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Effects of Ageing and Nutrition on Recognition Memory

Psychology

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ABSTRACT

This experiment is an attempt to find out the impact of ageing and nutrition on recognition memory. A sample of 100 subjects participated in the study. The young adults were recruited from high school or college and the older adults were from a local senior citizens club randomly. The independent variables age and nutritional status were manipulated by selection. A 2×2 factorial design was employed. Signal Detection Theory was applied to estimate Hits/False Alarms and level of sensitivity (i.e. 'd'). ANOVA was furnished to know mains and interactional effects of age and nutrition on recognition memory. Results revealed that ability of recognition memory decline due to ageing. Proportion of hits was found higher in younger adult than older adults. Misidentification of item (false alarm) was higher in older adult may be correlated to development mild cognitive impairment in older adults. Nutritional status was also found significant discovered that memory functions are subject to nutritional deficiency.

According to Anderson (1995) "Memory is the relatively permanent record of the experience that under his learning. There are four fundamental elements of memory registration, retention, recall and recognition. "Recognition Memory implies imaging of events experienced in the past and recognizing them as belonging to one on past experience."

AGEING

Ageing is caused by cumulative damage to cells as a result of everyday life or is it genetically programmed and if it can be prevents it with gene modification. As the natural process of ageing progresses, human experience a progressive decline in overall memory functions. This loss of ability to store and retrieve from short-term employs abstract reasoning and early learns new information. Many neurological diseases directly related to ageing such as Parkinson's diseases contribute to the loss of memory functions.

Ageing causes reduction of memory functions -

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

NUTRITION AND MEMORY

Nutrition plays a vital role in intellect, memory, thinking and personality. Any nutritional deficiency will affect performance. The growing evidences reveal that small or marginal deficiencies may have impact on cognitive functioning. Nutrition may affect following:

- The development and maintenances of brain cell functions.
- The level and activity of enzymes required for brain function.
- The amount of oxygen that reaches the brain.
- The accumulation and removal of cellular debris.
- The ability of the brain to transmit electrical message.

According to agricultural research that explores, the effect of diet and nutrition on memory of performance and its function across the lifespan. Scientists know that certain nutrition and other key chemical compounds are essential to memory junction ''Good nutrition is the cornerstone to healthy ageing''.

The British Journal of Nutrition (2009) reported a study at Tufts University in Boston which showed that brain function and motor skills in aged rats could be improved by adding walnuts to our diet. The human equivalent would be to eat seven to nine walnuts per day (adding walnuts to good diet may help older people Improve motor and Behavioral skills).

Park et al. (1987) examined that older adults tend to encode information at a general level has been called into question by the result of studies done with a recognition memory test and pictures rather than words (Puglisi, Park, Smith and Dudley, 1988). In these experiments, younger and older adults were equally sensitive to changes in context between study and test. The only circumstance in which older adults appeared to encode items in a general rather than a context-specific manner occurred when verbal material was encoded under divided attention. On the basis of these result, Puglisi et al. (1988) suggested that the older adults are less efficient in their processing, but that the processes that they apply are not qualitatively different from those of younger adult.

Craik et al., (1982) suggest that long term recognition memory declines either slowly or not at all as people grow older. They conclude that elderly people may have a significantly higher false alarm rate, they may say that an item is old, when in fact they have never seen it before (Craik & MC Dowd, 1987 and Perlmutter, 1979).

The result of Cohen et al. (1989) study concludes that older adults are more susceptible to the effect of misleading information presented after they witness a series of events, and they concluded that older adults are confused about the source of the information.

Pezdek (1987) reported a study that illustrates the important of sensitive ten criteria for detecting age difference in recognition memory performance. She examined picture memory among 7 yrs olds, 9 yrs old, young adults and older adults in relation to the amount of details in pictures. Her findings conclude that older adults encoded pictures in a less detailed manner than young adults.

According to some researchers there is concerning face recognition memory, evidence of an age-related deficit in discriminating old from new faces (Bartlett and Leslie, 1986; Ferris, Crook, Clark, McCarthy & Rae, 1980 and Smith & Winograd, 1978). In a recent paper, Bartlett, Leslie, Tubbs and Fulton (1989) provided evidence suggesting that this deficit may be due to reduced proficiency in performing a "careful matching" of test items against face representation in memory, and in distinctiveness of stimulus encoding. However, there is evidence that aging is associated with deficits in face recognition memory.

