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INVESTIGATING WORKING MEMORY AND METAMEMORY IN OLD AGE

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Abstract

An investigation of metamemory for working memory was conducted in a group of older adults aged 60 to 74 years using a variation of the Daneman and Carpenter (1980) reading span task. There were twelve trials in each experiment, with each trial containing six sentences. Participants had to assess whether each sentence was true or false as well as remembering the last word of each sentence in correct order. In Experiment 1 words were phonologically similar (rhyming) and dissimilar (non-rhyming), whereas Experiment 2 presented one syllable (short) words and two syllable (long) words. Half the participants were asked to predict how well they would remember the words and half were asked to postdict how well they had recalled the words. Participants were also asked to complete the Metamemory Functioning Questionnaire (Gilewski, Zelinski & Schaie, 1990) for a self-assessment of memory and this was compared to their memory performance on the recall task.

Results indicated that older adults recalled more rhyming words than non-rhyming words, and more short words than long words. They overestimated the number of non-rhyming words they would remember but their estimates fluctuated in the same pattern as actual recall for the rhyming and non-rhyming words showing some accuracy in their metamemory. However, people unexpectedly estimated that they would do better with long than short words. For long words postdictions matched recall better than predictions which showed that older adults were able to gather information about their performance during the task. There was no correlation between the MFQ scores and the recall accuracy of the memory task probably because the questionnaire measured more general aspects of everyday memory, whereas the recall task involved a single and very specific aspect of memory. When compared to the younger adults the older adults showed poorer recall performance and overestimation was larger for older adults. These results showed us that to some extent, older adults are able to estimate their memory performance, using metamemory in a complex memory task.

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OVERVIEW

There has been a sizeable amount of research that supports the commonly held view that memory deteriorates with age. However, the reasons for memory deterioration are not clear. They range from the optimistic view that poorer memory in old age arises from inefficient use of encoding and retrieval strategies, a problem subject to remedial intervention, to less optimistic views that declining memory ability is the consequence of irreversible age-related changes in basic mechanisms underlying cognition.

Much research has concentrated on working memory capacity in the elderly as there is a possibility that age-related changes in memory across the adult years arise from changes in fundamental processing mechanisms such as reduced ability to concentrate on a task, reduced working memory capacity or cognitive slowing. Working memory is used to describe the short-term memory system, which is involved in the temporary processing and storage of information. It is still to be determined whether older adults are limited by the storage capacity of their working memory, their efficiency of performing mental operations, especially complex tasks, or mental slowing. As working memory is potentially an underlying component of higher level tasks such as comprehension and problem solving, investigation of it is important. If working memory is not working effectively this will be more likely to be apparent in a complex task, requiring manipulation of information, when more demands are placed upon the system than in a simple task.

Research has also investigated metamemory. Light (1991) suggests that one of the factors contributing to age-related impairment in memory is the failure of metamemory. Metamemory refers to knowledge people have about what is demanded of their memory in different situations as well as strategies they use to cope with memory demands. This also includes beliefs about one's own memory abilities and self-knowledge about current memory use. If younger and elderly groups are using different strategies, then the difference in performance may be a result of these strategy differences rather than, or in addition to, capacity differences. Measurement of metamemory involves asking people to monitor their memory performance. They may be asked to predict how well

they will perform prior to completing a task or postdict how well they have performed once the task is completed. Studies have revealed inconsistent results when evaluating predictions of older and younger adults. Postdiction studies have been few but have found no age-related differences.

Brigham and Pressley (1988) hypothesized that developmental differences might be more certain in more demanding situations. The outcomes in their study suggest that life span changes in memory might be more obvious if complex memory tasks are studied. Declines in memory could be due to a number of changes in metamemory and interaction of metamemory with other factors.

It is therefore important to consider both working memory and metamemory when researching causes for age-related decrement in memory. There has been little research investigating metamemory for working memory. This study proposes to investigate metamemory for working memory in a complex task. It is important to complete a complex task study as there is the idea proposed by Baddeley (1986), that reduced memory capacity is available to the elderly when they have extra demands placed on them for storage and/or manipulation of information.

This study is a partial replication of a study by Richards-Ward (1996) which investigated metamemory for working memory in a sample of young adults. Comparisons will be made between the findings of the present study and the findings of the Richards-Ward (1996) study in order to determine whether there are age- related differences in metamemory for working memory.