EXPERIMENTAL ANALYSIS OF MEMORY PERFORMANCE: THE EFFECT OF IQ LEVEL AND MEMORY AIDS

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INTRODUCTION

The growing elderly population has encouraged researchers to focus on social and psychological changes related with age.

Among psychological changes a sizeable amount of studies have adressed the question of decline in cognitive functions and how social factors can influence it. The influence of life style is today one of the most important factors under study.

One of the most reported problems with advancing age is the decline of memory functions. However, the reasons of this decline are not yet clear. Up until now, there has not been an adequate model for the working of memory and distinctions like short and long term, or episodic and semantic, seem to be too simple for describing how memory performance is made.

Recent studies on short-term memory have paid attention to the following factors: a) the kind of information presented, that is verbal/nonverbal; b) the number of items presented; c)the possibility to organize items presented or the capacity to use mnemonics; d) the presentation rate; e) the influence of the intellectual level of the subjects.

In this paper we are going to consider the role of the previous variables both for a better description of the normal memory level and for the study of how memory can be improved.

SUBJECTS

Two groups of normal elderly subjects (mean age 69 yrs) with different educational and intellectual levels (IQ), and one group of young (mean age 20 yrs) were tested. One group (A) of old subjects comes from recreational centre and the second (B) from University courses for the elderly. Young subjects (group C) come from nurse training schools. They were without any apparent neurological and psychological problems that might interfere with experiments. The IQ of the group A is equal to that of the group C and both are inferior to that of the group B. All subjects live in Rome.

TABLE 1 : Mean Age and IQ level of the 3 groups

GROUP	A	B	C
N	16	16	16
Mean Age	71	66	20
IQ	98.4	119.4	104.8

MEMORY TASKS

Verbal and nonverbal LEARNING. Subjects are requested to learn a sequence of 7 words or 7 spatial positions (Rey, 1968). No more than 12 presentations are allowed.

Immediate recall of words : a SEMANTIC mnemonic. Subjects are asked to recall a list of 9 words immediately after presentation. The words belong to three different categories (flowers, animals and instruments). There were 2 conditions: the first, without any information and the second with the indication to use the semantic strategy.

Immediate recall of words : a VISUAL mnemonic. Subjects are requested to repeat a list of words. Six complexity levels are given, according to the number of presented words (4 to 9). Here too there were 2 conditions: a simple one and a second in which a series of pictures, in front of the subject, could be indirectly associated with words.

Immediate recall of words : a TEMPORAL mnemonic. A list of words was presented for immediate repetition. There were 3 different presentation rates of the words: 1 word every half second (0.5), every 2 seconds (2) and every 10 seconds (10).

RESULTS

Separate analysis of variance were made for each task.

The IQ factor. All tasks show a significant difference among groups: group C is better than group B, which is better than group A. As their ages are the same, the difference between the two groups of the elderly can only be attributed to IQ. Memory performance levels are proportional to IQ levels.

TABLE 2: RESULTS OBTAINED FOR EACH GROUP

		GROUPS			
TASKS		A	B	C	p <
LEARNING	(*)	4.9	4.1	2.6	.005
SEMANTIC	%	37.2	43.6	49.2	.001
VISUAL	%	63.5	74.5	83.0	.001
TEMPORAL	%	83.0	90.5	95.7	.001

(*) Number of repetition for learning

The KIND of material. There are no differences between the verbal/spatial conditions in the learning task. This is true for both young and old subjects.

The COMPLEXITY of the task. All subjects show a decrease of the memory performance as a function of the length of the list, but the shape is similar among groups.

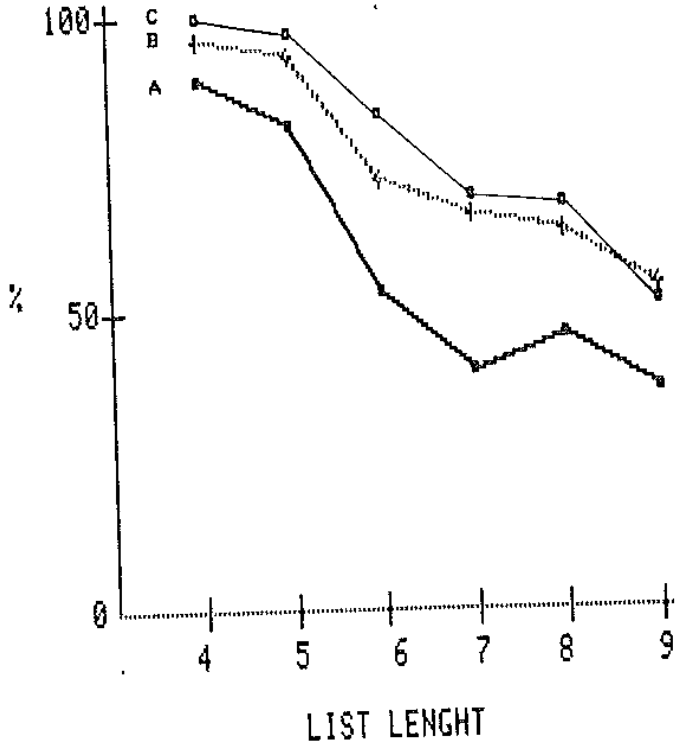
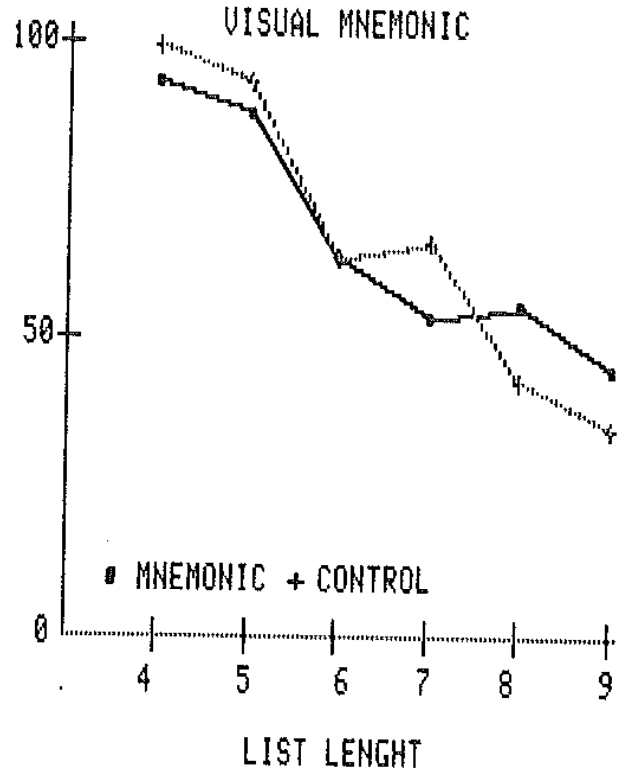


