35 - ATTENTIONAL TRAINING: EFFECTS ON SHORT-TERM MEMORY IN INDIVIDUALS WITHIN THE AGING PROCESS.

GISELE DE PAULA VIEIRA,
ERLAINE REZENDE DE OLIVEIRA CARRARO,
SEBASTIÃO CLAUDIO BATISTA FERREIRA,
VERNON FURTADO DA SILVA
Laboratório de Aprendizagem Neural e Performance Motora (LANPEM)
Universidade Castelo Branco- Rio de Janeiro, RJ, Brasil.
giselefisio04@hotmail.com

INTRODUCTION

The world elderly population increase is a phenomenon that has been occurring in the last decades with more intensity, especially, in developing countries. This phenomenon can be attributed to the current medical and technological achievements of modern medicine, which have enabled the prevention and cure of diseases that were before considered fatal (SOUZA; CHAVES, 2005).

However, the aging process is determined by profound biological, cognitive and behavioral changes, so one of the concerns associated with aging is directly linked to memory complaints, as the prevalence of cognitive impairment increases with age advancing. On the other hand, studies tell that memory is plastic; that exists the possibility of changing during the performance based on alterations in the neural systems. The literature suggests that memory training can promote changes in cognitive operation in the elderly and help maintain their functionality and independence (CARVALHO, 2006). In this context, according to Souza (1996), the retrogenesis of the neuropsychological functions involved in the cognitive process, such as learning and memory, consist of one of the major aims of the studies made about senescence, since these alterations may compromise the elderly biopsychosocial welfare interfering in their autonomy.

Over the past decades, different hypotheses have been formulated in order to explain the decline in the elderly performance in various memory tasks (CHARCHAT-FICHMAN et al, 2005). But, the latest case, which has attracted the researchers' attention in this line, is the idea that the elderly performance in memory tasks can also be negatively influenced by their attitudes and beliefs about their ability to memorize (BENITES; JACQUES; GOMES, 2006).

Although the forgetfulness is one of the major complaints among the elderly, other cognitive functions cannot be omitted, such as reading ability, knowledge of word meanings and use of these variants remain unchanged or, at least, somewhat compromised with aging (HANNINEN; SOININEN, 1997). And therefore, they must and can be retained and enhanced in the aging process (DANTAS, 2008).

Poncin Lee (1989) defends in his theory that the memory loss is not only related to anatomical and physiological changes, but the decrease in the cognitive exercise and the motivation in the learning and memory processes.

RESOURCES AND METHODS

The sample consisting of 24 people aged between 65 and 85 years, of both genders, living in the city of Cataguases, Minas Gerais, recruited through a Memory Workshop Informative. The exclusion criteria for taking part in the research were obtained by applying the Geriatric Depression Scale - GDS (YESAVAGE et al, 1983) and the Mini - Mental State Examination - MMSE (BERTOLUCCI et al, 1994), aiming the possibility of compromising participants' cognition.

After the preliminary assessment, the 24 participants were divided randomly into experimental group (EG) and control group (CG), each one with 12 individuals. As a pre-test, the episodic memory evaluation protocols and the symbol transfer test were applied to both groups. For the episodic memory evaluation, two boards with figures were used, versions A and B, each board containing 18 figures divided into three categories. The figures and the test procedures were extracted from Pompeii, Miranda and Bueno's work (2001), whose research data enable the use of this material as a tool for cognitive research in general. For this study, the consistency in the figure labeling, the familiarity with the objects, which are inherent in the figures, and the visual complexity of the drawings were evaluated.

It was also evaluated the cognitive processing speed based on the test protocol for the Wechsler Scale symbol transfer (LESAK; HOWIESON; LORING, 2004) used for measuring mental processing speed. As the test score, a large number of figures transferred at 90 seconds were adopted.

This present study attends to the rules for managing the human being research, as oriented by the National Health Council, Resolution 196/96 and approved by the Institutional Ethics Committee of the Castelo Branco University – UCB/ RJ.

The experimental intervention consisted of 90-minute-six sessions each, and the memory exercises were applied to the CG that used grocery lists and figure boards, based on the work by (YASSUDA; SHARON and NERI, 2005). Whereas the EG, before the exercises with the lists and boards, went through a routine that objected to activate the memory processes intending to induce practitioners to maintain neural attention and, so maximize the memory training effects.

Right after the sixth session of the experimental intervention, both groups took the post-test, which was conducted obeying the same criteria applied to the pre-test.

RESULTS AND DISCUSSION

The results of the cognitive assessment can be evaluated according to the data in the table 1, which expresses the relation between the scores obtained by the two groups, experimental and control ones, in the pre and post-training memory relating to the mental processing and episodic memory tests, respectively.

TABLE 1. The experimental and control groups' average data, in the episodic memory (kk) and mental processing tests. Pre-and post-training versions.

Groups	Mental processing (pre-test)	Mental processing (post-test)	Episodic Memory (pre-test)	Episodic Memory (post-test)
Experimental	23,41	23,33	18,58	23,66
Control	29	30,58	15,66	21,08

The Table 1, it is identified that the pre- and post-training scores in terms of mental processing are very close, but with

an improvement trend for the control group. In reference to episodic memory, both groups obtained significant improvement, regardless of the intervention type they had. Anyway, it is noticed that, in this factor, the CG again showed a slightly greater progress than the EG did.

