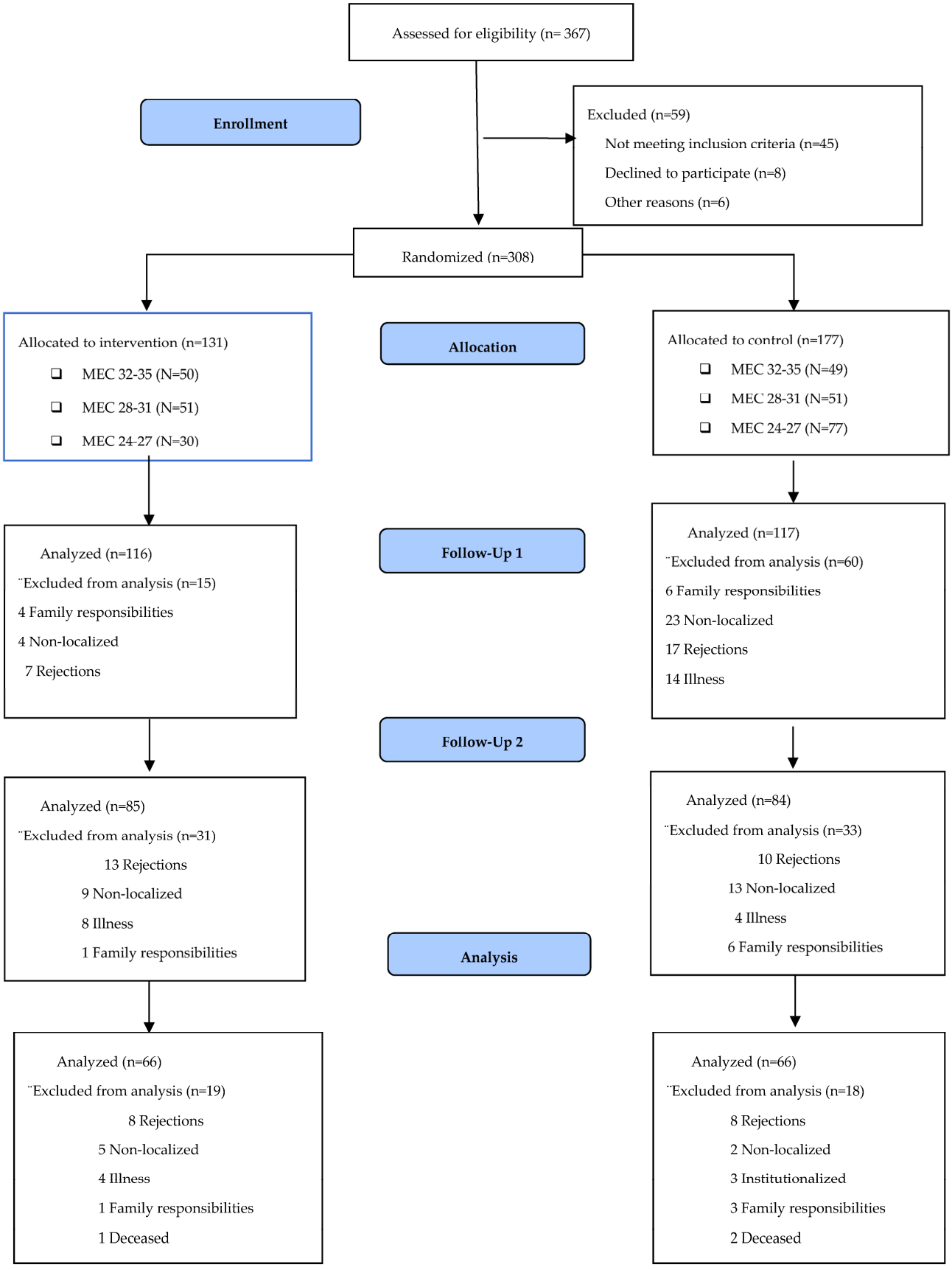

Figure 1. Flow Diagram CONSORT 2010.

Participants received information on the project from informative posters placed on the doors of all the medical consultation rooms and at their family doctor's office. This study followed the CONSORT guidelines [20].

