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Research Paper

Effects of ageing and nutrition on episodic memory contents

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ABSTRACT

This research endeavour is aimed to find out the impact of ageing and nutrition on episodic memory. In the present experiment 60 young and 60 older subjects were participated. A story was used which is consisted ten visual clips. Ageing and nutritional status, served as independent variables in experiment. To know the main and interaction effects of ageing and nutritional status on episodic memory contents, 2 × 2 factorial design and ANOVA were employed. The main effect of age and nutritional status were found significant. The results of experiment may be interpreted that young adults recall better than older adults. The results may also be interpreted that nutritional status affects the episodic memory.

Keywords: *Ageing, Nutrition, Episodic Memory*

Ageing is caused by cumulative damage to cells as a result of everyday life or it is genetically programmed. As the natural process of ageing progresses, human experience a progressive decline in overall memory functions. This loss of ability to store and retrieve information from memory. Many neurological diseases is directly related to ageing such as Parkinson's disease or mild cognitive (MCI) impairment which contributes to the loss of memory functions.

How ageing normally effect memory functions,

1. Cumulative effect of free radical damage in the brain over the years.
2. Decline in the energy output of brain cells.
3. Significant decline in the levels of key hormones after the age of 40.
4. Diminished oxygen availability to brain cells (due to atherosclerosis or heart disease, smoking, excessive drinking, drug abuse, limited exercise, poor diet, or stress)
5. Change in life style, dirt and nutrient absorption.

Some psychologists suggest that older adults have more difficulty than younger adults in remembering whether they saw a word of generated it from a clue (Mitchell, Hunt & Schmitt, 1956; Rabinowitz,1989) in remembering whether they learned fact in an experimental setting or know it before (Janowsky, Shimamura & Squire, 1989; McIntyre & Craik, 1987), in deciding whether they thought or said a word (Hashtroudi, Johnson & Chrosniak, 1989) and in remembering which of two orienting task they used for a word during encoding (Brighman & Pressley, 1988; Mueller, Wonderlich & Dugan, 1986).

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Nutrition

Nutrition plays a vital role in intellect, memory, thinking and personality. Any nutrition deficiency will affect performance and growing evidence that small or marginal deficiencies, may impact on cognitive functioning.

Nutrition deficiency affects the following.

1. The level of neurotransmitter
2. The development and maintenances of brain cell function.
3. The level and activity of enzymes required for brain function.
4. The amount of oxygen that reaches the brain.
5. The accumulation and removal of cellular debris.
6. The ability of the brain to transmit electrical message.

Assessment of nutrition status

The most recent classification is to use body mass index (BMI in Kg/m^2) (Kuczmarsk & Flegal, 2000). Body mass index ($wt/[ht]^2$) is a global measure of nutritional status that illustrates the difference between these two constructs. Most persons who consume insufficient energy have low body mass index, so the measure is sensitive. BMI, regardless of age or population is normal at 18.5 to 29.9 Kg/m^2, overweight at 25.0 to 29.9 kg/m^2 and obese at over 30.0 kg/m^2 (USDA and USDHHS 2000). In general BMI less than 18.5 assumed below normal and BMI greater than 30 is assumed to be due to excessive adiposity.

METHODOLOGY

Sample

For the present study, 60 young and 60 older subjects were participated in experiment. The young subjects adults (mean age= 22.3, range = 18-26) and the older subjects (mean age = 66.2 yrs, range = 62-69) were randomly selected from the computer database of electoral roll of voters of Sagar city.

Material

A story was used in this experiment which is consisted ten visual clips. The story was presented by the mean of Power point slide on computer screen. The story was developed visually around the theme highly familiar to subjects. Story was presented to all groups of subjects.

A tape recorder was used to give following instructions:

> *"You all have to see story carefully which is shown on screen. You all have to read the story carefully and try to remember the story at the later recall test".*

The same instruction was carried out for other groups too.

Experimental design

In this study, ageing and nutritional status, served as independent variables in experiment and were tested by presenting the story. Thus, there were two factors in the study: age and nutritional status, each comprised of two levels, the levels of age (younger and older adults) and nutritional status (below normal and normal). Inclusion of two factors with two levels on each led to the use of 2×2 factorial design.

