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Full Length Research Paper

The effect of chunking on long term memory at university students

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The aim of this research is to identify the impact of “chunking” on long-term memory. For the purpose of investigating that effect the researcher prepared a tool to measure “chunking”, consisting of two lists, each list contains (24) word ,one with complete words and the other with abbreviated ones. The tool were applied on a sample of (60) students which were selected randomly and were divided into two groups. The results showed that the students were more able to retrieve the list of abbreviated words than the group with complete words; the arithmetic mean of the first group was higher than the second group with the complete words. A number of recommendations and suggestions were presented in the light of the results of this research.

Keywords: Memory Skills, Chunking, Long-term Memory

INTRODUCTION

In the second half of the twentieth century, the subject of memory became one of the psychological and scientific subjects that received a great deal of study and interest; in which a progress and advancement have been made. The memory were studied through many disciplines and scientific fields, including those sciences that seems far from psychology like information technology, computer science, medicine, biology, physiology, and sociology through different approaches and methods (Mansour, 1988: 365)

The problem of the difficulty of retrieving and storing information in memory became one of the most notable researches in scientific fields. Scientists tried to explain memory starting from Ebbinghaus (Ebbinghaus, 1885), who undertook a methodic study of the memory on the basis that it is a complex informational process that occurs within a consecutive stages and through cognitive activities that all lies in the personality. (Abdul Hadi, 2011: 13)

This is clearly shown in the fact that many students make great efforts in memorizing and studying while they are preparing for their different exams in order to succeed and get the appropriate scores that qualify them to go to the next stage in school.

However, they may face some difficulties in that. These difficulties maybe related to the failure in encoding, storing, or retrieving information. This is because the students lack the appropriate awareness about their memory processes, and what that awareness includes of details such as memory performance, identifying their memory strengths and weaknesses, determining the appropriate strategy that can be used in encoding and retrieving the information that is required to be stored accurately and efficiently, (al-Zahaar, Afifi, 2005: 2)

Students handle information in different ways, some ways depend on what exists in the cognitive structure, other depend on the type of information and its importance to the student. The ability to store information

and retrieve it is regarded as a main and important necessity; this led the individual to develop new ways that depend on the organization of information and the awareness of retrieval steps. The main concept for active learning is that the learners should be aware of their memory processes and how to be strategic through educational training programs. These programs should teach them about memory systems; how to use a certain strategy, to what extent they are satisfied with their memory, and possible memory faults. This will help them organize the process of encoding and retrieving the information. Some studies questioned the ability to improve memory by only providing extensive information without development training, like the study of (Bishara and Attiyat 2008) and the study of (Kayal 2000) (Kayal, 2007: 84)

(Kail 1990) refers that the learner's usage for the strategic behavior depends on his awareness of his knowledge, his own beliefs, and his recalling efficiency. Learners who are unaware of the efficiency of their memory may overstate their estimations, therefore there is no reason for them to use memory strategies (Abdel Fattah, Jabber, 2000: 301)

Al-Sharkaoui (2001) emphasizes the importance of learning strategies, and how learners can benefit from these strategies in the process of memorizing. Al-Sharif and Syed (1999) pointed out that memorization strategies are about learning learners how to be strategic learners; through teaching them the procedures that can be followed by which the learner would be more efficient in studying his course and excel in it. The teacher should teach his students the strategies that can be used to improve memorization of the information being studied and the ability to retrieve it. Some of these strategies are the Acrostic technique, Pegsystems, and others.

The results of the studies of (Nelson and Hercher, 1972), (Bellezza and Reddy, 1983), (Jeary et al, 1980), (Stevens, 2001) have emphasized the importance of the different cognitive strategies in the process of recalling the information, which depends heavily on the ways of organizing information in memory during the encoding process. (Brokowski ,1982), (Blakand Rollins 2004), (Flavell, 1984) , (Chi, 1979), (Cavanaugh and Brokowski 1979), (Lawson and Fuelp , 1976), (Kramer and Engle, 1981), (Millr, 1982), (Newman and Mervy 1982), and (Paris 1980) have stated that the lack of information on the strategy used and when and how to use it, is a significantly influencing factor in the failure to use this strategy, (Zachary, 2008: 23)

Regarding the importance of studying the differences between the sexes; the results of the study of (Hultsch et al, 1987) has indicated to gender differences in performance on memory related tasks. This is due to their knowledge or belief about memory. It was found that females more commonly to use strategies associated with memory, and they are more worried about memory, and less confident with their answers in retrieving tasks

than males. However, the study of (Persinger and Richards, 1995) indicated that females perform the functions of memory better than males, while the study of (Butts et al, 1995) referred that there is no differences between males and females in the ability to remember and in the satisfaction with the memory (Al-jarah, 2009: 28).

