

The Effect of Working Memory Software Training on Self-Esteem, Self-Concept and Memory of the Middle-Aged People

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ABSTRACT

The purpose of the present study was to determine the effect of Working Memory Software Training on the self-esteem, self-concept and memory of the middle-aged people. The method was experimental with pretest - posttest control group design was carried out in tow groups. The statistical population included all of the middle-aged in Isfahan city, Iran. The sample of the research included 50 middle-aged selected using the convenient randomized sampling method. Half of them were placed in the experimental group (25) and the other half in the control group. The measurement instruments included three questionnaires including the Wechsler Memory Scale (W.M.S.) for adults, Rogers' Self-concept test, and Eysenck Self-Esteem Test. The results of Multivariate analysis of covariance (MANCOVA) showed that in all variables (self-esteem, self-concept and memory), differences were in favor of experimental group.

Keywords: the Working Memory Software, self-esteem, self-concept, memory, middle-aged.

1. INTRODUCTION

In recent years, with a growth in the elderly and the middle-aged population and also the increase in life expectancy, the attitudes have evolved toward the old age. Proposing a model named successful old age not only expresses a change in attitudes toward the old age, but also is considered an attempt to increase the quality of the old age and the middle-age. Of the prevalent imaginations on the elderly was a decrease in their cognitive functions at the old age. The belief in the decrease in cognitive functions in the old age or the middle age is stated using scientific examples, and is criticized and analyzed [1].

Middle adulthood is an age in which a person has a highly various and sometimes opposite and contrasting experiences [2]. Life in this period is on one hand critical and turbulent, and on the other hand possesses a relative tranquility. This period of life is when a person can feel satisfaction for his past achievements and admits his failures at the same time. Old adulthood is an age in which a person not only experiences joy, but also is sometimes exposed to heartbreaks and woes. The middle-aged have a greater ability in solving life's routine problems. This ability depends on their power to combine knowledge with life experience [3]. One thing that might face a drop in the middle adulthood is the memory.

Memory is one of the first concerned issues in psychology and has received great attention and richness in recent 3 decades, and embraced great amounts of scientific and experimental studies related to cognitive psychology [2, 3, 4].

From 1960s until now, many scholars have discussed and analyzed numerous structures and systems of memory. One of these famous theories is working memory theory of Baddeley [5]. Working Memory is a mental system having the simultaneous task of temporary information storage and processing to perform a set of complex cognitive tasks such as understanding, reasoning, and learning [6]. Numerous research observations express working memory's major and determining role in learning and performing complex cognitive tasks [7, 8, 9 and 10]. Working memory consists of a central performer and a number of subsystems. The central performer is the attention control system that is engaged in coordination and organization of different task performances, selective attention, attention displacement, attention restraint, and planning [11]. The visual-spatial part is engaged in maintaining and manipulating the visual-spatial information. The vocal part is responsible for maintaining and reviewing the verbal information. The fourth component named Temporary episodic store is recently added to this model through most recent surveys and is a system with limited capacity which enables the temporary information storage from the two subcomponents of working memory (the verbal part and the visual-spatial part) and the long-term memory and integrates and coordinates them [5].

One of the problems that arise in the middle adulthood is a deficiency in working memory function which is confirmed by different studies. According to these surveys, the functioning of the middle-aged working memory face some problems and in case this memory is not strengthened and the middle-aged do not receive enough education for strengthening it, the working memory problems may become greater and their

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lives become problematic. Therefore, considering the results of the previous researches, using the Working Memory Software training in the present survey, we have paid attention to the working memory strengthening of the middle-aged to answer this question whether we can increase their self-concept and the self-esteem in the middle aged through strengthening their working memory?

2. MATERIALS AND METHODS

Present study was experimental with pretest - posttest control group design was carried out in two groups. The three questionnaires of self-concept, self-esteem, and the memory were performed two times for each group. The first measurement was done before the Working Memory Software training in the form of the pre-test, and the second measurement was done after Working Memory Software training in the form of the post-test. In order to form the groups, the researcher searched the Retirement Centers and parks in Isfahan County and selected 50 middle-aged in 50 to 61 age range using the convenient randomized sampling method, he placed a half of the participants (25) in the experiment group and the other half in the control group. Three questionnaires including the Wechsler Memory Scale (W.M.S.) for adults, Rogers' Self-concept test, and Eysenck Self-Esteem Test were used in the present study. The Wechsler Memory Scale was used by different researchers and the correlational factors of this test and the subscales of the Wechsler Intelligence Test were reported between 0.66 and 0.83. Eysenck Self-Esteem Test was a 30-item questionnaire with a reported reliability of 0.87 [12 & 13]. Rogers' Self-concept test had the two A and B forms. The A form was related to the real-self containing 25 personality characteristics, and the B form is related to the ideal-self which also contains 25 personality characteristics. The reported reliability factor of this questionnaire is 0.83 [14].

Introducing the Working Memory Software

For several years, Professor Torkel kiinberg and his coworkers at Stanford University have been doing researches on Working Memory and studying its improvement ways. In order to train the Working Memory, They have used computerized software named Robo Memo. This program includes a number of Working Memory tasks that must be performed 30 -40 minutes per day by individuals. In the present study, using the available theories in this respect (including Baddeley's theory), the available researches, and also modeling the Robo Memo software, the present software was made. The desirable amount of this software usage is 30-40 minutes per day during 3 months. The training of this software was done in three sessions after selecting the experiment group. Then each of the individuals was morally engaged to use this software for 30-40 minutes a day during three months and to present weekly reports. During this period, weekly meetings were held with the experiment group and the occurred problems were studied and solved. The researcher was also informed of their activities during the week through phone calls. The multi-variable covariance analysis statistical method was used to analyze the inferential data.

