THE EFFECT OF ALLITERATION ON ACQUISITION AND RETENTION OF MEANINGFUL VERBAL MATERIAL

by

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STATEMENT BY AUTHOR

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF ILLUSTRATIONS</td>
<td>vi</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>vii</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>EXPERIMENT I</td>
<td>3</td>
</tr>
<tr>
<td>Method</td>
<td>3</td>
</tr>
<tr>
<td>Subjects</td>
<td>3</td>
</tr>
<tr>
<td>Materials</td>
<td>3</td>
</tr>
<tr>
<td>Procedure</td>
<td>4</td>
</tr>
<tr>
<td>Results</td>
<td>6</td>
</tr>
<tr>
<td>EXPERIMENT II</td>
<td>8</td>
</tr>
<tr>
<td>Method</td>
<td>8</td>
</tr>
<tr>
<td>Materials</td>
<td>8</td>
</tr>
<tr>
<td>Procedure</td>
<td>8</td>
</tr>
<tr>
<td>Results</td>
<td>9</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>12</td>
</tr>
<tr>
<td>APPENDIX A: SENTENCES EMPLOYED IN EXPERIMENTS</td>
<td>15</td>
</tr>
<tr>
<td>I AND II</td>
<td></td>
</tr>
<tr>
<td>APPENDIX B: QUESTIONS PRESENTED FOLLOWING STUDY</td>
<td>17</td>
</tr>
<tr>
<td>PERIODS</td>
<td></td>
</tr>
<tr>
<td>REFERENCES</td>
<td>18</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Analysis of Variance: Experiment I</td>
<td>7</td>
</tr>
<tr>
<td>2. Analysis of Variance: Experiment II</td>
<td>10</td>
</tr>
</tbody>
</table>
LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Example of method of sentence construction</td>
<td>5</td>
</tr>
<tr>
<td>2. Mean recall scores of Group 4 in Experiments I and II</td>
<td>11</td>
</tr>
</tbody>
</table>
ABSTRACT

Naturally occurring linguistic cues such as grammatical word order and rhyme have been found to facilitate learning of verbal material. In order to test the hypothesis that alliteration will also produce such facilitation, sentences were constructed which varied through four degrees of alliteration. Three independent recall groups were employed—immediate, 30-minute, and 1-week. Only length of retention interval produced a significant effect. It was hypothesized that the failure to find a significant effect for degree of alliteration might have occurred because Ss did not notice the alliteration. A partial replication was conducted with the addition of two types of attentional cues to insure that Ss would be aware of the alliteration. Both types of attentional cues were found to produce a significant increase in retention for the 30-minute and 1-week recall groups. It was concluded that in the presence of attentional cues, alliteration can be an effective aid in the recall of meaningful verbal material.
INTRODUCTION

Recent research in the area of verbal learning has investigated stimulus aspects with which Ss are familiar through formal language training and casual use of the language. Work by Miller and Isard (1963) has shown that intelligibility is highest for meaningful grammatical material. This result was confirmed by Marks and Miller (1964), who varied syntactic and semantic rules independently.

Simpson (1965) found that serial learning of word lists occurred more rapidly as a function of increasing approximation to sentence word-order. Cofer and Bruce (1965) indicated that form-class (part of speech) clustering was ineffective as a basis for recall of nonassociated words. Glucksberg and Cohen (1965) experimentally generated form-classes (noun or verb) for CVC's. Subsequently, they found appropriate paradigmatic (part of speech) associations to these CVC's. Rosenberg (1966) found that sentences with grammatical word order were recalled more easily than those with ungrammatical word order. Levy and Gentner (1967) reported that rhymed paired associates were learned more easily than unrhymed.
Alliteration, the stimulus parameter investigated in the present experiment, is also one with which Ss are familiar through previous experience. Alliteration may be defined as the repetition of the same sound at the beginning of two or more words within the same phrase or sentence. Perhaps the most famous (or infamous) example of alliteration is the familiar Peter Piper "tongue-twister." The degree of alliteration in four-word sentences was varied systematically. Subjects in Group 4 received completely alliterative sentences, while those in Group 0 received completely non-alliterative sentences. Groups 3 and 2 were intermediate with respect to degree of alliteration. Three independent retention intervals were employed for each group—immediate (immediate recall, IR), 30-minute (short-term recall, STR), and 1-week (long-term recall, LTR).

It was hypothesized that acquisition and retention would improve as a function of increasing degree of alliteration in the sentences to be learned. This improvement should be due to positive transfer of the Ss' pre-experimental experience, since early childhood, with linguistic patterns such as alliteration, rhyme, and meter.
EXPERIMENT I

Method

Subjects

Students in the introductory psychology classes at The University of Arizona served as subjects. Each experimental group (4 through 0) consisted of 90 Ss. These groups were in turn subdivided as described below.

