Age-associated memory impairment (AAMI)

From Gene to Man - Gerontological Research in The Netherlands
C.F.A. van Bezooijen, R. Ravid, A.A.J. Verhofstad, editors

AGE-ASSOCIATED MEMORY IMPAIRMENT (AAMI): RESULTS FROM A CONTROLLED STUDY INTO MEMORY DYSFUNCTION

E.J. Reyersen van Buuren, P.J. Houx and J. Jolles

Department of Neuropsychology and Psychobiology, University of Limburg, P.O. Box 616, 6200 MD Maastricht

ABSTRACT

Twenty middle-aged subjects suffering from Age-Associated Memory Impairment (AAMI) were compared to control subjects who were matched to individual patients by age, sex and education. The AAMI patients had been diagnosed/classified according to strict criteria; one of these was the fact that memory performance on a complex test of memory should be at least one Standard Deviation below the norm for young adults. The present paper describes the results of a comparison of AAMI and age-matched controls. The results show that the patients are inferior on a complex test of memory namely the word learning test by at least 20%. The data indicate that the memory deficits in AAMI can not be attributed only to biological aging; other factors are also involved. It is possible that particular AAMI subjects are in an early phase of degenerative brain disease such as Alzheimer's disease.

INTRODUCTION

It is widely accepted that various cognitive abilities change in many healthy individuals during the later decades of adult life (e.g. Craik, 1977). Especially memory functions and problem solving activities deteriorate with age, if they involve speed of response. It is apparent that the cognitive abilities deteriorate particularly in the senium, although some abilities start to decline in the 50's, some in the 60's but some already in mid 30's (e.g. Craik, 1988). There is even morphological evidence that areas in the brain notably in the frontal lobes degenerate already in the 30's (Jolles, 1986).

Complaints about memory are common among the middle aged and elderly persons, especially since people experience fear of becoming demented. Accordingly, specialised health care facilities are getting more and more patients who are seeking medical help for what they experience as an approaching dementia. The difficult task for an increasing number of professionals is, to assess whether the memory complaints that the patient presents himself with are an indication of a pathophysiological condition such as Alzheimer's disease or an early stage of that condition. Alternatively, other

disease states are known to cause cognitive deficits and even dementia, such as thyroid dysfunction. Of course, memory dysfunctions which are known to be a quite normal exponent of biological brain aging might also be the cause of the request for help.

The present paper describes an experiment in which middle-aged persons who actively seek help for their memory problems are compared with carefully matched controls on a number of memory test parameters. The subjects are diagnosed as suffering from Age-Associated Memory Impairment, a condition described by Crook et al. (1986). This condition is -by definition- characterized by memory performance inferior by more than 1 standard deviation compared to young adults. The present study tests the hypothesis that AAMI patients are also inferior in performance compared to age-matched controls.

MATERIALS AND METHODS

Twenty patients were selected from the outpatient pool of Maastricht Memory Clinic. The patients were 40-69 years in age and were screened for AAMI criteria according to a standardised and protocolized medical and neuropsychological investigation. Control subjects were matched to individual patients in terms of age, sex, and level of education. They also received a similar medical investigation as the patients. Both groups were compared with respect to their performance on a word learning test. The test consists of a list of 15 monosyllabic meaningful words, which are presented in 5 trials. Each trial ends with a free recall of the words (immediate recall), a delayed recall is given after 20 minutes followed by a delayed recognition trial.

RESULTS

On the word learning test, the AAMI subjects performed significantly less well with regard to the acquisition of new material, the consolidation into memory and the retrieval of the new material from memory (see Fig. 1).
On all five learning trials there was a significant difference. The AAMI subjects started lower than the controls and ended lower. For the AAMI subjects, the total number of words recalled after five trials was 25% less than that of the controls ($P<.001$). After a delay of 20 minutes, the active retrieval of information from memory was for the AAMI subjects 29% lower than that of matched controls ($P<.001$). In addition recognition of the previously learned words by the AAMI subject was significantly less than that of the matched controls ($P<.05$), suggesting less adequate consolidation of information into memory.

