FREE RECALL IN THE INCIDENTAL LEARNING PARADIGM BY ADULTS WITH AND WITHOUT SEVERE LEARNING DIFFICULTIES

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Introduction

Most of the investigations regarding memory in the mentally retarded have been done using the multi-store model of memory (Lupart, 1978). Different variations of this model have been proposed by Broadbent (1958), Waugh and Norman (1965), Atkinson and Shiffrin (1968, 1971) and Ellis (1970). Common and basic to these different variations of the multi-store memory model are the “short-term store” or “working memory”, where items are retained for a short term to be worked with immediately or elaborated on and encoded for future use, and the “long-term store” where information is stored for long periods of time. Operations, some automatic, and others controlled by the subject, were associated with each of the stores.

The long-term store was reported to be intact in mentally retarded persons (Belmont, 1966). The relatively poor memory of these persons was attributed to both capacity limitations and the lack of a planned use of mnemonic processes in the short-term store (Ellis, 1970) Belmont and Butterfield, 1971). It was found, however, that mentally retarded persons could be trained in the use of mnemonic strategies that improved their memory performance (Butterfield et al., 1973; Ashcraft and Kellas, 1974; Brown et al., 1974). The generalisability and long-term retention of these learned strategies, however, remain in question (Beirne-Smith et al., 1994).

While the localisation of deficits in the short-term stores of retarded individuals is feasible, the focus of attention in memory research has shifted from structures to processes. Neither Ashcraft and Kellas (1974) nor Brown and her associates (1974) even mention the stores. Bjork’s (1973) memory model, later modified by Lawson (1978), while retaining the store structure, dissociates the “control processes” that is, the operations intentionally performed by the subject, from the stores.

In 1972, Craik and Lockhart came up with a model of information-processing known as the “Levels of Processing”.

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model. These authors suggested that incoming information may be processed in three qualitatively different ways (at three different levels), namely, according to its physical characteristics, according to its sound (“phonemically”), and/or according to its meaning (“semantically”). Experiments using this theory have suggested that phonemically processed information is remembered better than physically processed information, and that semantically processed information produces the most durable memory trace (Craik and Tulving, 1975). This suggested that phonemic processing took place at a deeper level than physical processing, and that semantic processing occurred at the deepest level. Craik and Lockhart’s (1972) model included a paradigm of incidental learning (learning that occurs without an express intention of learning) according to which, induced levels of processing would be included by different orienting questions (e.g., the questions “Is this word written in red?”, “Does this word rhyme with apple?” or “Is this word a synonym of supply?” induce either physical, phonemic or semantic processing respectively even when there is no deliberate attempt on the part of the processor to remember).

Further support for the Levels of Processing model has been provided, among others, by Owings and Baumeister (1979) as well as by Stuart (1979) who did their research with children.

However, there have been criticisms of Craik and Lockhart’s (1972) theory. Jacoby and Craik (1978) made the following observations: Firstly, the concepts of “depth” and “meaningfulness” have not been clearly specified. Secondly, within each “level”, there are different sub-levels and ways of analysis. Thirdly, orienting tasks only emphasise certain levels but do not exclude other levels. Otherwise, say these authors, there would be zero recall after analysis at the physical level because what is analysed is the size or colour of a word, but what is recalled is the word itself. Fourthly, there is a circularity in the definition of “depth” (Eysenck, 1978; Baddeley, 1982). On the one hand, traces in memory are said to be more durable because they have been processed at a deeper level; on the other hand, the level is said to be deeper because the memory traces last longer. Fifithly, Eysenck (1978) reports that phonemically processed words that are atypically encoded are recalled better than semantically processed words that are typically encoded.

Further, there are alternative explanations to “depth”. Although it seems intuitively evident that the difference in “quality” and abstraction between the levels proposed by Craik and Lockhart (1972) would result in differential recall performance, other authors have suggested distinctiveness of trace, quantity of elaboration of stimulus, compatibility between encoding and retrieval conditions etc. as being the factors that really affect the durability of memory traces (Craik, 1978).

