


The effects of an intergenerational multidisciplinary cognitive stimulation program



Gislaine Gil¹
Alexandre Leopold Busse²
Fabiana Tintori Shoji¹
Patrícia Dancieri Martinelli¹
Elisabeth Frohlich Mercadante³

Abstract

Objectives: To ascertain and compare the performance of adult and elderly participants in attention, memory, mood and metamemory assessments, before and after participating in the intergenerational multidisciplinary cognitive stimulation program. **Method:** The medical records of 79 male and female patients, aged 40 years and older, were selected between 2008 and 2012. Each participant had at least 11 years of schooling and complained of subjective memory deficiencies. Dementia, as defined by the *Diagnostic and Statistical Manual of Mental Disorders – DSM-IV-TR*, was ruled out as a cause of such complaints among the patients. The results of cognitive test evaluations, mood scale and subjective memory complaint questionnaire scores were assembled, before and after patient participation in the stimulation program, which consisted of twenty 100 minute sessions that were conducted in a large hospital in the city of São Paulo. **Results:** There was an improvement in patient performance, not only regarding attention tests but also memory tests ($p < 0,001$); however, no improvement was detected regarding metamemory. There was a reduction in symptoms of depression ($p = 0,014$) and anxiety ($p < 0,001$). Immediate associative learning improved greatly among elderly participants ($p = 0,022$), whereas the reduction in symptoms of anxiety and depression ($p = 0,019$) was greater among adult participants ($p = 0,022$). **Conclusions:** Study results showed that Intergenerational Multidisciplinary Cognitive Stimulation program improved the cognitive performance and the mood of adult and elderly participants who complained of subjective memory deficiencies.

Key words: Cognitive Stimulation; Multidisciplinary; Intergenerational; Memory; Cognition.

¹ Instituto de Geriatria do Hospital Alemão Oswaldo Cruz. São Paulo, SP, Brasil.

² Universidade de São Paulo, Serviço de Geriatria do Hospital das Clínicas da Faculdade de Medicina. São Paulo, SP, Brasil.

³ Pontifícia Universidade Católica de São Paulo, Programa de Pós-graduação *Stricto Sensu* em Gerontologia Social. São Paulo, SP, Brasil.

Financed by: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior–CAPES (The Higher Education Personnel Qualification Organization), case No. 33005010028T4, research grant.

Correspondence
Gislaine Gil

E-mail: neuropsicologa.gislainegil@gmail.com; contato@vigilantesdamemoria.com.br

INTRODUCTION

Aging is a slow, adaptive and continuous process, bringing with it a series of life modifications. This existence of cognitive change depends on physiological, emotional and environmental changes, and is subject to large degrees of variability among individuals. It is important, therefore, that people recognize each other as individuals with particular needs and capabilities, rather than a group within which everyone is the same simply because they are getting older.¹

Losses in cognitive skills are determined and stimulated, at least in part, by the rhythms of each person's lifestyle.² Adults that are from the "multitasking generation", who split their focus of attention over more than one stimulus, demonstrate losses in the ability to dedicate themselves to the principal task at hand. As a result, they complain of memory deficiencies that are due to the daily excesses of information and stress.³

These adults, once they reach old age, display a considerable reduction in relation to environmental demands, initiating a process of the "untraining" of cognitive abilities, which is, at least partially speaking, responsible for the changes that occur during this phase of life and for the increase in complaints regarding memory lapses.² The different age groups, who seek to maintain their cognitive health, look to prevention as a more promising means of reaching this objective.

The cognitive stimulation program arose as a concept for a therapeutic program that would be capable of promoting mental health, contributing, as such, to increases in synaptic density and neuroplasticity, as it requires new processes of learning and the development of cognitive strategies.⁴ It was demonstrated that the improvements that were detected after the patients participated in memory stimulation programs were maintained over time for periods that varied from six months to up to five years after these programs began.⁵

New proposals for cognitive stimulus studies are necessary due to the intensity of the demographic transition, making necessary, in the short term, the redefinition of health care models, adapting them to cover the greatest number of patients, while bringing people of different age-groups together to interact in a manner that also aims to reduce costs.