Research Aims

The aim of the research is to identify the effect of chunking on long-term memory.

Research Limitation

The current research is limited to the students of the university of Al _mustansiriya for the academic year of 2012-2013, males and females, according to the scale used in the research (using the measuring tool submitted by the researcher)

Definitions

The concept of chunking has been defined from a cognitive perspective, which is: Cognitive process through which the individual groups the chunks of information being studied or memorized into a form of abbreviations.

Theoretical Background

Interest in information processing started since the forties of the last century when psychologists tried to understand the mechanisms of cognitive processes of encoding, storage, retrieval.

Haberland 1994 emphasizes that the development of information processing trend was a reaction to the behavioral trend; therefore the study of cognitive processes is not new in psychology.

Before the school of behaviorism attracted the interest of most of the researchers and gained wide fame, Tolman used cognitive maps to explain the intentional behavior and adopted a number of cognitive methods which mediates the stimulus and the response.

Pavlov used the concept of the second signal system to explain the individual' learning of language. Vygotsky spoke about inner speech as a cognitive awareness, which is considered as a clear reaction to the American behaviorism.

Psychologists realized that in order to identify an integrated system for information processing this requires the studying of sensation, attention, perception, thinking.

Psychologists provided a lot of notions about the models of information processing. Many of them tried to explain memory components, functions and locations as compared with other cognitive processes. These models try to simplify and organize the work of memory and rearrange them in models that are consistent with the trend of information processing.

The human memory is divided into three storages: sensory memory, short-term memory, and long-term memory. The information is transferred from one stage to another through many processes. (Al-Atoum, 2008: 281-289)

The component that holds the information for a very short time is called "short-term memory" S.T.M. This type of memory is used to hold a phone number until it is used, to absorb a written or heard idea, to follow a conversation. The short-term memory lies between the sensory memory and the long-term memory. It is a virtual structure with low capacity but has a great importance. In S.T.M. the information related to environmental stimulus is handled which is transferred through the senses and the sensory memory. Perhaps the low capacity of the S.T.M. is connected with the limited ability to process information (Al-Zghoul, 2003: 135)

The other type of memory are the long-term memory L.T.M. psychologists subdivide the LTM into two subdivisions; explicit memory that recalls information in a conscious manner, and implicit memory that recalls information in an unconscious manner. The procedural memory is considered one of the most important forms of this memory which its information refers to how to perform certain skills which is gained by the individual through experience and learning (Al-Atoum, 2008: 296)

Memory is affected by training. The more training of memory will lead to the more accurate and organized information retrieval. this is indicated in the study of Pirollly and Anderson 1985. The phenomenon of memory performance as a function of training strength explain the phenomenon of the unity of the existence. Noel and Rosenblum 1981 referred to this phenomenon as the law of training strength (Anderson, 2007: 254)

Research Procedures

The research community: the current research community comprise the students of the university of Mustansiriya for the academic year 2012/2013; (22820) students distributed over (12) college, (7) humanities and (5) scientific colleges. (12361) males and (10459) females.

The research Sample

The sample of the current research is (60) students selected randomly from males and females, and from humanities and scientific disciplines.

The research tool

For the purpose of achieving the aims of the research, the researcher prepared a measuring scale for the chunking after it has been determined in the light of the cognitive theory. The measure consists of (24) items with two alternatives (yes, no) , degree of (1) is given to the Alternative (Yes) and the degree of (zero) is given to the alternative (no). Therefore, the highest degree is (24) and the least is (zero). in order to verify its psychometric properties, the following procedures were implemented :

Psychological Characteristics

Validity is one of the most important properties the research scale should maintain. The measure is considered valid if it actually measures what it is intended to measure. The face validity is one of validity types that use a panel of "experts" to assess the measure. (al-imam, 1990: 130). The measure was presented to a group of experts in education and psychology to assess and examine its validity and suitability for the field. The measures have gained an agreement rate of 80% by the experts; all the items of the measure were maintained which is (24).