Materials

Two equivalent sets of four sentences were constructed for each of the four groups. All sentences used are shown in Appendix A. The sentences presented to Groups 4, 3, 2, and 0 contained four, three, two, and no alliterative words, respectively.

Sentences were constructed as follows: Each Group 4 sentence was used as a basis for constructing an equivalent sentence for each of the remaining three groups. Every alliterative word was replaced by one of equal meaningfulness and frequency of occurrence according to the Lorge-Thorndike norms (Thorndike & Lorge, 1944). Replacement words were also equated to the original alliterative words in number of syllables. An example of this
method of sentence construction is given in Figure 1. Pattern changes (order of replacing alliterative words) were equivalent for the two sets in each group. Two orders of presentation were used for each set of sentences.

Procedure

Materials were presented in 8½ x 7 inch booklets (Bilodeau, Fox, & Blick, 1963). The four sentences of a set appeared on the first page, with the alternate order of the same set on the second page. A 1-minute study period was allowed for each page. The instructions read as follows: "STUDY THE SENTENCES BELOW." Half of the Ss received a given set of sentences with one of two orders of presentation first, while the other half received the alternate order first. For each set of sentences there were three independent recall sub-groups—IR, STR, and LTR. The recall period was 2 minutes in all cases.

In an effort to prevent rehearsal, particularly in the STR and LTR groups, all Ss were asked three questions about irrelevant stimulus parameters at the end of the study period. These questions are listed in Appendix B. The questions were included in an effort to give the Ss the impression that the study had been concluded and that they would not be requested later to reproduce the sentences they had studied.
Fig. 1. Example of method of sentence construction.

Each word in the Group 4 sentence is replaced by one of equal meaningfulness, frequency of occurrence, and number of syllables. Frequencies are given in the notation used by Thorndike and Lorge (1944).
Four degrees of alliteration and three retention intervals produced a $4 \times 3$ factorial design with a total $N$ of 360. An alpha of .05 or less was considered significant. Two methods of scoring were utilized—number of correct words in correct order, and number of correct words regardless of order. Minor spelling errors were scored as correct.

Results

Table 1 shows the results of the analysis of variance for Experiment I. No significant differences were found between the two scoring methods. For this reason, only the data for number of correct words in correct order were analyzed. The analysis of variance indicated a significant Retention Interval effect ($F = 397.32$, $df = 2/348$, $p < .001$). Degree of Alliteration did not produce a significant effect, nor was there a significant interaction.
Table 1

Analysis of Variance: Experiment I.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention Interval (A)</td>
<td>2</td>
<td>4847.28</td>
<td>397.32**</td>
</tr>
<tr>
<td>Degree of Alliteration (B)</td>
<td>3</td>
<td>7.12</td>
<td></td>
</tr>
<tr>
<td>Interaction: A x B</td>
<td>6</td>
<td>16.89</td>
<td></td>
</tr>
<tr>
<td>Within Cells</td>
<td>348</td>
<td>12.20</td>
<td></td>
</tr>
</tbody>
</table>

**p < .001
EXPERIMENT II

As noted above, degree of alliteration did not produce a significant effect in Experiment I. Since attention is known to be an important variable, an attempt was then made in Experiment II to draw the attention of the Ss to the alliterative nature of the sentences. Loss of alliteration would obviously have no effect if the alliterative cue had not been noticed. The same method was employed in Experiment II as in Experiment I, with the exceptions noted below.

Method

Materials

Only the Group 4 sentences from Experiment I were used, with two orders of presentation as before.

Procedure

Half of the Ss received the following instructions emphasizing the alliterative nature of the sentences: "STUDY THE SENTENCES BELOW. NOTE: WITHIN EACH SENTENCE, THE FIRST LETTER OF EACH WORD IS THE SAME." The remaining Ss studied sentences in which the first letter of each word was capitalized, again in an attempt to make the
alliteration a more salient cue. Two types of attentional cues and three retention intervals produced a 2 x 3 factorial design, with a total N of 180.

Results

The results of the analysis of variance for Experiment II are shown in Table 2. The analysis again revealed a significant Retention Interval effect ($F = 272.72, \text{df} = 2/174, p < .001$). The two types of Attentional Cues did not produce a significant effect, nor was there a significant interaction.