The importance of intergenerational groups was observed in Article 16 of the Madrid International Plan of Action on Ageing.⁶ Therein, the United Nations organization (UN) recognized the need to strengthen not only aspects of solidarity between generations but also intergenerational initiatives that emphasize the particular needs of the oldest and youngest members of society. It is relevant to emphasize that the promotion of social interaction amongst the elderly and the reduction of prejudices against these members of society are crucial to achieving a change in public perception, which regards old age as a period of physical dependency and overall incapacitation. The interaction of individuals of different age groups is of fundamental importance and value, as is the interaction of these individuals with health care professionals.

As a result, this study sought to assess and compare, through data obtained from medical records, performance in attention, memory, humor and metamemory (the subjective perception of a decline in memory capacity) tests of elderly individuals and adults who participated from 2008 to 2012 in the intergenerational multidisciplinary cognitive stimulation program of a large hospital in the city of São Paulo.

METHODOLOGY

Eighty-nine medical records (from between March 2008 and April 2012) belonging to participants in the program, were selected, of which 10 were discarded (nine patients did not undergo a reevaluation and one had completed primary school education only). Therefore, the study incorporated the medical records from 2008 to 2012 of 79 male and female patients, aged 40 years and older. Each participant had

at least 11 years of schooling and complained of subjective memory deficiencies. Dementia, as defined by the *Diagnostic and Statistical Manual of Mental Disorders* – DSM-IV-TR, was ruled out as a cause of such complaints among the patients. The results of cognitive test evaluations, mood scale and subjective memory complaint questionnaire scores before and after patient participation in the stimulation program of a large hospital in the city of São Paulo were collected.

The cognitive tests that were applied by a psychologist, before and after patient participation in the stimulation program, included: digits forward, digits backward and sequences of numbers and letters pertaining to the Wechsler III adult intelligence scale, which evaluates attention span and focal and divided attention; the Wechsler III scale paired-associate subtest, which evaluates the individual's capacity to make associations; the Rivermead Behavioral Memory Test, which evaluates prospective memory; the 30 item Geriatric Depression Scale (GDS), which checks symptoms of depression; the Beck Anxiety Scale, which assess symptoms of anxiety; and the Sunderland Everyday Memory Questionnaire,⁸ which evaluates the subjective perception of the decline of memory.

The program that was described in the records was of a multidisciplinary nature, consisting of twenty 100 minute weekly meetings, divided into two groups - one psychoeducative and the other, practical. Health care professionals were assigned to each group, and the sessions were organized as follows: one was presided over by a geriatric physician, another by a psychologist specializing in cognitive-behavioral therapy and another by a physical therapist specializing in Gerontology. Two sessions were overseen by a nutritionist; another session involved music therapy, and the remaining sessions were supervised by a psychologist specializing in Neuropsychology.

During each of the meetings, the health care professionals employed positive reinforcement techniques,⁹ by means of verbal incentives and praise, in order to motivate the participants to engage more fully in the activities.

The content of the meetings was structured as follows:

- *Meeting 1:* Presentation of group members and course activities. An overall presentation of what is memory, types of memory, the stages and illnesses that can affect how memory works, such as dementia and Alzheimer's, and vascular dementia.
- *Meetings 2 and 3:* Description of the path through which a visual image travels from one's eye to the brain and the relationship of this process with visual memory.¹¹ The most common illnesses that adversely affect vision that occur amongst adults and the elderly are presented.¹² The first stage of memory, which is the process of receiving information, is explained, as well as the fundamental role of attention, through the use of objective training and the technique of employing the strategy of self-control. The process through which attention is objectively trained involves the use of cognitive exercises that are planned to increase the efficacy of the systems that form the foundations of attention. Regarding the strategy of self-control, the participant learns to begin to control his or her own attention, for the techniques are based on auto-instructional routines that aid the individual in focusing his or her own attention more efficiently.¹³
- *Meeting 4:* An explanation is provided of the path that sound travels from the ear to the brain and the correlation of this process with auditory memory.¹¹ A presentation is given of the most common illnesses in the elderly that involve hearing loss.¹² An auditory attention training session is conducted using the PQRST repetition strategy.¹⁴ This strategy produces better recall than the practice of repetition as it offers better clues for recall, increases the specificity of codification and processes material at a deeper level.
- *Meetings 5 and 6:* The path through which smells traverse the human brain

and its roles in taste are explained. The relationship of these senses with olfactory memory and taste memory is described.¹¹ The importance of a healthy diet is discussed, emphasizing the role that certain foods have in positively influencing improvement in cognitive performance.¹⁵