Procedure

The participants were seated in a room arranged for data collection in a college. Proper rapport with the subjects was established before the actual commencement of the

experiment. The work began with some initial conversation by asking subject's name, during this conversation, the attention of the subjects were drawn to the task, and they were told what we were going to do. The subjects were informed that a story will be presented by the mean of power point slide on computer screen. The story is about thieves who have stolen a few things from a house. Subjects should see the story carefully, and try to remember the things that thieves have stolen, for the later free recall test. The story was present visually for both the group of subjects which ends in 2 minutes. After presentation a story, a simple mathematical calculation was administered for 3 minutes. as a buffer task. After completion the buffer task, a response sheet (blank) was given to all subjects to write the story step by step in total ten steps. Both the groups of the subjects were asked to recall the story as soon as possible.

Table: 1 Showing Systematic Presentation of Procedure in Experiment

S.No.	Step	Time	Activity
1.	Presentation of story	2 min. story exposed	Reading story on screen
2.	Buffer task	3 min.	Simple mathematical calculation
3.	Recall test	No time limit	On test sheet

RESULTS AND DISCUSSION

To know the main and interaction effects of ageing and nutritional status a 2 × 2 factorial design was followed. It is observed that young adults recalled more story contents than older adults.

Table: 2 Mean recall scores and standard deviation according to the levels of age and nutritional status.

Age	Below Normal	Normal
Younger adults	5.33 (1.24)	5.96 (0.94)
Older adults	3.5 (1.05)	3.9 (1.13)

The recall score of below normal young adults of 18-26 years of age level ($\bar{x}$ = 5.33) and normal young adults ($\bar{x}$ = 5.96) appeared to be somewhat higher than those of below normal older adults of 62-69 years of age levels ($\bar{x}$ = 3.5) and normal older adults ($\bar{x}$ = 3.9) respectively. It is observed that younger adults recalled more events than those of older adults in both levels of nutrition status.

Table: 3 Showing 2×2 Analysis of Variance for Recall Score of Experiment.

Source of variation	Sum of square	df	Mean square	F
Age (A)	114.07	1	114.07	107.6*
Nutritional status (B)	8.1	1	8.1	7.64*
AB	0.23	1	0.23	0.21
Within cell (error)	123.93	116	1.06	
		119		

** Significant at 0.01 level*

The table indicates that the main effect of age was found to be significant [F, (1, 116) = 107.6, p<0.01]. The main effect of nutritional status was found significant [F (1, 116) = 7.64, p<0.01]. Interaction between age and nutritional status is not found significant difference [F, (1, 116) = 0.21, p > 0.01].

The table indicates that the story was better recalled by young adults in comparison to older adults. The present results are similar to those obtained by Cohen and Faulker (1989), who found that older adults are more susceptible to the effect of misleading information presented after they witness a series of events and they are confused about the source of the information.

In addition, older adults are more likely than young adults to recall a previously seen name, face or events when it is encountered later, indicating faulty source attribution (Bartlett, Strater & Fulton, 1991 and Dywan & Jacoby, 1990).

Hypothesis-1: "There will be no significant difference between the mean recall test scores of (i.e. episodic content) of young adults and older adults".

Analysis of recall test scores revealed the main effect of age [F (1,116) =107.6], reach acceptable level of significance. On the basis of obtained result hypothesis is rejected.

The result of experiment may be interpreted that young adult's recall better than older adults. These results are also supported the studies of Kausler (1985), he concluded that various components of episodic memory include list content, non-content attributes of external events (e.g. frequency of occurrence, temporal information, spatial information, auditory and visual attributes, sex of voice, and case format). The ability to remember one's own prior activity is an important contributor memory proficiency of older as well as young adults. Consequently, as related deficits in this component of episodic memory are likely to be among the reasons older people frequently report having problem with everyday memory. A special aspect of episodic memory is source (context) memory: the recollection of the source of acquired information (e.g. in which situation one learned a particular fact or event). Thus, age differences have been shown to be particularly pronounced in source memory impairment in the older adults reflects difficulties in the recollection of the perceptual aspects of episodes.

Hypothesis-2: There will be no significant difference between the mean recall test scores (i.e. episodic content) of nutritional statuses (below-normal and normal). After analysis of test scores, the main effect of nutritional status [F (1, 116) = 7.64, $p<0.01$] reach an acceptable level of statistically significant. Hence, hypothesis-2 is rejected. Interaction between age and nutrition status was not found significant.

The results of experiment may be interpreted that nutritional status affects the episodic memory. These results are also supported by the study of Lopes and Heymfield, (1987). They have reached the conclusion that nutrition status was affecting the memory functions.

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Conflict of Interest

The author declared no conflict of interest.

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