Inclusion and Exclusion Criteria

Individuals aged 65 years or older, scoring 24 points or more on the MEC-35 (validated Spanish version of the Mini-Mental State Examination, MMSE) [21] and presenting subjective memory complaints were included. We excluded individuals who had received cognitive stimulation in the last year (to avoid possible biases), those who were institutionalized, and those who presented functional (<60 points on the Barthel index and 3 or less points on Lawton), psychological (more than 6 points on the abbreviated Goldberg anxiety scale and 12 points or more on the Yesavage depression questionnaire) and major sensory (blindness and deafness) problems, as well as neuropsychiatric disorders. These exclusion criteria were taken into account in the face of physical, functional, psychological, or sensory impossibility to attend or adequately carry out the intervention sessions.

The withdrawal criteria consisted of the failure to attend assessments or decision to abandon, death, or entry into a geriatric center.

All the participants were informed about the nature of the study, its objectives, and the voluntary nature of their participation, and that they were free abandon it at any time without giving any explanations.

2.2. Sample Size

The sample size calculation was performed with G*3 Power 3.1 (Heinrich-Heine University Düsseldorf, Germany). The calculations were based on a standard deviation (SD) of 5.2 points, a between-group difference of 2 points (it was the minimal detectable change [MDC] of the MEC-35 [22], an alpha level of 0.05, and power of 80%. A total sample of 132 participants was estimated. Considering a dropout rate of 50% based on previous studies conducted with this type of population, an initial sample of 308 participants was necessary to reach 132 participants at follow-up, one year after the intervention.

2.3. Treatment Allocation

Participants were randomized into two groups: the intervention group (IG) and the control group (CG). A stratified randomization was carried out based on the scores obtained in the MEC-35 scale [21]: group 1 had scores between 32 and 35 points, group 2 had scores between 28 and 31 points [23,24], and group 3 had scores between 24 and 27 points, in accordance with the classification by Calero et al. [25]. For randomization, an opaque urn was used into which the participants' file numbers were placed and an anonymous person drew the selected numbers. The first author verified the inclusion criteria of the participants. The randomization was carried out by a therapist who was independent from the study.

2.4. Outcomes Measures

Participants who confirmed their willingness to participate and fulfilled the inclusion criteria were enrolled in the study and assessed for all outcome measures at baseline (Pre), at 10 weeks (Post-intervention), at 6 months (Follow-up I), and one year after the intervention (Follow-up II). Each evaluation was performed by different occupational therapists who were blinded to the group allocation. Evaluators who performed the interventions carried out a 20 h specific theoretical–practical training program to guarantee homogeneous application of the evaluation criteria. Assessments were always performed at the same time and in the same place in order to preserve participant conditions as far as possible. Additionally, other factors such as changes in medication were also controlled.

Primary outcomes were the changes in the cognitive level, evaluated with the MEC-35. Secondary outcomes included the abbreviated form of the set test [26].

2.4.1. Variables

Sociodemographic, clinical, contextual, and environmental variables were examined. The sociodemographic variables studied were age, gender, civil status, education level, physical occupational status, and mental occupational status. Moreover, education level was divided into two subgroups (Primary/Higher). This is the most basic classification possible, given that this variable was not initially considered for the inference analysis of the results. The subdivision of physical occupational status and mental occupational status was made according to three levels: low, medium, and high for each of them, in accordance with the classification used by Grotz et al. [27].

The clinical state variables examined were high blood pressure (HBP), diabetes, hypercholesterolemia, obesity, and cerebrovascular accident (CVA).

2.4.2. Neuropsychological Assessment

The primary variable was the MEC-35, one of the most widely used short cognitive tests for the study of cognitive capacities in primary care. It evaluates eight components: temporal and spatial orientation (10 points), fixation memory (3 points), attention (3 points), calculation (5 points), short-term memory (3 points), language, and praxis (11 points). Its sensitivity is 85–90% and its specificity is 69% [21]. This questionnaire was used to assess the global cognition and cognitive functions of temporal orientation, spatial orientation, fixation memory, attention, calculation, short-term memory, language, and praxis. Unlike the MMSE, the MEC-35 includes a three-digit series to repeat two similar items in reverse order. Subtraction is performed three by three from 30, instead of 7 by 7 from 100, as in the version used by Folstein et al. [28]. In this version, as the number of items increases, the maximum score reaches 35 points as compared to 30 in the original one [29].