Despite the criticisms that call into question the notion as well as validity of the Levels (or “Depth”) of Processing theory, Parkin (1993) states that Craik and Lockhart (1972) left us a useful legacy, namely, the relation between perception and memory, the enormous variation in encoding that could occur, and a substantial framework within which one could talk meaningfully of encoding deficits as a reason for memory
failure. Ashcraft (1994) states that while the levels of processing model may not be suitable for formal research, it could be a good rule of thumb for everyday memory usage.

The preoccupation over the concept of “depth” or “level” probably distracts from the usefulness of the levels of processing model. If the concept of “mode” could be substituted for “level” or “depth”, it may be easier for both theorists and researchers to agree that different “modes” of processing result in different quantities of recall as research seems to indicate.

Although research using this model with retarded subjects has been relatively sparse, what little has been done points to some interesting and potentially useful directions.

Lupart (1978) used the paradigm to test both non-retarded and MA (mental age)-matched mentally retarded persons both under incidental and intentional learning conditions. Although there were no differences in free recall between physically and phonemically analysed materials, a significantly larger number of semantically processed items was recalled after incidental learning. Also, the difference in performance between the two IQ groups was greatest in the area of recall after semantic processing.

Schultz (1983) tested mentally retarded and MA-matched non-retarded children for speed and accuracy in answering questions requiring different processing depth, and gave them an unexpected recognition test. He found that retarded children were able to process information semantically when induced to do so although they took longer than non-retarded children. Also, the retarded children were able to recognise the material as efficiently as the non-retarded children.

Woodley-Zanthos (1993) conducted two experiments to compare recognition memory of non-mentally retarded (NMR) and mildly mentally retarded (MR) adolescents immediately after and one week following presentation of word stimuli with either semantic incidental, non-semantic incidental, or intentional orienting instructions. In Experiment One, the task was subject-paced. Recognition memory for all subjects improved following semantic encoding instructions; both intelligence level groups performed comparably in all encoding conditions at both delay intervals. Encoding time for MR persons were approximately twice those of NMR persons. In Experiment Two, encoding times were equated for the two groups. Both groups recognised more words following semantic instructions; NMR persons recognised more words that MR persons in the semantic condition but not in the non-semantic condition. Results suggested similar processing of words in MR and NMR persons; however, MR persons require longer encoding times in order to equal the recognition-memory performance of NMR persons when orienting instructions are semantic. There were no intelligence level differences in long-term forgetting in either experiment.

While the studies done by Lupart (1978), Schultz (1983) and Woodley-Zanthos (1993) did support Craik and Lockhart’s (1972) claim that semantically processed items are recalled better than items processed in any other way (physically or phonemically) in the cases of people with mental retardation as well, all these studies were done only with
mentally retarded children. Also, the studies by Schultz (1983) and Woodley-Zanthos (1993) tested only recognition which is less useful than recall where everyday living is concerned.

Boyd and Ellis (1986) conducted an experiment with 70 non-retarded undergraduates and 108 young adults (87 students with a mean CA (chronological age) of 17.3 and 21 sheltered workshop workers with a mean CA of 29) with mental retardation on incidental learning tasks at shallow and deep levels of processing. All the subjects were later tested unexpectedly for recall. Both groups of subjects recalled more after deeper processing but the non-retarded subjects recalled more items than the retarded subjects. Boyd and Ellis concluded that: (a) mentally retarded adults were capable of semantic processing which resulted in enhanced recall performance, and (b) mentally retarded adults did not perform as well as non-retarded adults either because they used an inferior retrieval strategy or because they used a more limited "spread" or "elaboration" of encoding than non-retarded adults.

There had already been some dispute as to whether "breadth" or "spread" of processing as opposed to "depth" of processing is responsible for differences of retention. As mentioned earlier, Craik and Tulving (1975) performed a series of experiments to test the original theory. In their seventh experiment, they discovered the effect of the "spread of encoding" on recall performance. Lockhart et al. (1976) also emphasise the effects on recall of spread or elaboration of encoding. However, these authors did not seem able to make up their minds as to whether "spread of elaboration" or "depth of processing" is more critical for recall performance.