3. RESULTS

In this part, the findings are presented considering research hypothesis in tables 1-3. For analysis of data, SPSS software, version 16, is used. The descriptive statistics for dependent variables are presented in table 1.

Table 1. Descriptive Statistics of dependent variables o in pretest- posttest

	Variables	Group	Mean	SD	N
Pretest	Self-concept	Experimental	0.31	0.12	25
		Control	0.33	0.10	25
	Self- esteem	Experimental	20.28	4.13	25
		Control	22.30	2.92	25
	Memory	Experimental	94.52	12.88	25
		Control	91.96	12.14	25
Posttest	Self-concept	Experimental	0.11	0.07	25
		Control	0.34	0.09	25
	Self- esteem	Experimental	23.40	3.57	25
		Control	21.27	2.93	25
	Memory	Experimental	105.23	14.5	25
		Control	92.45	11.64	25

Preliminary analysis was first performed to test assumptions for MANCOVA and ANOVA and no violations observed. Then a MANCOVA test is conducted to assess the overall effect of Working Memory Software training on tree dependent variables: self-concept, self-esteem and memory. The analysis revealed statistically significant group differences as a result of Working Memory Software training (Wilks' Lambda=0.47, F (3, 46) =11.42, p=.001). Results of analysis are presented in table 2.

Table 2. Multivariate Tests: Groups

Effect		Value	F	Hypothesis df	Error df	Sig.
Group	Pillai's Trace	0.47	11.42	3	46	0.001
	Wilks' Lambda	0.86	11.42	3	46	0.001
	Hotelling's Trace	0.49	11.42	3	46	0.001
	Roy's Largest Root	0.49	11.42	3	46	0.001

Hypothesis 1. The Working Memory Software training has an effect on the level of the middle-aged self-esteem.

Hypothesis 2: The Working Memory Software training has an effect on the level of the middle-aged self-imagination.

Hypothesis 3: The Working Memory Software training has an effect on the level of the middle-aged memory.

Follow up ANOVA analysis, indicated that there is significant differences between groups in dependent variables. Based on this analysis, F value for self-esteem calculated equal with 14.02 which was significant at the 0.001 level, ($F_{1,58} = 14.02, p < .001$), F value for self-concept calculated equal with 127.87 which was significant at the 0.001 level too, ($F_{1,58} = 127.87, p < .001$), and F value for memory calculated equal with 18.96 which was significant at the 0.001 level too, ($F_{1,58} = 18.96, p < .001$).Results of analysis are presented in table 3.

Table 3. ANOVA Working Memory Software training on dependent variables

Variable	Sum of squares	Df	Mean of squares	F	Significance level	Eta Coeff.	statistical Power
Self-esteem	56.69	1	56.69	14.02	0.001	0.23	0.96
Self-concept	0.65	1	0.65	127.87	0.001	0.73	1
Memory	2021.85	1	2021.85	18.96	0.001	0.29	0.99

Based on the obtained results, the observed F in 0.001 levels shows a significant difference in the middle-aged self-esteem, self-concept and memory between experimental and control groups. Therefore we can conclude that the Working Memory Software training had an effect on the level of the middle-aged self-esteem, self-concept and memory. Based on the obtained Eta factor of 0.23, the self-esteem grades variance is related to the Working Memory Software training. Also, the 0.96 statistical power shows that the sample volume was efficient. Based on the obtained Eta factor of 0.73, the self-concept grades variance is related to the Working Memory Software training. Also, the 1 statistical power shows that the sample volume was efficient. Additionally, based on the obtained Eta factor of 0.29, the memory grades variance is related to the Working Memory Software training. Also, the 0.99 statistical power shows that the sample volume was efficient.

4. DISCUSSION AND CONCLUSION

The elderly and the middle-aged have a special position in Islamic culture and tradition and were always respected by people. Due to their old age and some problems caused by their lifetime, this age group might face some difficulties. One of these probable difficulties is the occurrence of memory disorders which can influence other psychological characteristics in them such as self-confidence, self-imagination, anxiety and depression outbreaks. Based on the same reason, the present survey trained the memory software in order to prevent the occurring difficulties related to the middle-aged memory and then measured the level of their memory, self-esteem and self-confidence.

The obtained results of the effect of Working Memory Software training on the level of the middle-aged self-esteem, self-concept, and memory have shown a significant difference between the experimental and the control groups. In other words, the Working Memory Software training could improve the elderly's memory function, increase its efficiency, and increase the level of their self-esteem and self-concept significantly. This finding is in line with the previously performed surveys [15, 16, 17, 18].

In general, the strengthening of the Working Memory with its influence on people's whole life and its ability to provide them with healthy thought and psyche can enhance people's quality of life and be very beneficial to them. Based on this, it's necessary for the middle-aged and the elderly and in order to prevent the decrease in their Working Memory using the proper instruments, especially the Working Memory Software, to pay attention to their memory strength. In order for them to continue having the attention power, concentration, decoding, remember and maintain their own information and their psychological health has not been damaged.

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