The presence of subjective memory complaints (SMC) was evaluated through the question: Do you have complaints about your memory? Dichotomous response (yes/no) [30,31].

The set test [26] evaluates verbal fluency in four categories: colors, animals, fruits, and cities. It has been proposed as a diagnostic aid in dementia in elderly patients. The cutoff value was 29 in adults and 27 in elderly people. A lower score is indicative of dementia. Sensitivity was 79% and specificity 82%, with 20% of incorrectly classified patients.

2.4.3. Intervention

The intervention was carried out at La Caridad Foundation in Zaragoza (collaborating entity). This foundation was close to the health center, which facilitated the participants' access to it and had the appropriate facilities to carry out the intervention program (which the health center lacked).

All participants, who were blinded to the group allocation, were treated by two skilled occupational therapists. The intervention was carried on subgroups of 25–26 participants from group 1: 32–35 points and group 2: 28–31, as well as in subgroups of ten participants from group 3: 24–27 points [32], each using the notebook of mental activation [33], designed by cognitive level in accordance with MEC [23–25].

The intervention was carried out, adapting the stimulating activities to the life history, personal preferences, limitations, and potentialities of the patient [34]. The intervention was performed in each subgroup by two trained occupational therapists.

The intervention consisted of 10 sessions of 45 min/week for 10 weeks. Each session included four parts: (a) reality orientation: questions about date, time, and place, using calendars, clocks, and posters indicating the place and address where the participants were situated; (b) explanation of the cognitive aspect that was going to be focused on in each session, with alternatives including: (1) "memory" (changes with aging, types of memory, strategies such as association and categorization); (2) "orientation" (temporary, spatial, and personal); (3) "language"; (4) "praxis" (ideomotor, ideational, and constructive); (5) "gnosis"; (6) "calculation"; (7) "perception"; (8) "reasoning"; (9) "visual attention"; (10) "executive functions" (planning capacity, training in social skills, and association with activities of daily living); (c) individual practical work, in which four exercises of the

cognitive aspect corresponding to each session were performed; (d) group correction of practical exercises.

Although the cognitive stimulation program was comprehensive, the exercises were performed in the different subgroups, according to the cognitive level, in the language area, as shown in Figure 2.

LEVEL 1-MEC: 32-35 POINTS	LEVEL 2-MEC: 28-31 POINTS	LEVEL 3-MEC:24-27 POINTS
Antonyms	Synonyms	Verbal fluency: words that begin with a letter/syllable
Definitions	Categorial verbal fluency	Read comprehension
Sort Phrases	Guess definitions with clues	Word association
Syntagmatic and paradigmatic relationships	Complete proverbs	Complete sentences

Figure 2. Cognitive stimulation program exercises.

3. Results

The study participants' sociodemographic and clinic characteristics are shown in Table 1.

Table 1. Study participants' sociodemographic and clinic characteristics.

	Mean ± SD/% Total (n = 308)	**Mean ± SD/% GC (n = 177)**	**Mean ± SD/% GI (n = 131)**	***p*-Value**
Age (years)	73.66 ± 5.88	74.57 ± 6.16	72.85 ± 5.608	0.009
Gender				
Man	108 (35.1%)	73 (4.2%)	35 (26.7%)	0.008
Woman	200 (64.9%)	104 (58.8%)	96 (73.3%)	
Level of education				
Primary	235 (76.3%)	131 (74.0%)	104 (79.4%)	0.273
Higher	73 (23.7%)	46 (26.0%)	27 (20.6%)	
Civil status				
Single	16 (5.2%)	10 (5.6%)	6 (4.6%)	
Married	207 (67.2%)	120 (67.8%)	87 (66.4%)	0.929
Widowed	75 (24.4%)	41 (23.2%)	34 (26.0%)	
Separated	10 (3.2%)	6 (3.4%)	4 (3.1%)	
Physical occupational				
Low	64 (20.8%)	37 (20.9%)	27 (20.6%)	
Medium	123 (39.9%)	71 (40.1%)	52 (39.7%)	0.992
High	121(39.3%)	69 (39.0%)	52 (39.7%)	
Mental occupational				
Low	178 (57.8%)	106 (59.9%)	72 (55.0%)	
Medium	113 (36.7%)	59 (33.3%)	54 (41.2%)	0.248
High	17 (5.5%)	12 (6.8%)	5 (3.8%)	
HBP				
Yes	151 (49.0%)	84 (47.5%)	67 (51.1%)	0.522
No	157 (51.0%)	93 (52.5%)	64 (48.9%)	
Diabetes				
Yes	42 (13.6%)	27 (15.3%)	15 (11.5%)	0.336
No	266 (86.4%)	150 (84.7%)	116 (88.5%)	