FIG.1: PERCENTAGE OF RESPONSES AS A FUNCTION OF THE NUMBER OF ITEMS IN THE LIST

A SEMANTIC mnemonic. The introduction of a semantic mnemonic does not give the expected result: all groups show a decrease ($p<.001$) in performance when they were asked to utilize this strategy.

A VISUAL mnemonic. A significant interaction ($p<.001$) is present between the visual mnemonic and the complexity of the list, but only for group A and B, that is to say for the elderly.

FIG. 2: THE ADVANTAGE OF THE VISUAL MNEMONIC ONLY APPEARS WITH MORE ITEMS IN THE LIST.



A TEMPORAL mnemonic. All subjects show an increase in performance with a slower presentation rate ($p<.005$).

CONCLUSION

Age is not the only influential factor on memory performance: more intelligent elderly subjects can partially compensate the decline of their performance.

All memory tasks proposed in this work require controlled processes and, as proposed, they are affected by age. Neither the kind of material, nor the complexity of the task show a differential effect among groups.

All strategies or mnemonics require much cognitive effort and therefore can only be used when the normal process cannot reach a given level. Semantic strategy is not used by all groups, whereas visual strategy, amongst the elderly, is used when the list is longer than the memory span.

As Salthouse suggests. the decline of some cognitive functions in the elderly can be best explained as a decrease in the information processing rate. However, as in our results all subjects, both young and old, showed an increase in performance with a slower presentation rate, this hypothesis should be more closely examined.

The possibility of increasing memory performance in normal elderly decline or pathology is one of the most important goals in current cognitive neuropsychology.

dramatic shifts in their assessment of people's cognitive, verbal and social abilities were recorded with reference to long established as well as new residents. The impact on the regimes, ethos or cultures of the facilities appears to have been minimal. The complex and intractable passive-dependency inducing nature of some of these regimes has remained untouched.

ABSTRACT NUMBER 56.26

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The growing elderly population have encouraged researchers to focus on social and psychological changes related with age. Among psychological changes a sizeable literature addresses the question of decline in mental functions and how social factors can influence it.

One of the most reported problems with advancing age, is the decline of memory functions. However, the reasons for this decline are not yet clear. One factor that seems to be relevant for memory performance is the education level of subjects and their mental exercise.

These problems were analysed across a series of memory tests. They were designed for the study of verbal and nonverbal learning, immediate repetition of word lists and the influence of internal and external aids.

Two groups of normal elderly subjects (n=32), mean age 69 years) with different educational and IQ levels, and one group of young (n=16, mean age 20 years) were tested on four different types of memory tasks. The subjects were also required to fill in a self-rating questionnaire.

The findings show a significant difference between young and old subjects and between the two elderly groups: in the elderly, memory performance is correlated with IQ level. The difference between groups increases with the complexity (list length), while semantic and/or visual aids seem not to improve memory skills. Lengthening the inter-stimulus interval significantly improves recall performance. This result seems to suggest that the memory decline with age can be better understood as a slowing of the information processing rate.

ABSTRACT NUMBER 57.1

FOR THE ELDERLY: ROOTS OF INNOVATIONAL DRIVE, IMPACTS OF INDIVIDUAL AND SMALL-GROUP ACTIVITY, CHANCES OF PROCESS MONITORING

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The premise of this paper is that a diverse and highly- structured (legally as well as state-controlled), system of health and social services operates within a democratic state. An intricate cobweb of organisations and government administrations has developed its own balance of power, with commonly accepted domains of interest, influence, information channels and modes of decision making.

How do processes of innovation take place? What chances are there for the elderly to influence and initiate services aiming at their own needs? How much flexibility is there eg. to draw on experience from other countries?

Secular trends and mainstream developments lead to changes in the above characterised system of responsibilities and domains of influence: changes in the political culture and in the value system, augmentation of knowledge, professionalisation, changing demand-supply relationships, population development, re-definition of boundaries between publicly controlled services and free enterprise. Such developments open the door for innovatory processes.

The more structured, legally controlled and power balanced the system is, the more restricted are the conditions under which it is possible to launch innovatory programs by government decision, be it by introduction of new concepts, by legislation or by financial promotion programs. Changes induced by secular trends surpass the innovatory capacity of the state. State activity tends to be a late reaction to ongoing change.

An additional explanatory concept is that of islands of innovation developing within the