Three orthogonal comparisons were made between Experiment I and Experiment II to determine whether the attentional cues of Experiment II facilitated retention. The comparison between IR Group 4 without attentional cues (Experiment I) and IR Group 4 with attentional cues (Experiment II) did not show a significant effect ($t = .16, \text{df} = 522, p > .40$). However, the analogous STR and LTR comparisons both revealed significant effects produced by the presence or absence of attentional cues ($t = 3.11, \text{df} = 522, p < .01$ for STR; and $t = 2.64, \text{df} = 522, p < .01$ for LTR). Figure 2 compares the mean recall scores of Group 4, Experiment I, with those of Experiment II.
Table 2
Analysis of Variance: Experiment II

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention Interval (A)</td>
<td>2</td>
<td>2360.78</td>
<td>277.72**</td>
</tr>
<tr>
<td>Attentional Cues (B)</td>
<td>1</td>
<td>4.36</td>
<td></td>
</tr>
<tr>
<td>Interaction: A x B</td>
<td>2</td>
<td>5.60</td>
<td></td>
</tr>
<tr>
<td>Within Cells</td>
<td>174</td>
<td>8.50</td>
<td></td>
</tr>
</tbody>
</table>

**p < .001
Fig. 2. Mean recall scores of Group 4 in Experiments I and II.
DISCUSSION

The expected influence of degree of alliteration upon retention was not found in Experiment I. Degree of original learning, as measured by immediate recall, was found to be equivalent for all groups in both experiments. A significant Retention Interval effect was demonstrated by the results of the analyses of variance for both Experiments I and II. In the comparisons between the two experiments, a significant interaction between Attentional Cues (presence or absence) and Retention Interval was indicated by the fact that Attentional Cues produced a significant effect in the STR and LTR comparisons but not in the IR comparison.

It is difficult to account for the lack of a significant effect for Degree of Alliteration in Experiment I, particularly in the light of positive findings with similar naturally-occurring linguistic cues such as rhyme (Levy & Gentner, 1967). One possible explanation of this negative finding, of course, is that alliteration by itself is not a sufficiently useful cue for differential amounts to affect recall. In view of the findings of
previous experimenters with similar cues, this does not appear to be the most plausible explanation.

An alternative is that the multiple alliterative cues for each set of sentences produced interference rather than facilitation. Each of the four sentences in a set contained a different alliterative letter. For example, the alliterative words for a set might begin with g's, l's, b's, and s's. In essence then, there were four cues for each set. This problem of multiple coding cues has been discussed by Underwood (1965), who noted that such multiple cues may impair performance. This position is given some support in the present study by the fact that many Ss who failed to recall the material correctly, produced alliterative sentences using alternate letters in the material. This hypothesis could be tested using single sentences for each S and varying the degree of alliteration as before. The lengths of the periods allowed for study and recall would need to be shortened appropriately.

A third possibility is that the retention intervals employed were too short to demonstrate the effectiveness of degree of alliteration as a mnemonic device. It has not yet been determined whether the recall process after a 1-week delay period involves a short-term-memory
mechanism, a long-term-memory mechanism, or an intermediate process combining aspects of both. It is possible that alliteration functions as an effective aid to recall only in long-term memory. This possibility could be investigated by replication of Experiment I with longer retention intervals.

Results of the comparisons between Experiments I and II indicated that attentional cues facilitate use of alliteration as an aid to recall of meaningful sentences. This finding suggests a possible interaction between attentional cues (presence or absence) and degree of alliteration. This interaction could not be tested statistically in the present study, however, since only the Group 4 level of the alliteration variable was replicated in Experiment II. The generality of this effect should be determined by a further study in which all conditions of Experiment I are replicated with the addition of attentional cues.
APPENDIX A

SENTENCES EMPLOYED IN EXPERIMENTS I AND II

Group 4, Set A
All armies are alert.
Difficult duties demand diligence.
Lean lizards leap lightly.
Black bugs bother boys.

Group 4, Set B
Some soldiers salute swiftly.
Fine foods find favor.
Large lakes look lovely.
Good gardeners grow grass.

Group 3, Set A
Black bugs bother girls.
Lean weasels leap lightly.
Difficult duties require diligence.
Most armies are alert.

Group 3, Set B
Most soldiers salute swiftly.
Fine cooks find favor.
Large lakes are lovely.
Good gardeners grow trees.

**Group 2, Set A**
Most armies look alert.
Difficult problems require diligence.
Lean weasels leap swiftly.
Black bugs frighten girls.

**Group 2, Set B**
Good gardeners plant trees.
Large eyes are lovely.
Fine cooks find honors.
Most soldiers respond swiftly.

**Group 0, Set A**
Most armies look hostile.
Compelling problems require diligence.
Lean weasels jump swiftly.
Red bugs frighten girls.

**Group 0, Set B**
Most soldiers respond promptly.
Fine cooks win honors.
Blue eyes are lovely.
Young gardeners plant trees.
APPENDIX B

QUESTIONS PRESENTED FOLLOWING STUDY PERIODS

How many different sentences did you study?

The sentences that you studied were typed in
(a) all capital letters
(b) capital and small letters
(c) all small letters

Estimate the length of time allowed for each of the two study periods.
(a) 30 seconds
(b) 1 minute
(c) 2 minutes
REFERENCES