- *Meetings 7 and 8:* Stress, anxiety and depression are explained, as well as how these clinical diagnoses disrupt the functioning of memory. The method of registering dysfunctional thoughts is explained¹⁶ in order to improve the recognition of the symptoms of anxiety and depression. Relaxation techniques are presented that aim to reduce tension, improve attention and minimize fatigue, by means of a practical group training technique known as autogenic relaxation, according to the Schultz method.¹⁷ This technique induces states of relaxation through sensations of weight and heat at the extremities of the body, the regulation of one's heartbeat and by focusing on breathing.
- *Meeting 9:* Attention and tactile memory are explained.¹¹ Respiratory training is given that aims to minimize anxiety and improve memory capabilities.⁹ A lesson is given regarding a fall-free environment, since one of the intrinsic factors that influence falls are cognitive deficits, more specifically alterations in memory.¹²
- *Meeting 10:* An explanation of the stages of sleep, sleep disorders and how they affect cognitive performance, is provided during this session. Sleep hygiene, which is responsible for improvements in attention and memory, is also explained.¹²
- *Meeting 11:* In this session, the second stage of memory is examined, known as decodification. An exercise is conducted involving the decodification of the phonological characteristics of information during recall of previously learned material.⁹
- *Meeting 12:* An exercise is conducted involving the decodification of logical characteristics in order to recall material that was learned previously.⁹
- *Meeting 13:* The importance of semantic organization or categorization in learning new material is discussed.⁹
- *Meeting 14:* Expanded Learning Technique.¹⁸ This technique consists of learning new information over greater intervals of time between moments when that information is recalled. When an error in recall occurs, the interval of time between recall is increased to the previous time interval, when the participant had recalled the information correctly. Once the individual has once again recalled the information correctly, the interval of time is increased and the participant is asked to recall the information once again.
- *Meeting 15:* The name-face associative technique is explained¹⁹ through a practical application of the concept. By employing visual mnemonics, the name of a person may be transformed into an image in order to subsequently evoke the person's name.
- *Meeting 16:* An associative technique for remembering numbers and dates is presented.¹⁹ By using visual mnemonics, each number between 0 and 9 is transformed into a specific item, related to the written shape of the number.
- *Meeting 17:* During this session, the loci technique¹⁹, for remembering itineraries, is discussed. This technique is used for recalling a sequence of events. In doing so the participant must draw a map of his or her own home, number the rooms from

1 through 7 and imagine himself entering each room in order to recall some step of the sequence.

- *Meeting 18: Music and memory.* Studies reveal that certain types of music²⁰ can favor the maintenance of mental health, reduce or prevent stress and, consequently, prevent lapses in memory, alleviate physical fatigue and induce emotions, which explains the use of music as a therapeutic aid.
- *Meeting 19:* In this session, the fourth stage of memory, recovery, is explained. The ugly sister strategy.⁹ It is during the process of recovery when the participant may encounter problems and suffer from that irritating sensation that only his or her ugly sister comes to mind, i.e., a closely related word, but not the desired one. To avoid the wrong word, the individual should, as a technique, examine the intrusive word and associate it functionally with other words until he or she recalls the desired word.
- *Meeting 20:* This closing session promotes the sharing of each participant's lifelong memories. Each participant explains why he or she sought out the program and if his or her objectives were achieved.

Each of the sessions began with a recap of the objectives and accomplishments that were achieved during the previous session and ended with feedback about the benefits of the results that were obtained in the meeting. It should be noted that the stimuli employed in the assessment procedures were not trained at any moment during the meetings.

At the end of each meeting, participants were encouraged to practice what they learned at home by reviewing the learning material that was produced with what was learned during the meetings (supplied at the beginning of the course) and the execution of exercises. Participants were

encouraged to apply the techniques they learned to everyday activities, which gave them the opportunity to apply the methods they learned to their routine frequently with the benefit of corrective feedback.⁹

Statistical analysis

The continuous variables were presented as averages and standard deviations and the comparison of these variables as a function of time was achieved through the paired Student's t-test. The discrete variables were presented as proportions and were compared by using the dual proportion equality test.