Anderson and Reder (1979) argue that the variation in memory trace is a result of the number of elaborations that subjects produce while studying the material, that these elaborations produce more redundant encodings of the to-be-remembered material, and that elaboration is what is critical for retention, especially over a long period. The authors see long-term memory as a network in which input is stored in the form of propositions. Elaboration produces a larger subset of propositions. At retrieval, the more propositions bearing the target item that are activated, the easier would be its recall. "Breadth" of Processing, is suggested as a more appropriate metaphor than "Depth" of Processing. Semantically processed material is usually better recalled because most people find it easier to elaborate on material at the semantic level. In any case, it would be the number or quantity of elaboration and not the level or quality of processing that would be a better predictor of recall.

The purpose of the present research was to test the theory of Anderson and Reder for both non-retarded and mentally retarded adults. It was also intended as the first of a series of experiments leading to an intervention programme for the purpose of improving memory for items relevant to daily living in mentally retarded adults living in the community.

Method

Subjects

The subjects were thirty mentally retarded adults and thirty non-retarded adults. Within each IQ group, there were fifteen from each sex.
The mentally retarded subjects were randomly picked from residential facilities, sheltered workshops and schools around Edmonton, Alberta. Those who were known to have brain damage and those who were unable to read the target words and understand them were excluded. Their ages ranged from 19 to 29 years with a mean between 22 and 23 years. Although IQ scores could not be obtained for all (only 20 were available), it can be surmised with great probability that all the subjects of this population had IQs between 50 and 80 on the Wechsler Adult Intelligence Scale - Revised (WAIS-R) (Wechsler, 1981). The WAIS-R is a test of intelligence for adults that taps into verbal and non-verbal skills in eleven areas of functioning.

The non-retarded sample comprised three university graduate students, ten university undergraduate students, four housewives, four literate farmers, two social workers, one receptionist, one teacher, one nurse and one recreational therapist. Their ages too ranged from 19 to 29 years with a mean around 25 years. It was not possible to obtain IQ scores for members of this group. However, it is probably safe to say that their IQ scores were between 100 and 120 on the WAIS-R.

Materials

The materials were thirty-six monosyllabic common shopping list items, mostly from the categories of food, clothing and furniture. The words were comparable regarding Concreteness, Imagery, Categorisation, Meaningfulness, Familiarity, Number of Attributes or Features, and Pleasantness, according to student ratings compiled by Toglia and Battig (1978) in the Handbook of Semantic Word Norms. They were printed in one and a half inch letters with a black felt tipped pen on white 4" x 6" cards which were later laminated. Twelve of the words (the same for each experiment) were used as target words, and the rest were used as distracters in recognition tests.

A standard set of twenty four sentences, two for each of the target words, was also used as will be described later (see Appendix).

Procedure

The subjects at each IQ level (mentally retarded and non-retarded) were randomly assigned, in equal numbers within each sex, to three conditions of treatment. Thus, there were six groups with five males and five females in each group. The three treatment conditions were the same for each IQ level with the exception of one small difference (which will be explained later) in the third treatment condition.