Hypothesis

"There will be no significant difference between the mean rec-

ognition test scores of young adults and older adults in relation to nutritional status."

Design
A 2×2 factorial design was employed. The independent variables age and nutritional status were manipulated by selection.

Sample
A total 100 subject divided into two groups participated in the study. The young adults (mean age = 22.3 years), range = 18-26 years were high school or college student the older adults (mean age = 66.2years), range 62-69 years were recruited from a local senior citizens club randomly.

Assessment of BMI
Nutritional status is the state of the body with respect to each and to the overall state of the body weight and condition. 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. 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. In general BMI less than 18.5 assumed below normal and BMI greater than 30 is assumed to be due to excessive adiposity.

Task
In the first phase, the study consists of 10 colour pictures. Pictures were presented by means of an automatic slide projector, the slides being 5.1×5.1 cm. Viewing distance was adjusted individually in order to optimal visual acuity. All pictures were presented to both groups of subjects visually. In the final phase, another 10 new colour pictures were mixed at the time of testing phase.

Procedure
The subjects were individually tested. In the first phase, a total of 10 pictures were presented, rate of presentation was 5 sec. per picture and the inter-item interval was 2 sec. Following presentation of the last picture there was a 10 minutes interval before the recognition test was given. During this interval, the simple mathematical work was administered. In the final phase, another 10 colour pictures were inter mixed. The recognition test was self paced. The subjects made their old/new judgment orally and the response were recorded by the experimenter.

RESULTS
In experiment, Signal Detection Theory (SDT) has been applied to assess recognition memory of younger and older subjects. Subject's hits and false alarms were estimated and transformed into d' value.

To evaluate the data statistically, a 2 (Age: young adults and older adults) × 2 (Nutritional Status: below normal and normal) factorial design.

The ANOVA revealed significant main effects of age and nutritional status. The results are also indicating that younger adults are recognizing better than older adults. It is also discovered that young subjects had higher'd' value than did the older subjects.

Table 1
Mean proportion of Hits (H) and False Alarms (FA) and sensitivity'd' Scores, across Age and Nutritional Status

Age	Below normal			Normal		
	Hits	FA	'd'	Hits	FA	'd'
Young adults	0.85	0.14	2.12	0.93	0.10	2.75
Older adults	0.66	0.33	0.85	0.71	0.28	1.14

Table 2: Analysis of Variance of Recognition Scores

Source of Variance	Ss	df	Ms	F-ratio
Age (A)	86.5	1	86.1	201.1*
Nutritional status (B)	5.3	1	5.3	12.32*
Interaction (AB)	0.2	1	0.2	0.46
Within Cell (Error)	42.2	96	0.43	

*** Significant at 0.1 level**

ANOVA on corrected recognition scores demonstrated that young adult performed better than older adults. The main effect of age [F (1, 96) = 201.1, p<0.01] and nutritional status [F (1, 96) = 12.32, p<0.01] were found to be significant. The interaction of age × nutritional status was not found significant F (1.96) = 0.46, p>0.01.

CONCLUSION
Results of experiment show that ability of recognition memory decline due to ageing. This difference could be attributed to the inability of older adult to encode or retrieve the information in comparison to younger adult. Proportion of hits were found higher in younger adult than older adults can be attributed to slow down brain adventures as a result of ageing. Misidentification of item in the list (false alarm) and older adult may be correlated to impairment and generally evident in the patients of MCI (Mild Cognitive Impairment). Difference in sensitivity (d') of younger and older adult was found significant also confirms the reduction of memory functions in older adult. Subjects with normal nutritional status showed better recognition scores than below normal.

These finding finally to realize ageing effects on memory functions. This research may be of great importance to identify and diagnose the areas of memory problems in older adults. Findings may hints to Psychologists, Clinical Psychologists and even Government and other agencies to formulate memory intervention programme to reduce the rate of memory losses in very old people with 80+ of age.

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