Analyzing the data above, based on the effects of the two intervention types applied, it can be said, even without the use of final conclusions, that the memory training regardless of the kind of device used to maximize the effect of that training, enhance learning with regard to episodic memory. And the mnemonic plasticity hypothesis is suggested to the elderly undergoing them to interventions that make them to explore their memory.

Noticing the statistic analysis results made, it can be verified that the effects of the intervention on the elderly short-term memory were really effective, though, in the factor associated with mental processing there has been not occurred any statistic significance.

The plot of the average scores on the mental processing test and the episodic memory test, respectively, is shown in Figure 1 (A, B), illustrating clearly the comparison between the moment results, pre and post memory training, in the groups that made up the experimental design of this research.

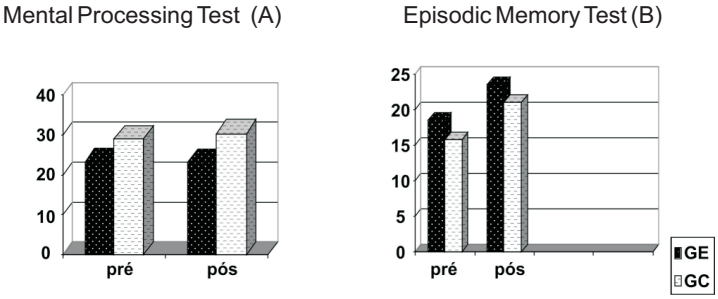

Figure 1. Plotting the data of the pre and post tests obtained through the assessment protocols of mental processing (A) and episodic memory tests (B) in control and experimental groups.

Based on the result of non-parametric statistics, using the sign test to analyze the scores obtained in the tests, the progress difference between the groups revealed certain importance with the sign test rate $z = 3.27$ (0.05) > 1.96, $p < 0.05$ to the episodic memory test in the control group. As for the mental processing test, the results showed no significance ($p > 0.05$). These results indicated the possibility of the STM and the elderly adaptation, due to the training effect. This improvement occurred to both groups, although the significant relation has only occurred to the CG, who received the memory training, but without any complementary activity to empower the training effects.

The emerging issue in relation to the effects of the intercedents lies with the reason for the best result when the training was less composed. The explanation for this result may be in the proper operation and memory structures described by Allegri et al (2001). According to them, the memory can be conceived as an information flow between different files interrelated. Pinto (1990), based on some memory models involved in the literature, describes the short-term memory as a temporary information record, where the items after being recorded, are kept by repeating for a few seconds until they are sent to the long-term memory. Describing a serial processing model that is susceptible to congestion depending on the information amount to be recorded and the velocity of discharge of that information for other types of memory.

Those serial processing models are slower compared to others that use parallel processing, especially in the elderly, who, according to the cognitive slowing theory by Salthouse (1980), old people process, record and retrieve information in the same way as the younger people, yet at a slower pace.

In this sense, the inferior memory performance throughout the serial position would be the result of a slower repeating activity. Toward that, it is possible to deduce that the work made in EG through the problem solving nuance games, calculations and visual memory, due to the slow serial information processing in this group, instead of activating the neural processes of the memory by encouraging training, caused a kind of congestion in information processing, which possibly interfered negatively in it. Therefore, this made the post-training results not show significant improvement in the GE when compared to CG.

Table 2 shows the static data related to non-parametric analysis made in the scores of mental processing and episodic memory test in comparison with pre and post-tests.

TABLE 2. Data statistics made through the sign test, applied to the pre-and post-test groups.

Statistic Test	Mental Processing	Episodic Memory
Sign Test	Z = 0,408 (0.05) < 1.96, p> 0.05	Z = 3,27 (0.05) > 1,96, p< 0,05

According to Baltes (1994), the capacity of cognitive reserve can be mobilized, and even improved through training. In that regard, Goldman et al (1999) mention two longitudinal studies conducted in Seattle and Baltimore, showing that, when people strengthen their brains through methodical and intentional mental exercises, experience memory improvement, think faster, and capture information efficiently. These evidences confirm the hypothesis that memory stimulation and its effective mind functioning may be seen as essential neural instruments underlining the health promotion for elderly people (ALMEIDA; BEGER; WATANABE, 2007).

According to Guerreiro and Caldas (2001), several researchers indicate a positive relation between elderly cognitive performance and their continued stimulation. They suggest that those techniques should be observed with healthy practices so that the procedures can become effective due to their purposes.

CONCLUSION

Coming to a first conclusion based on this study is to relate the participants' perception to the ability to store memory and run it. Obviously, they understood that memory problems do not occur only to them, even though they can act on their aging process, giving it its own borders, simply not suffering this process effects. This recognition, which is inherent in the brain plasticity, was followed, under some circumstances, by obtaining the group an understanding about the role of each one as for the way to promote healthy aging.