Each subject was tested individually by the same experimenter. In every instance, the subject sat across an empty table from the experimenter. The test materials, when not actually displayed on the table, were placed out of the subject's view on a chair beside the experimenter. This procedure was adopted not only to eliminate unnecessary distractions but also to enhance the incidental learning nature of the task (by keeping the subject guessing in regards to what was to come next and what it was all about).
Treatment Condition One was a sort of baseline condition against which the performances of subjects in the other two treatment conditions was to be compared. The twelve target cards were laid in random order on the table in front of the subject. The subject was asked to sort the cards into items he/she would buy and items that he/she would not buy during an imaginary shopping spree. The purpose of this sorting exercise was to get subjects to pay attention to all the items. The experimenter wrote down the items as they were sorted in order to give the subject the impression that sorting was the main purpose of the study. After the cards were collected and put away, the subject was requested to recall as many of the items as possible in any order he/she pleased. There was no time limit for the recall. The twelve cards were then randomly mixed with the remaining twenty-four and shown one by one to the subject. The subject was asked to say “yes” or “no” as each card was shown, depending on whether or not he/she had seen it among the original twelve. After the memory tests, each subject was asked about the cues that he/she used for recall and also whether he/she had guessed that the experiment had to do with memory. Most subjects did not guess that the experiment had to do with memory. The results of those who guessed it to be so were discarded. If the subjects desired it, the nature of the research was fully explained to them.

In Treatment Condition Two, the sorting exercise was done as in the first treatment condition with each of the subjects. After that, the cards were collected and shown one by one to the subject who was invited to generate two words that rhymed with each of the experimental words. If the subject hesitated too long, the experimenter prompted the rhyme. Prompts were rarely necessary since the target words were carefully picked with an eye to “rhymeability”. The rhymes vocalised by each subject were written down by the experimenter to draw attention away from the memory nature of the task. Due to the prompts, a few subjects guessed that it was a memory test and their scores were later discarded. The rhymes were requested in order to induce phonemic elaboration of the target words. After an unexpected free recall test, a recognition test followed as in the first treatment condition. The subjects were then asked about the cues that they used for recall and whether they had guessed the nature of the experiment. The scores of those who guessed the memory aspect of the experiment were discarded.

The difference between the second and third treatment conditions was that the subjects in Treatment Condition Three were requested to generate two sentences using each target word instead of two rhymes for each item. This was done in order to induce semantic elaboration of each item. Sentences were supplied by the experimenter if there was a long delay. The supplying of sentences was needed only on two occasions, and one of the two subjects guessed that the experiment was one on memory and his scores were rejected. An unexpected recall test was followed by a recognition test in the second treatment condition. After the recognition test, the subjects were asked about the cues they actually used for recall and they were also checked out regarding their knowledge or otherwise regarding the memory nature of the experiment.
Once again, the scores of those who had foreseen a memory test were discarded. In this third treatment condition, retarded subjects were not asked to generate sentences. Instead, they were instructed to listen carefully to a standard set of sentences prepared by the experimenter (see Appendix). This was done because pilot testing had shown that some of the retarded subjects were incapable of generating suitable sentences of their own.

Hypotheses

1. That in each of the three treatment conditions, non-retarded subjects will recall (and recognise) a significantly greater number of items than the mentally retarded subjects.
2. That within each IQ level, there will be a significant difference in recall (and recognition) between those who elaborated the items (either semantically or phonemically), and those who did not elaborate (sorting only).
3. That within each IQ level, there will be no significant difference (and recognition) between those who elaborated phonemically (rhymes) and those who elaborated semantically (sentences).

Results

The experimental design consisted of two sets of variables, namely IQ levels (3) and treatment conditions (3). Although measures of two dependent variables, namely recall and recognition, were taken, only recall scores were analysed due to ceiling effects for recognition (at least six out of ten subjects in each group recognised all twelve items). TABLE I shows the number of subjects whose scores were used in the computations, the mean recall scores and the range of scores. The means are plotted in FIGURE 1. TABLE II shows the analysis of variance for recall. The analysis indicated a significant main effect for IQ levels, a significant main effect for treatment conditions, and a significant interaction effect. Post Hoc Scheffe tests done on the cell means are shown in TABLE III.

As can be seen from the tests, Hypothesis 1 is borne out for Treatment Conditions One and Three, but not for Treatment Condition Two in which the scores were identical. This shows that non-retarded subjects do not excel retarded subjects in recall performance under all conditions. Possible reasons for this may be complex and will be discussed later.