In order to measure the effects of sociodemographic variables on the evolution of psychometric tests, the value of the simple mathematical difference of the pre- and post-program participation averages was calculated. Subsequently, an ANOVA test was performed, followed by a Tukey multiple comparison test.

The significance values that were adopted were $p < 0.05$ with a 95% confidence interval. The following software programs were used: *Excel Office* 2010, *Minitab* 16 and *SPSS* v17.

Ethical procedures

The project was approved by the Research Ethics Committee of the Hospital Alemão Oswaldo Cruz, registered under case No. 244/003-13; moreover, the underlying ethical principles of the National Council for Health and the National Council of Research Ethics in the use of medical records for research purposes were complied with.

RESULTS

The sample characteristics are shown in table 1.

Table 1. Sample characteristics (n=79). São Paulo, SP, 2012.

Sample characteristics	n	%
Elderly	62	78.48
Adults	17	21.52
Women	60	75.95
Men	19	24.1
Graduated college	63	79.7
Graduated high school	16	20.3
Married	51	64.6
Unmarried	28	35.4
Retired	36	45.6
Currently employed	43	54.4

Participants were aged between 40 and 88. Unmarried participants were classified into the following groups: 15.2% were widows or widowers, 10.1% were single and 10.1% were divorced or separated.

Significant statistical differences were found between pre- and post-program indices with respect to the following cognitive functions and scales (table 2):

Table 2. Comparison between the pre- and post-program phase indices scores for cognitive functions and mood and memory scales. São Paulo, SP, 2012.

Phases		Average	Standard-deviation	n	p-value
AA	Pre	7.75	2.04	79	<0.001
	Post	10.51	2.97	79	
AM	Pre	5.41	1.79	79	<0.001
	Post	6.80	2.22	79	
AD	Pre	6.70	3.36	66	<0.001
	Post	9.00	3.03	66	
AAI	Pre	17.97	7.33	79	<0.001
	Post	24.71	5.98	79	
AAT	Pre	5.61	2.17	79	<0.001
	Post	7.34	1.42	79	
MPP	Pre	18.97	4.19	78	<0.001
	Post	21.55	3.36	78	
MT	Pre	8.60	2.44	78	<0.001
	Post	10.22	1.89	78	
Anxiety	Pre	8.06	6.84	79	<0.001
	Post	5.53	5.36	79	
Depression	Pre	8.24	5.50	79	0.014
	Post	7.23	5.38	79	
Metamemory	Pre	70.11	35.78	45	0.985
	Post	70.04	30.65	45	

AA= attention span; AM= focal attention; AD= divided attention; AAI= immediate associative learning; AAT= late associative learning; MPP= prospective memory standard profile; MT= prospective memory triage profile.

No difference was detected between genders in terms of gains in cognitive function and mood and memory scale scores. In terms of academic background, a significant statistical difference was found between average immediate associative learning and late associative learning scores; it was found that participants who finished high school performed better (participants who had 11 years of schooling).

All of the adults in the group finished college, whereas of the elderly participants, 74% had finished college (more than 11 years of schooling) and 26% finished high school (11 years of schooling).

Table 3 shows the relationship between adult and elderly participants in terms of the variability of their scores regarding cognitive functioning, mood scales and the metamemory questionnaire.

DISCUSSION

During this study, attention and memory performance indices improved after the Intergenerational Multidisciplinary Cognitive Stimulation program was implemented with adult and elderly participants with 11 or more years of schooling. The methodology

Table 3. Comparison of age group regarding cognitive function scores, mood scale and metamemory questionnaire. São Paulo, SP, 2012.

Age Group		Average	Standard-deviation	n	p-value
AA	Adult	3.24	2.05	17	0.412
	Elderly	2.63	2.83	62	
AM	Adult	1.94	1.71	17	0.227
	Elderly	1.24	2.19	62	
AD	Adult	2.71	1.82	14	0.544
	Elderly	2.19	3.05	52	
AAI	Adult	3.71	3.70	17	0.022
	Elderly	7.56	6.50	62	
AAT	Adult	1.35	1.69	17	0.326
	Elderly	1.84	1.82	62	
MPP	Adult	1.88	2.89	17	0.211
	Elderly	2.77	2.47	61	
MT	Adult	1.12	1.90	17	0.152
	Elderly	1.75	1.51	61	
Anxiety	Adult	-5.00	6.73	17	0.019
	Elderly	-1.85	4.14	62	
Depression	Adult	-2.76	3.29	17	0.022
	Elderly	-0.53	3.52	62	
Metamemory	Adult	-4.57	21.63	14	0.391
	Elderly	1.97	24.19	31	

