

Age Differences in Memory for Facts versus Inferences¹

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¹This study was supported in part by postdoctoral fellowship
1 F32 AG05140 to the first author by the National Institute
on Aging and by program project grant AG00133 from the National
Institute on aging to the third author.

APA, 1979

Abstract

This report discusses the results of two experiments investigating age differences in ability to draw inferences from sentence sets, using the paradigm developed by Moeser (1976). Four sets of three related sentences were presented to young and elderly subjects. They then completed a recognition test. The first four items on the test required inferences from the information in each sentence set. The remaining 12 items required recognition of the original sentences (fact memory). All subjects performed almost perfectly on the fact items, while the old performed more poorly than the young on inference items. Experiment II investigated whether including fact items first would improve inference performance in the elderly. Results showed no improvement in inference item recognition in older subjects. The data suggest that older people retained the fact information, but either did not integrate the information across sentences or did not use the stored information in responding to the inference items.

Until recently, most studies of memory in older people dealt with their ability to remember information presented in a list format. Consequently, very little is known about how older people remember material presented in sentences or in prose passages. Since studies involving supraspan list memory have generally found performance deficits in older subjects in a variety of memory tasks (see Craik, 1977, for a review) it is especially critical to use more ecologically valid materials to establish whether age differences in memory are due to the artificial nature of the study materials or whether they are also to be found to situations more closely approximating the memory demands of everyday life. In one of the few studies using prose materials, Gordon and Clark (1974) found that older subjects performed more poorly than the young in a syllogistic inference test following reading a story. However, the older subjects did not comprehend the story as well as the young, and this could conceivably account for the age-related deficit in inference as well.

In the two experiments reported here, we studied memory for facts and the ability to draw inferences from them by using a paradigm developed by Moeser (1976). In her experiments, Moeser presented subjects with sets of three related sentences, such as:

The ants ate the jelly.
The jelly was on the table.
The table was under the tree.

or

The kitten sat in the box.
The box was in the car.
The car was in the park.

Following presentation of the sentence sets, subjects completed a two-part forced-choice test, in which they selected one of two sentences as "correct in terms of the sentences just presented." One part of this measure tested recognition of the original sentences (fact memory).

For instance, a pair of sentences from this part of the test would be:

The ants ate the jelly.
The kitten ate the jelly.

The second part of the test investigated ability to make inferences based on each sentence set. A pair of test sentences from this part would be:

The kitten was in the park.
The kitten was under the tree.

If subjects selected the first sentence from this pair, it would indicate either that they had integrative the three sentences as a unit during original reading, or that they had stored the sentences separately, but could draw the appropriate inferences from them at the time of test.

Mooser's (1976) data showed that when related sentences from a set were presented sequentially, both recognition of old sentences and performance on inference items were at nearly asymptotic levels for subjects ranging in age from kindergarten to college. The two studies reported here replicate Mooser's work with young and elderly subjects.

Experiment I

Subjects were paid volunteers from a sample obtained through a prepaid medical plan based in Long Beach, California. There were 11 subjects aged 30-35 (young), 49 aged 55-69 (young-old), and 21 aged 70-85 (old-old).

Twelve sentences, comprising four sets of three related sentences (see examples above) were tape recorded and typed on a sheet of paper. Subjects read the sentences to themselves as they listened to the recording. Sentences were presented at approximately one every five seconds. Following presentation of the sentences, the recognition test described earlier was administered. The first four items required inference, while the remaining twelve required fact recognition. Results

are seen in Table 1. The data indicate that all three age groups were virtually perfect on the fact items. However, the two older groups performed at approximately chance levels on the inference items, while the young subjects correctly selected a high proportion of inference sentences.

These striking (and depressing) results indicate that the older people acquired the fact sentences correctly, since their fact-sentence recognition scores were nearly perfect. Yet their ability to make inferences was poor. This suggests that the older sample had stored information about individual sentences, but did not integrate them or draw the appropriate inference from unintegrated representations of the study sentences.

It is possible that the poor performance of the older subjects is due to the fact that the inference items preceded the fact items on the test. Instructions to choose the correct member of each pair based on what had been studied may have been confusing. In Experiment II we examined this question by placing the inference items at the end of the test for half of the subjects. Under these conditions subjects would be responding to study questions first and, since their choices would mostly be correct, they would have an additional opportunity to integrate the propositions within each set of related sentences. Also, we thought this format would increase the subjects' tendency to review their answers to fact questions when answering the inference items. Thus there are two reasons for expecting better performance in this condition.

Experiment II

Nineteen undergraduate students and clerical staff from the University of Southern California, aged 18 to 36, served in the young group. The older subjects were 27 young-old and 26 old-old paid

volunteers from a senior citizens' nutrition program in Claremont, California^a.

Subjects were presented with the identical materials used in Experiment I. For the recognition test, approximately half the subjects in each age group were given inference items first, half fact items first. Results are seen in Table 2. It is clear from this table that the order of the two parts of the test had no big effect on recognition. Again, the young and both old groups performed at high levels on the fact items. As in the first study, performance of young subjects on inference items was excellent, while the old groups performed at chance levels on these items. The inference results are presented in a slightly different way in Table 3. This table gives the number of subjects getting 0, 1, 2, 3, or 4 items correct. It is clear that the majority of elderly subjects made 1 or 2 correct responses to the inference items while the majority of the young got 3 or 4 correct. Thus the data for individual subjects confirm the conclusions drawn above.

To summarize, the data show that older people are quite good at retaining exact information from sentence sets, but do not integrate the information within sets, or make appropriate inferences from available information.

References

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Table 1

Mean proportion of correct recognitions of fact sentences
and of inferences by the Young, Young-Old and Old-Old
age groups in Experiment I.

<u>AGE</u>	<u>N</u>	RECOGNITION ITEM	
		<u>FACT</u>	<u>INFERENCE</u>
YOUNG (Age 30-35)	11	.99	.88
YOUNG-OLD (Age 54-69)	49	.91	.58
OLD-OLD (Age 70-85)	21	.92	.58

Table 2

Mean proportion of correct recognitions of fact sentences
and of inferences, as a function of order of test
items and of age in Experiment II.

<u>AGE</u>	<u>N</u>	<u>RECOGNITION ITEM</u>	
		<u>FACT</u>	<u>INFERENCE</u>
YOUNG			
Inference items first	8	.98	.87
Fact items first	11	.96	.86
Marginal	19	.97	.87
YOUNG-OLD			
Inference items first	15	.87	.58
Fact items first	12	.83	.50
Marginal	27	.85	.54
OLD-OLD			
Inference items first	15	.82	.48
Fact items first	11	.82	.57
Marginal	26	.82	.52

Table 3

Frequency of number of correct recognition of inference items by age (Experiment II).

<u>AGE</u>	Number of Correct Inference Recognitions				
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
YOUNG					
Percent of group	0.0	0.0	10.5	31.6	57.9
YOUNG-OLD					
Percent of group	3.7	29.6	29.6	18.5	18.5
OLD-OLD					
Percent of group	3.7	37.0	22.2	25.9	11.1