Table 1. *Cont.*

	Mean ± SD/% Total (n = 308)	**Mean ± SD/% GC (n = 177)**	**Mean ± SD/% GI (n = 131)**	***p*-Value**
Hypercholesterolemia				
Yes	121 (39.3%)	74 (41.8%)	47 (35.9%)	0.292
No	187 (60.7%)	103 (58.2%)	84 (64.1%)	
Obesity				
Yes	41 (13.3%)	23 (13.0%)	18 (13.7%)	0.849
No	267 (86.7%)	154 (87.0%)	113 (86.3%)	
CVA				
Yes	20 (6.5%)	11 (6.2%)	9 (6.9%)	0.817
No	288 (93.5%)	166 (93.8%)	122 (93.1%)	

This shows that 64.9% were women and 35.1% were men. Their mean age was 73.66, with an SD of 5.88. Generally, no statistically significant differences were observed in sociodemographic characteristics, clinical characteristics, and participant lifestyle, with the exception of the number of women and men ($p = 0.008$) and their age ($p = 0.009$). The profile was a married (67.2%) woman (64.9%), having a primary-level education (76.3%), a medium physical occupation (39.9%), and a low mental occupation (57.8%).

Regarding the clinical characteristics, the profile of our participants included 49% with arterial hypertension, 13.6% with diabetes, 39.3% with hypercholesterolemia, 13.3% with obesity, and 6.5% with cerebrovascular accident.

Tables 2 and 3 show the effect of the intervention, at 10 weeks (Post-intervention), at 6 months (Follow-up I), and a year after the intervention (Follow-up II) with respect to the baseline evaluation, on the main variable MEC, and specifically, on the cognitive domain of language.

Likewise, we analyzed the effect of the intervention on the secondary outcome variable Set-test. As can be seen, all the comparisons between the control group and intervention group turn out to be significant ($p < 0.05$) at the three time points, for the variables MEC-35, language and Set- test. With respect to the language and praxis variable, this difference is significant in Post and the Follow-up II; however, it is not significant in Follow-up I ($p = 0.068$).

Table 4 shows the most adjusted model of the regression for the dependent variable language and Set- test in the post-intervention evaluation, and one year after the intervention with the rest of the variables studied. It was decided to perform this regression at these two moments in time to determine if the predictor variables can be modified over time.

The results show that at the post-intervention moment, the language variable presents the educational level and the set test as predictor variables with a positive relationship with the group (control or intervention), and a negative relationship with depression. According to ANOVA, there is a significant relationship (F = 8.478, *p*-value less than 0.001). One year after the intervention, this language variable is positively related with the group and mental occupation, and negatively with age and depression. According to the ANOVA, there is a significant relationship (F = 6.436, *p*-value less than 0.001).

Post-intervention, the Set- test variable is positively related to stroke and Lawton, and negatively to age. According to ANOVA, there is a significant relationship (F = 11.739, *p*-value less than 0.001). One year after the intervention, it is positively related to educational level, Lawton, and mental occupation, and negatively to age. According to the ANOVA, there is a significant relationship (F = 7.633, *p*-value less than 0.001).

Table 2. Mean and standard deviation in the main outcome variables in the control and intervention group at the four time points.