AA= attention span; AM= focal attention; AD= divided attention; AAI= immediate associative learning; AAT= late associative learning; MPP= prospective memory standard profile; MT= prospective memory triage profile.

utilized encompassed various strategies of intervention in the form of intergenerational group interaction. The positive results that were obtained suggest that these activities, with the inclusion of broader approaches implemented by a multidisciplinary group, would produce beneficial effects among patients.

Apóstolo et al.²¹ suggest that the positive effects of a cognitive stimulation program (CSP) could be directly related to longer periods of schooling, much like Argimon & Stein,²² who stated that greater schooling has an important role in the cognitive abilities of the elderly and facilitates higher performance in association

with some cerebral functions. However, in this study, participants that completed high school enjoyed greater gains in associative learning tests than participants that finished college. In much the same way, participants with lesser schooling obtained better cognitive response results in the study performed by Kwok et al.²³ It may be that participants with more years of schooling were already in the habit of employing associative strategies in their lives.

Complaints of memory deficiency were most frequent amongst elderly women, which could be related to the hormonal alterations that occur after menopause.²⁴ Elderly female

participants were even more self-conscious of their cognitive deficiencies because, having planned very carefully for old-age, they wanted to suffer from the least amount of cognitive decline, which would compromise their old-age planning.²⁵ This would corroborate the results of this intergenerational multidisciplinary cognitive stimulus program study on 77.5% of the women.

The majority of the participants in the intergenerational multidisciplinary stimulation program were married (61.8%), probably because the percentages of married adults and elderly people was greater than the percentage of adults and elderly people of other marital statuses, in accordance with marital status statistics that have been measured by the IBGE, the Brazilian Institute of Geography and Statistics.²⁶

Only 47.2% of the participants in the sample were retired. The authors of the present study propose that the period after retirement would probably bring a period of cognitive untraining that could predispose these individuals to a decline in their cognitive performance.²⁷ However, a large proportion of the study's participants worked, which therefore meant that they were exposed to the paradox of an overabundance of information and the difficulty of attributing some sense to all of it, which leads to feelings of impotence that are equivalent to those of a person that slowly loses his or her memory.²⁸

The cognitive complaints in the elderly seem to be, in many cases, more related to their subjective negative perceptions than to some objective difficulty in their functional performance. These complaints seem to be, therefore, constructed around their preconceived beliefs with respect to aging. The beliefs regarding memory or the notion of auto-efficacy with respect to memory are identified as an aspect of great influence when it comes to cognition.²⁹ Olchik³⁰ explains that this belief may be viewed as a social construct, since society espouses that, as individuals age, their cognitive abilities enter into decline. The individual, therefore, incorporates this discourse, resulting in lower auto-efficacy, or in other words, adopts the perception that he or she

is less capable of facing challenges than during previous phases of his life.

In the questionnaires that measured metamemory, the subjective memory deficiency complaints declined upon completion of the program, albeit these results were not statistically significant. However, only 46 medical records contained fully filled out post-stimulus questionnaires, which could have compromised the power of the sample.

Yassuda²⁹ observed that elderly participants that were subjected to cognitive stimulation made greater use of memory strategies. As a result, the elderly participants that were trained used more of the strategies that they were taught. In the present study, much like in Yassuda's study, it was observed that during the associative learning test, performance results were better among the elderly than among adults after the stimulus, which corroborates the findings of Rendel & Craik³¹, which showed that, through the use of associative strategies and the repetition of information, the elderly were shown to be more efficient.

There was also a reduction of symptoms associated with anxiety and depression; however, this reduction was more prevalent amongst adults when compared with the elderly, after completion of the cognitive stimulation program. Complaints regarding memory seem to be correlated with symptoms that are associated with anxiety and depression,³² which may have been reduced due to the benefits of social interaction, which would corroborate Wilson's results.¹⁹ Yassuda,²⁹ in a literature review, did not observe a reduction of the symptomology of depression, as outlined in the Geriatric Depression Scale.