Hypotheses 2 and 3 are borne out for the mentally retarded subjects with remarkable clarity. Since only these two hypotheses are concerned with the theory of Anderson and Reder (1979), it would seem that their position is supported by the results of this experiment in the case of the mentally retarded adults.

The only significant difference within the level of non-retarded subjects is between the second and third treatment conditions. This result is consistent with Craik and Lockhart's (1972) original theory, namely that semantically encoded material would be recalled better than phonemically encoded material. It is inconsistent with the theory of Anderson and Reder (1979). However, this result may have been influenced by factors other than those discussed by either pair of authors.
### TABLE I
Mean Recall Scores

<table>
<thead>
<tr>
<th></th>
<th>Sorting Only</th>
<th>Sorting &amp; Rhymes</th>
<th>Sorting &amp; Sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low IQ</td>
<td>n = 10</td>
<td>n = 10</td>
<td>n = 10</td>
</tr>
<tr>
<td></td>
<td>Mean = 7.00</td>
<td>Mean = 9.00</td>
<td>Mean = 9.00</td>
</tr>
<tr>
<td></td>
<td>Range = 5 - 10</td>
<td>Range = 6 - 10</td>
<td>Range = 6 - 10</td>
</tr>
<tr>
<td>High IQ</td>
<td>n = 8</td>
<td>n = 8</td>
<td>n = 9</td>
</tr>
<tr>
<td></td>
<td>Mean = 9.5</td>
<td>Mean = 9.00</td>
<td>Mean = 10.80</td>
</tr>
<tr>
<td></td>
<td>Range = 7 - 12</td>
<td>Range = 7 - 12</td>
<td>Range = 9 - 12</td>
</tr>
</tbody>
</table>

### TABLE II
Analysis of Variance for the Two IQ Levels and Three Conditions of Learning

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F-ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between IQ Levels</td>
<td>1</td>
<td>30.8203</td>
<td>28.644823</td>
<td>0.000003</td>
</tr>
<tr>
<td>Conditions</td>
<td>2</td>
<td>13.6523</td>
<td>12.688589</td>
<td>0.0000031</td>
</tr>
<tr>
<td>Interaction Levels x Conditions</td>
<td>2</td>
<td>8.31641</td>
<td>7.729329</td>
<td>0.0011117</td>
</tr>
<tr>
<td>Error</td>
<td>54</td>
<td>1.07595</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE III
Significance of Differences in Recall Scores Between Groups

<table>
<thead>
<tr>
<th>Between Groups</th>
<th>F-ratio</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 and 2</td>
<td>16.586</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>1 and 3</td>
<td>16.586</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>2 and 3</td>
<td>0.000</td>
<td>N/S</td>
</tr>
<tr>
<td>4 and 5</td>
<td>1.61764</td>
<td>N/S</td>
</tr>
<tr>
<td>4 and 6</td>
<td>7.8535</td>
<td>N/S</td>
</tr>
<tr>
<td>5 and 6</td>
<td>15.056</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>1 and 4</td>
<td>25.044</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>2 and 6</td>
<td>0.000</td>
<td>N/S</td>
</tr>
<tr>
<td>3 and 6</td>
<td>15.056</td>
<td>p &lt; .05</td>
</tr>
</tbody>
</table>

N/S = Not Significant

Critical F-ratios

\( \alpha = .05 = 2.28 \times 5 = 11.9 \)
\( \alpha = .01 = 3.37 \times 5 = 16.85 \)

(df_1 = 5, df_2 = 54)
The difference between the scores of Treatment Conditions One and Three for the non-retarded subjects, although non-significant, shows a trend consistent with Anderson and Reder's theory. It is possible that the subjects in both groups analysed the items semantically, but those in Treatment Condition Three elaborated more.

When the subjects were asked to indicate the cues they used for recall, all the non-retarded subjects gave answers while only two mentally retarded subjects were able to explain how they remembered (they used their needs for groceries as cues in the sorting only condition).

Of the ten non-retarded subjects in the sorting only condition, five used the categories of food, furniture and clothing as recall aids, one was helped by "the things I liked", two went by the things they needed, and the other two were helped in recall by a combination of cues, namely, needs, categories, and visual images of the positions of the cards on the table.