Although this research has shown statistic significance only for one of the items studied, it can be affirmed through a

subjective analysis that a large part of the research sample, regardless of group, had some kind of benefit to the interventions made. This statement is supported by the fact that the perception of memory improvement through training has been reported objectively by 60% of the elderly. Thus, even the lack of statistic significance of one of the comparisons made, the important progress, proved in the experimental group in episodic memory functions, and the subjective reports of the individuals assessed indicate that regular memory stimulation through specific exercises can help delay the harmful effects of retrogenesis on the elderly neuropsychological functions.

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Autor correspondente: Gisele de Paula Vieira
Rua Maria Gouvêa Ferraz, 409 –Bairro: Paraíso - Cataguases, Mg - Cep 36772-154.
Fone: (32) 91132191 – email: giselefisio04@hotmail.com.

ATTENTIONAL TRAINING: EFFECTS ON SHORT-TERM MEMORY IN INDIVIDUALS WITHIN THE AGING PROCESS.

ABSTRACT:

Evidence indicates certain kinds of mental exercises and life style as lessening the memory retrogenic process. This perspective was adopted for a memory exercises training aimed at improving attentional processes, and consequently, short-term memory performance and mental processing for a group of 24 individuals, aged from 65 to 85 years. Post exercises improvement was examined by the Carvalho (2006) protocol and a test called SKT (ERZIGKEIT, 2001) was used in measuring the mental processing factor. The non-parametric statistics used for the scores analysis revealed to be significant with the signal tests index $z = 3,27 (0.05) > 1,96$, $p<0.05$ for the episodic memory test, but not for the mental processing one ($p > 0.05$).

KEYWORDS: Attention; Short-term memory; Memory training.

ENTRAINEMENT DE L'ATTENTION : EFFET SUR LA MÉMOIRE A COURT TERME CHEZ L'INDIVIDU AGÉ

RÉSUMÉ:

Des preuves indiquent que certains types d'exercices mentaux et des styles de vie particuliers atténuent le processus rétrogénique (de dégradation) de la mémoire. Cet résultats ont été utilisés, pour développer des exercices d'entraînement visant à améliorer l'attention et par conséquent les performances de la mémoire à long terme,sur un groupe de 24 personnes agées de 65 à 85 ans. L'amélioration succédant aux exercices a été étudié via le “Protocope de Carvalho (2006). Le test “SKT” (ERZIGKEIT, 2001) a été utilisé pour mesurer le facteur de transformation mentale. Les statistiques non paramétrées utilisées pour les résultats de l'analyse se sont révélées être significatives avec un indice du signal test $z = 3,27 (0.05) > 1,96$, $p<0.05$ pour

le test de mémoire épisodique, mais pas pour la transformation mentale (p>0.05).

MOTS-CLÉS: ATTENTION, MÉMORISATION À COURT TERME, ENTRAINEMENT DE LA MÉMOIRE.

ATENCIONAL FORMACIÓN: EFECTOS DE CORTO MEMORIA PLAZO EN LAS PERSONAS EN PROCESO DE ENVEJECIMIENTO.

RESUMEN:

La evidencia ha mostrado que ciertas tareas, estilos de vida y minimizar el proceso de degeneración de la memoria. Teniendo en cuenta este hecho, una combinación de ejercicios diseñados para mantener la atención fue manipulado con el fin de facilitar así la puesta en funcionamiento de la memoria a corto plazo y el procesamiento mental de un grupo de 24 personas mayores, con edades comprendidas entre 65 y 85 años. Los instrumentos de prueba fueron los protocolos para la medición de la memoria episódica (Carvalho, 2006) y la prueba de SKT para la transformación mental (ERZIGKEIT, 2001). El pre-y post-ejercicio, estudiada a través de estadística no paramétrica (Teste de señal) mostró un índice de z = 3,27 (0,05)> 1,96, p <0,05, estadísticamente significativo para la memoria, pero no para el factor de procesamiento mental (p> 0,05).

PALABRAS CLAVE: Atención; corta memoria plazo, la formación de la memoria.

TREINAMENTO ATENCIONAL: EFEITOS NA MEMÓRIA DE CURTO PRAZO EM INDIVÍDUOS EM PROCESSO DE RETROGÊNESE.

RESUMO:

Evidências têm mostrado que certas tarefas e estilos de vida minimizam o processo retrogênico de memória. Considerando-se tal fato, uma conjugação de exercícios direcionados à manutenção de atenção foi manipulada com o objetivo de, com isso, facilitar-se a operacionalização de memória de curta duração e de processamento mental de um grupo de 24 idosos, idade entre 65 e 85 anos. Os instrumentos de testes foram os protocolos de mensuração de memória episódica (CARVALHO, 2006) e, o teste SKT para processamento mental (ERZIGKEIT, 2001). Os dados pré e pós-exercícios, estudados através de estatística não paramétrica (Teste de Sinais) revelaram um índice z = 3,27 (0.05) > 1,96, p<0.05, estatisticamente significativo para memória, mas não para o fator processamento mental (p> 0.05).

PALAVRAS-CHAVES: Atenção; Memória de curto prazo; Treinamento de memória.

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