1. Validity: is one of the important characteristics that must be met in the search scale which demonstrates to what extent does the scale measure the parameters that meant to measure. (Ades, 1993: 145). Two types of validity have been achieved in the current measure:

a. Face validity: the measure is considered valid if it measures what it is intended to measure. The best way to verify the face validity is by using a panel of experts to judge the validity in measuring what is intended to measure. This type of validity has been verified when the scale were presented to a panel of experts in the field of education and psychology.

b. Construct Validity: this validity determine to what extent the measure was able to measure what it is intended to measure. It is the most relate validity type among other types with the theory. Indexes were extracted that verify this type of validity through the correlation of the parameter degree to the final degree.

Table 1. shows the value of T and the arithmetic mean of research variable

Group	Sample	Arithmetic mean	Standard deviation	Calculated T value	Tabular T value
First	30	15.3	1.34	15,26	2
Second	30	18.2	1.54		

2. Reliability: reliability means the accuracy of the measure or any other tool in the measure, and that it does not hold a self contradiction. Reliable measure is a measure that you can trust its results. (Abo-Elam 2006:131).

For the purpose of extracting reliability in the current research, the measure was applied on a sample of 50 students (males and females), then after two weeks the measure was applied for the second time on the same sample. The correlation coefficient between the two applications (0,76) for chunking measurement tool. thus reliability were verified by test and re-test method.

Final test

After preparing the scale of the research, the researcher applied it on a sample of (60) students (males and females). The samples were divided into two groups. A list of complete words was presented to one group, and they were asked to recall the list. The other groups were presented with an abbreviated list and they were also asked to recall the list. The period of time between presenting the list and recalling the list is 15 days; the same apply for both groups. Using the T-test for independent samples, the results were as the following:

RESULTS AND DISCUSSION

The current research tried to verify the following

– Identifying the effect of chunking on the long-term memory:

Statistical analysis of the data showed that the mean of the first group that were asked to recall the complete words is (15.3) with a standard deviation of (1.34), while the arithmetic mean of the second group that were asked to recall the abbreviated words was (18.2) with a standard deviation of (1.54). For the purpose of knowing the significant of difference between the two, T-test was used on two independent samples. The calculated T value was (15.26) when compared with the tabular value of (2) at the level of significance of (0.05), there was a difference between the means in favor of the second group, (Table 1) shows that.

The result above shows us that the practice of chunking by the student will facilitate the process of information retrieval. This means it is an important and necessary process for retrieval as it ease the burden of short-term memory and therefore facilitate its transfer to the long term memory.

In addition, it reduces the units of information stored in the memory, thus it enable the memory to hold more chunks of information. So there is a positive effect for chunking process in increasing the capacity of the short term memory. The need for mental effort may be little when there is a rule that facilitate chunking process that exists in the long-term memory.

(Miller)explained how that each character represents a bit of information, so each character fills a space, while the characters that represent an acronyms of the words can be chunked into one abbreviated word, accordingly the acronym will fill one space of information in the short term memory instead of many spaces. Therefore chunking greatly increases the ability to remember. So if we want to hold larger amount of information successfully, we must reorganize them into chunks or groups; each hold a large amount of partial information.

RECOMMENDATIONS

In light of the research's results, the researcher recommends the following:

1. Teachers should provide the students with opportunities to use memory skills that make them aware of their memory, and provide them with a feedback of the extent to which they were able to achieve the required goals. This is done by monitoring their learning and following up the effectiveness of memorizing strategies and choosing the most appropriate ones and organizing them while doing the educational tasks.

2. Preparing educational courses by professionals in the field of educational psychology to direct the educational counselors in schools to educate their students about their memories, in order to increase awareness of memory.

3. Developing an integrated plan for training teachers who are engaged in the educational process and preparing instructional programs to make them aware of the importance of memory in learning and how to organize its work. This will contributes in enabling the

students to replace the useless strategies with more effective ones.

Suggestions

In light of the research's results, the researcher suggested the following:

1. Conduct a study to identify students' memory strategies in other educational stages.
2. Examine the relationship between memory components and other variables, like academic degrees, achievement motivation, and self effectiveness, etc, among students from different educational stages.
3. Conduct a study on the relationship between memory strategies and the main dimensions of personality.

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