Of the ten non-retarded subjects in the sorting and rhyming condition, five reported that they did not use rhymes as cues. Three of these non-users of rhymes used categories of items as cues and the other two went by the things they needed. Two of the non-users of rhymes said that the rhymes were more of an obstacle than a help in recall. Of those who used rhymes, two subjects used them in combination with visual cues (positions
of cards on the table) and categories, and one subject used them in combination with visual cues and things he needed. The remaining two subjects used rhymes with categories as cues, and one of them used rhymes in different ways, namely most recent rhyme, difficult rhymes, and non-typical rhymes. In spite of all this variety in the use of rhymes as cues, the user recalled only eight out of the twelve words.

Of the ten non-retarded subjects in the sorting and sentences condition, two subjects used only sentences as cues while two others used only categories as cues. The remaining six subjects all used the sentences as cues in combination with other cues (one with categories, one with categories and items he had chosen to buy), three with categories and the visual images of the positions of the cards on the table, and one with categories, items he chose to buy, and visual images of positions of cards on the table). Thus, eight subjects in this group used sentences as cues and eight subjects used categories, with six subjects using both sentences and categories.

Discussion

Although they were not instructed to classify or to remember, all the non-retarded subjects in the sorting only condition classified the items according to some criterion. While some categorised the items according to food, clothing and furniture, others classified the items according to things they did or did not need, or things they did or did not like. This amounted to a semantic analysis of the items although it was done without much elaboration. It is unlikely that the mentally retarded subjects classified the items spontaneously since earlier research (Ellis, 1970; Belmont and Butterfield, 1971) has shown that they rarely do so. This may account for the significant difference in recall between the two IQ levels in this condition of learning.

The generation of rhymes over and above the sorting (second condition) had opposite effects on the performance of the subjects at the two IQ levels. The significant increase in recall by the mentally retarded subjects may have been due to greater elaboration of the shopping-list items in the manner suggested by Anderson and Reder (1979). Although sorting alone did not induce much semantic processing in the mentally retarded subjects, the rhymes may have resulted in the encoding of the target words in more “propositions”. In the case of the non-retarded subjects, on the other hand, the rhymes may have interfered with the categories induced by the earlier sorting task. In fact, two of the subjects in this group did report that the rhymes were a hindrance. Even those subjects in this group who said that they did not use rhymes as cues for recall may have been hampered by them without realising it. It is also possible that only some people use rhymes as aids to elaboration and that mentally retarded persons are among those who do so. The interference effect of the rhymes may account for the small and non-significant drop in recall scores for the non-retarded subjects in this condition of learning.

The mean number of items recalled by the mentally retarded subjects in the second and third treatment conditions was identical. This result supports Anderson and Reder’s theory very well.
It is the quantity of elaboration that is critical for recall, and not the quality. It did not matter whether the elaborations were made by means of rhymes or by means of sentences.

In the case of the non-retarded subjects, the generation of sentences did result in an increase in memory performance over the sorting only condition (although non-significant). This trend in performance is in keeping with Anderson and Reder’s theory. Unlike in the case of the rhymes, it would appear that the sentences did not interfere with the earlier categorisation during sorting but probably built on it. In other words, the quantity of elaborations had been increased. The non-significance in the difference between mean scores in Treatment Conditions One and Three is consistent with Craik and Lockhart’s (1972) original theory. These authors said that there would be no difference in mean scores if two groups of subjects both processed the same information according to semantic considerations.

The significant difference in performance between the two IQ levels in Treatment Condition Three may have more than one explanation. One possibility is that the difference was caused by the source of the sentences. Whereas the non-retarded subjects generated their own sentences, the mentally retarded subjects had a standard set of sentences read out to them. Although the sentences in the standard set were comparable in complexity of elaboration and imagery to those generated by the non-retarded subjects, the effort made to generate the sentences may have contributed to better recall. Another possibility is that because the mentally retarded subjects probably categorised less than the non-retarded subjects during sorting, the total quantity of elaboration was less for the former.