	Control Group (n = 177)				Intervention Group (n = 131)			
	Basal	**10 Weeks Post-Intervention**	**26 Weeks (Follow-Up I) 6 Months**	**52 Weeks (Follow-Up II) 12 Months**	**Basal**	**10 Weeks Post-Intervention**	**26 Weeks (Follow-Up I) 6 Months**	**52 Weeks (Follow-up II) 12 Months**
MEC-35	29.92 ± 2.639	30.085 ± 3.167	30.36 ± 3.281	30.48 ± 2.780	29.82 ± 2.624	31.634 ± 2.395	32.07 ± 2.511	32.27 ± 2.402
Language and Praxis	9.81 ± 1.101	9.72 ± 1.105	9.94 ± 1.101	9.97 ± 0.960	9.81 ± 0.921	10.41 ± 0.780	10.16 ± 1.010	10.52 ± 0.707
Language	5.36 ± 0.801	5.43 ± 0.780	5.58 ± 0.746	5.50 ± 0.707	5.34 ± 0.721	5.75 ± 0.558	5.65 ± 0.685	5.83 ± 0.514
Set Test	37.32 ± 3.759	37.74 ± 4.016	37.94 ± 3.883	38.67 ± 2.863	38.22 ± 2.638	38.81 ± 2.118	39.13 ± 1.765	39.21 ± 2.072

MEC-35: Mini cognitive exam-35 points (Spanish version of MMSE). Data expressed with mean ± standard deviation.

Table 3. Differences between groups at 10 weeks (Post), at 6 months (Follow-up I), and at 12 months (Follow-up II) with respect to the baseline evaluation in the main outcome variables.

	Differences between Groups Basal-10 Weeks Post-Intervention	**GroupTime Interaction *p*-Value**	**Differences between Groups Basal-26 Weeks (Follow-Up I) 6 Months**	**GroupTime Interaction *p*-Value**	**Differences between Groups Basal-52 Weeks (Follow-Up II) 12 Months**	**GroupTime Interaction *p*-Value**
MEC-35	−5.482 (−0.868, −6.819)	0.000	−5.321 (−1.215, −5.961)	0.000	−5.307 (−1.278, −5.728)	0.000
Language and Praxis	3.266 (1.285, 5.281)	0.001	−1.828 (−0.544, −2.199)	0.068	−3.706 (−0.839, −4.518)	0.000
Language	−4.557 (−0.964, −5.277)	0.000	−3.354 (−1.900, −2.946)	0.001	−3.928 (−1.355, −4.382)	0.000
Set Test	−2.860 (−1.488, −2.661)	0.004	−2.669 (−1.484, −2.340)	0.008	−4.403 (−3.100, −3.142)	0.000

MEC-35: Mini cognitive exam-35 points (Spanish version of MMSE). *p*-value: Wicolson's nonparametric test; IC95%: confidence interval at 95%.

Table 4. Multiple regressions for the dependent variable language and Set- test in the post-intervention evaluation and one year after the intervention.

Language 2 (Post)									**Language 4 (year after the intervention)**							
	B	**B standardized**	**e.t.**	**R^2**	**t**	**Sig.**	**Anova F**	**Sig.**		**B**	**B standardized**	**e.t.**	**R^2**	**t**	**Sig.**	**Anova F Sig**
Group	0.273	0.198	0.649	0.130	3.137	0.002	8.478	0.000	Group	0.267	0.209	0.594	0.171	2.538	0.013	6.436, 0.000
Study	0.275	0.169			2.697	0.008			Age	−0.234	−0.180			−2.178	0.031	
Set Test	0.032	0.151			2.404	0.017			Mental occupation	0.232	0.180			2.195	0.030	
Depression	−0.034	−0.139			−2.208	0.028			Depression	−0.242	−0.158			−1.895	0.060	
Set Test 2 (Post)									**Set Test 4 (year after the intervention)**							
	B	**B standardized**	**e.t.**	**R^2**	**t**	**Sig.**	**Anova F**	**Sig.**		**B**	**B standardized**	**e.t.**	**R^2**	**t**	**Sig.**	**Anova F Sig**
Age	−1.207	−0.184	3.050	0.134	−2.891	0.004	11.739	0.000	Age	−0.986	−0.192	2.297	0.196	−2.216	0.029	7.633, 0.000
CVA	1.599	0.117			1.883	0.061			Mental occupation	0.976	0.192			2.279	0.024	
Lawton	0.632	0.268			4.179	0.000			Study	0.503	−0.218			−2.502	0.014	
									Lawton	0.177	0.277			3.266	0.001	

e.t.: standard error of the estimate; R2: R square (coefficient of determination); CVA: Cerebrovascular accident; B: Beta.