Among the limitations of the study, the absence of a control group, having random distribution, is notable. The difference within the sample between elderly and adult participants could have compromised the comparisons made between these groups. People with lesser degrees of schooling were not evaluated, which is a group that would be most representative of the Brazilian population. However, the study

has some strong points, including the fact that the evaluation was sufficiently broad and the program employed stimulation techniques that can be incorporated in participants' day-to-day lives. The formation of groups of various ages, in addition to the presence of a multidisciplinary team, should also be noted.

In a world that is aging rapidly, one health care professional acting alone could not fully explain and intervene with respect to the subject of the study, which was the aging of the human being. It is exactly at this point where Gerontology comes into play, by "establishing the connection between the intermediate elements that arise, filling in the gaps left behind by the sciences, reworking the dialectic character of its specific object, which is, at once, unique and diverse," according to Sá.³³ As such, the analysis of an intergenerational multidisciplinary stimulation program could make use only of the science of Gerontology to meet the health care needs of aging persons.

CONCLUSIONS

The intergenerational multidisciplinary cognitive stimulation program that was administered with a group of people over the age of 40 had positive impacts on the participants of the study.

Progress was made in terms of their performance on psychometric tests, which

suggests that there were improvements among participants in terms of their memory and attention, in addition to a reduction in symptoms associated with depression and anxiety. No statistically significant changes in metamemory were found in this study.

The greatest gains in immediate associative learning were observed among the elderly participants, whereas adults enjoyed the greatest reductions in the symptoms that were associated with depression and anxiety.

Researchers hope that the study's results will promote mental stimulation initiatives that strengthen affective relationships, engendering feelings of mutual cooperation and belonging between peers, regardless of their ages; they also hope to witness the implementation of these initiatives in public and private health and education services.

ACKNOWLEDGMENTS

The authors would like to thank Alexandre da Silva, Omar Jaluul, Genova Príncipe, Filomena Camilo, Flávia Araújo, Fabiana Simomura, Edmilson Carvalho, Beltrina da Purificação da Côrte Pereira, Claudia Marina Fló and all of the professors of the Social Gerontology Post-Graduate Program of the Pontifícia Universidade Católica de São Paulo for their valuable contributions.

REFERENCES

1. Kofl A. Discurso de Kofl Annan, secretário-geral da Organização das Nações Unidas. In: Plano de Ação Internacional para o Envelhecimento. Brasília, DF: Secretaria Especial dos Direitos Humanos; 2003. p. 13-15.
2. Jodar M. La memoria en la ancianidad: disminución y potenciación. Ger Press 1994;24:1-3.
3. Milnik A, Nowak I, Müller NG. Attention-dependent modulation of neural activity in primary sensorimotor cortex. Brain Behav 2013;3(2):54-66.
4. La Rue A. Healthy brain aging: role of cognitive reserve, cognitive stimulation and cognitive brain function and prevent demetia. Clin Geriatr Med 2010;26(1):99-111.
5. Willis SL, Tennstedt SL, Marsiske M, Ball Karlene, Elias J, Koepke KM, et.al. Longterm effects of cognitive training on everyday functional outcomes in older adults. J Am Med Assoc 2006;23:2805-14.
6. Organizações das Nações Unidas. Plano de Ação Internacional para o Envelhecimento. Madrid: ONU; 2002.