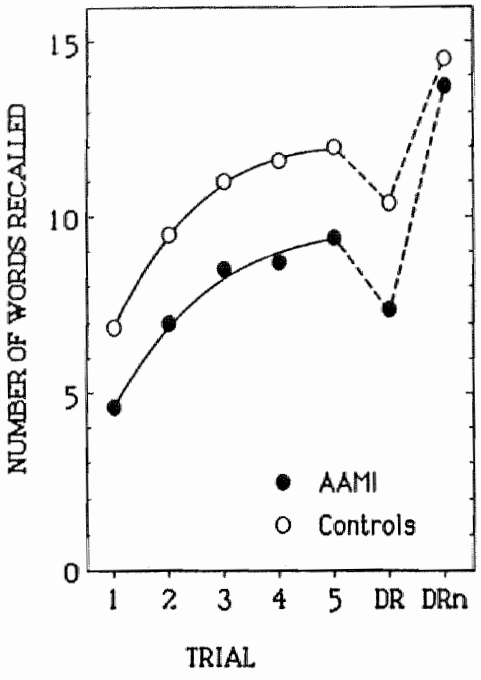

Fig. 1 Performance of AAMI patients and controls on word learning test. DR - Delayed Recall after 20 min; DRn - Delayed Recognition, immediately following delayed recall.

DISCUSSION

The present experiment shows that a particular class of middle-aged subjects which is classified as Age-Associated Memory Impairment has an inferior performance on a complex test of memory compared to Age Matched Controls. The memory deficits can be interpreted in terms of inferior acquisition and consolidation of a new material into memory and in the retrieval of information from memory. Primary memory -which is measured on well-known tests such as Digit Span were not affected. The striking finding is that subjects who have medical diagnosis of AAMI have more pronounced memory deficits than age-matched controls. Similar findings were done for dysthymic subjects compared to matched controls (Reyersen van Buuren and Jolles, in preparation). This may indicate several things. In the first place it may be the case that the control subjects are "too good". Indeed, they have

been screened thoroughly for possible suboptimal health or risk factors for brain dysfunction. However, all demographic sex and education factors were similar for controls and patients. Accordingly, the inferior performance of the patients must be caused by factors other than biological aging. The second possibility is compatible with this notion. The AAMI subjects may be exclusively characterized by the fact that they complain about memory dysfunctions: their deficits are assessed objectively at least when compared to young controls and they do not have any medical condition that could account for the memory deficits. It may be the case that these patients suffer from a medical condition that regular medical diagnostic interventions are not able to detect. Another study by our group has shown that the criteria for AAMI are not so clear-cut (Reyersen van Buuren and Jolles, in preparation). This gives rise to the possibility that the AAMI subjects presently discussed have sustained something that is known to hamper optimal brain functioning (such as repeated mild closed head injuries or repeated general anaesthesia. A very relevant possibility in this respect is the fact that AAMI in particular middle-aged subjects might be an early phase in a degenerating process such as Alzheimer's disease. This hypothesis is being tested on a larger number of subjects in the Alzheimer Centre in Maastricht. Both case control studies and longitudinal research are performed.

REFERENCES

Craik F.I.M., Age differences in human memory, In: Handbook of the Psychiatry of Aging, Eds J.E. Birren and K.W. Schaie, Van Roshand Reinhold Co., New York, 1977, 384-420.

Crook T., R.T. Bartus, S.H. Ferris, P. Whitehouse, G.D. Cohen, and S. Gershon, Age-associated memory impairment: Proposed diagnostic criteria and measures of clinical change, Dev. Neuropsychol. 2 (1986) 261-276.

Jolles J., Cognitive, emotional and behavioral dysfunctions in aging and dementia, Progr. Brain Res., 70 (1986) 15-39.