Thus, while the recall scores of the mentally retarded subjects in this experiment are consistent with the theory of Anderson and Reder (1979), the scores of the non-retarded subjects are not. On the other hand, it seems that the performances of the non-retarded subjects may have been affected by extraneous variables such as interference and ceiling effects.

Despite the remarkable performance of the mentally retarded subjects consistent with Anderson and Reder’s theory, replications and refinements of the present study are desirable. Future research with non-retarded subjects should be done with more items (about 20 items instead of 12) in order to eliminate ceiling effects. There should also be greater control to minimise interference. Narrower IQ and age spans and similarity of background and occupation would assure greater homogeneity in the samples. It may be interesting to include a group of non-retarded subjects who are proficient in rhyming. Rhymes for such subjects are likely to increase the quantity of elaboration without interfering with the categories induced by sorting. Another possibility is to eliminate the sorting exercise from the experimental paradigm in order to prevent interference effects.

A further step, with both non-retarded and mentally retarded subjects, should be to examine individual differences in retrieval strategies. In the meantime, the results of the present study should be interpreted cautiously with an openness towards explanations other than Anderson and Reder’s (1979).

The results of this study could have a very useful practical application. Adults
with mental retardation who are being prepared to live as independently as possible in the community have several things to remember. Although deliberate strategies both external and internal, can be taught them, it would be too burdensome for them to use these deliberate strategies for everything that they have to remember. If the staff working with them could induce incidental learning of the greater number of things that need to be remembered by asking orienting questions, the mentally retarded people learning to cope with all the demands of daily living in the community could be greatly helped.

Appendix
Standard Sentences for Treatment Condition
Three for Mentally Retarded Subjects

1. The fat man sat on the old CHAIR.
2. This CHAIR has only three legs.
3. There is a round RUG on a square floor.
4. The small RUG is beside my bed.
5. I always drink COKE when I am thirsty.
6. Jane likes 7-Up better than COKE.
7. I sleep on a soft BED.
8. My friend has a queen-size water-BED.
9. My SHIRT has no collar.
10. My brother’s SHIRT does not fit me.
11. I have read this BOOK.
12. John did not find this BOOK at the book-store.
13. It is rude to chew GUM while talking.
14. Someone has put GUM on my chair.
15. I wear a COAT when it is cold.
16. Andy’s COAT was made of leather.
17. The baby’s SOCKS came up to his knees.
18. Donnie Osmond wears purple SOCKS.
19. I like to eat NUTS while drinking beer.
20. Squirrels like all kinds of NUTS.
21. It is good to wear a HAT when the sun is hot.
22. When I go to the rodeo, I wear a cowboy HAT.
23. I like to have a CAKE on my birthday.
24. CAKE is my favourite dessert.

Summary

Thirty mentally retarded adults and thirty non-retarded adults were tested for free recall under three conditions of incidental learning. The materials were twelve common shopping list items. The conditions of incidental learning were: (a) sorting the items into those that the subjects would buy and those that they would not buy, (b) sorting the items as in the first condition and then generating two words that rhymed with each of the twelve target words, and (c) sorting the items as in the first condition and then generating two sentences using each of the twelve target words. In the light of conflicting evidence, the two rhymes or two sentences were assumed to induce equal quantities of elaboration; the rhymes inducing phonemic elaboration and the sentences inducing semantic elaboration. The non-retarded subjects remembered more of the items when they formed sentences with them than when they generated rhymes, supporting Craik and Lockhart’s (1972) theory that semantically processed items will be better remembered. The mentally retarded adults remembered the items equally well under the two conditions of phonemic and semantic processing, supporting the theory of Anderson and Reder (1979) that it is the number of elaborations that leads to variations in recall.

Author’s Note

This research was done as part of a course project at the University of Alberta, Edmonton, Alberta, Canada.
References