7. American Psychiatric Association. Manual diagnóstico e estatístico de transtornos mentais: DSM-IV-TR. 4ª ed. Porto Alegre: Artmed; 2002.
8. Spreen O, Strauss E. A compendium of neuropsychological testes: administration, norms and commentary. 2nd ed. London: Oxford University Press; 1998.
9. Gil G, Busse AL. Ensinar a lembrar: guia prático para ajudar a reconhecer e melhorar problemas de memória. São Paulo: Casa Leitura Médica; 2013.
10. Gil G, Busse AL. Avaliação neuropsicológica e o diagnóstico de demência, comprometimento cognitivo leve e queixa de memória relacionada à idade. *Arq Méd Hosp Fac Ciênc Med Santa Casa São Paulo* 2009;54(2):44-50.
11. Gazzaniga MS, Ivry RB, Mangun GR. Neurociência Cognitiva: a biologia da mente. 4ª ed. São Paulo: Artmed; 2002.
12. Jacob Filho W, Podoan F, Farias LL, Miranda FRB, Lin SM, Da Silva A. Manual de terapêutica não farmacológica em Geriatria e Gerontologia. São Paulo: Atheneu; 2014.
13. Sohlberg MM, McLaughlin KA, Pavese A, Heidrich A. Evaluation of attention process training and brain injury education in persons with acquired brain injury. *J Clin Exp Neuropsychol* 2000;22(1):656-76.
14. Robinson FB. Effective study. New York: Harper & Row; 1970.
15. Phillipi ST. Nutrição e dietética. 4ª ed. Barueri: São Paulo;
16. Beck JS. Terapia cognitiva: teoria e prática. Porto Alegre: Artmed; 2002.
17. Lipp MN. Relaxamento para todos. Campinas: Papirus; 2003.
18. Landauer T, Bjork R. Optimal rehearsal patterns and name learning. In: Gruneberg MM, Morris PE, Sykes RN, editors. Practical aspects of memory. London: Academic Press; 1978. p. 625-32.
19. Wilson BA. Reabilitação da memória: integrando teoria e prática. Ribeiro C tradutor; Fonseca RP, revisão técnica. Porto Alegre: Artmed; 2002.
20. Nunes-Silva M, Moreira LC, De Moraes GRJ, Rosa GT, Marra CAS. A música para indução de relaxamento na Terapia de Integração Pessoal pela Abordagem Direta do Inconsciente: ADI/TIP. *Contextos Clín* 2012;5(2):88-99.
21. Apóstolo JLA, Martins ASM, Graça ML, Martins MCS, Rodrigues SIS, Cardoso DFB. O efeito da estimulação cognitiva no estado cognitivo de idosos em contexto comunitário. *Actas Gerontol* 2013;1(1):1-12.
22. Argimon ILL, Stein LM. Habilidades cognitivas em indivíduos muito idosos: um estudo longitudinal. *Cad Saúde Pública* 2005;21(1):64-72.
23. Kwok T, Wong A, Chan Grace, Shiu YY, Ko-Chen L, Young D, et.al. Effectiveness of cognitive training for chinese elderly in Hong Kong. *Clin interv aging* 2013;8:213-9.
24. Almeida OP. Miniexame do estado mental e o diagnóstico de demência no Brasil. *Arq Neuropsiquiatr* 1998;56(3B):605-12.
25. Barros MML. Trajetória dos estudos de velhice no Brasil. *Sociologia* 2006;52:109-32.
26. Instituto Brasileiro de Geografia e Estatística [Internet]. Rio de Janeiro: IBGE; 1995- . Censo demográfico 2012. [acesso em 10 mar 2012]; [aproximadamente 2 telas]. Disponível em: www.ibge.gov.br
27. Lira JO, Rugene OT, De Mello PCH. Desempenho de idosos em testes específicos: efeito de grupo de estimulação. *Rev Bras Geriatr Gerontol* 2011;14(2):209-20.
28. Rodrigues GM. Memória e esquecimento ou solidão informacional do homem contemporâneo: a metáfora do filme Amnésia. *Em Questão* 2005;11(1):137-52.
29. Yassuda MS. Treino de memória no idoso saudável: benefícios e mecanismos. *Psicol Reflex Crít* 2006;19(3):470-81.
30. Olchik MR. Treino de memória: um novo aprender no envelhecimento [tese]. Porto Alegre: Faculdade de Educação da Universidade Federal do Rio Grande do Sul; 2008.
31. Rendell PG, Craik FIM. Virtual week and actual week: age-related differences in prospective memory. *Appl Cogn Psychol* 2000;14(7):43-62.
32. Guerreiro TCl. Queixa de memória e alteração objetiva de memória em idosos que ingressam na Oficina de Memória na UnATI/UERJ. *Rev Bras Geriatr Gerontol* 2011;14(2):209-20.
33. Sá JLM. Gerontologia e interdisciplinaridade: fundamentos epistemológicos. In: Neri AL, Debert GG, organizadores. Velhice e sociedade. Campinas: Papirus; 2003.

Received: Aug 28, 2014

Revised: Mar 18, 2015

Accepted: July 07, 2015