4. Discussion

This research showed that in older people with subjective memory complaints, the addition of a comprehensive cognitive stimulation program according to the pre-existing cognitive level (measured with MEC-35) led to global cognitive improvements in the specific language domain and in the verbal fluency of the intervention group compared to the CG. Furthermore, these effects not only occured after the intervention, but were also maintained over time, both in Follow-up I (6 months) and on a longer-term in Follow-up II (one year after the intervention).

Similarly, other studies have shown cognitive benefits with different techniques in healthy older adults, regardless of their initial cognitive status [35–45]. This reflects a general view that lack of cognitive activity accelerates cognitive decline [46] and that cognitive stimulation could optimize cognitive function [47,48] producing an increase in neuronal volume [49].

However, we have identified only few studies that analyzed the effect of these programs on the cognitive subdomain of language. The study by Park et al. [40] also found significant differences in language skills with a similar number of sessions to our study, but with a pretest–posttest design and a multicomponent program. Regarding verbal fluency, we have identified three studies whose results agree with those obtained in our study: the global cognitive improvement in MMSE and the improvement of verbal fluency, with similar programs that work comprehensively on cognitive functions [37,45,49]. Both tests show moderate agreement in cognitive screening [50].

Therefore, the cognitive benefits that obtained globally, in language proficiency and in verbal fluency, have been corroborated in other studies [45,51,52], and with long-term effects [33]. These results suggest that engaging in memory training improves confidence in this memory ability [53,54] and generally promotes self-esteem and quality of life [45,52].

The results of the predictive models (regressions) show how, in older people with SMC, the level of education, verbal fluency, and mental occupation are positively related as predictors of language proficiency, and negatively with depression and age. Similarly, this study has shown how verbal fluency is positively related to stroke and instrumental activities of daily living (IADL), and negatively to age and mental occupation.

Consistent with this, other studies have indicated that linguistic skills and verbal fluency decrease with age [7,10], and that education dampens overall performance and language proficiency especially if SMC exists [55]. These complaints are also linked to depression and cognitive deficit in primary care settings [56]. However, other authors have found no relationship between SMC and verbal fluency in older people [57], but rather with mental occupation [58], the deterioration of AIDL [59,60], and the relationship with aphasia as a frequent complication after a stroke [61].

The literature indicates the relationship between SMC and the risk of MCI [62] and dementia [63]. If these complaints are multidomain (memory, language, executive), the risk increases [63]; therefore, in clinical practice all complaints [62,64] should be considered as possible early indicators of incipient dementia [65].

Therefore, CS from the field of occupational therapy is a cost-effective psychosocial intervention [47,66] to prevent and delay the onset of MCI and dementia [67,68], especially if work activities are considered to be stimulating [69]. Despite the effects of these programs improving emotional well-being and quality of life [43,70], there is a gap in their implementation in clinical practice [66].

In addition, the literature emphasizes, consistent with our study, the need to adapt interventions to individual needs and resources (person-centered care) [71] and address the practice of CS in a global or multi-domestic manner [68] to avoid that the interactions between the multiple cognitive processes necessary for a healthy mental state are lost [44,51,72–74], the results endure over time [49], and are extrapolated to functional and psychological areas [43].

Regarding this study's limitations, in the first place, in this study we have not been able to compare the effects of the intervention with another group of elderly people with-

out CMS. Second, we have not explored the transfer of the program to functional and psychological capacities.

This paper adds that programs that work comprehensively on cognitive functions improve verbal fluency. This study shows how verbal fluency is positively related to stroke and instrumental activities of daily living, and negatively to age and mental occupation. This research demonstrates that the addition of comprehensive cognitive stimulation programs in people with subjective memory complaints leads to global cognitive improvements, as well as improvements in specific language proficiency and verbal fluency.

Finally, future studies should explore complaints in other domains such as language and the effects that this program produces on functional and psychological variables.

5. Conclusions

This study has shown that comprehensive cognitive stimulation in older people with SMC, with a work methodology by cognitive levels, and which takes into account previous work aspects, improves overall cognitive performance, in addition to improving language proficiency and verbal fluency.

In addition, aspects such as educational level, verbal fluency, and mental occupation are positively related as predictors of linguistic competence, which should be taken into account to treat the most vulnerable older people.

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