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THE EFFECT OF RHYME AND METER ON ACQUISITION AND
RETENTION OF MEANINGFUL VERBAL MATERIAL

by

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I hereby recommend that this dissertation prepared under my
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ABSTRACT

Recent research in verbal learning has produced considerable evidence on the importance of natural language parameters such as syntax, semantic meaning, and word-order in learning and retention of meaningful verbal materials. To test the effect of rhyme and meter on the acquisition and retention of four-word sentences, three levels of meter were used: iambic, trochaic, and mixed (iambic and trochaic combined). Rhymed and unrhymed sentences were employed. Two independent recall groups were used (immediate and 1-week), producing a 2 x 2 x 3 factorial design with an N of 360.

The rank order for acquisition and retention of metered materials was as follows: trochaic > mixed > iambic. This rank order was consistent for both rhymed and unrhymed conditions. There was a significant meter effect for both acquisition and retention. A significant rhyme effect was found only in retention. There were no significant interactions. Possible explanations of these findings were discussed in terms of subjects' pre-existing language habits.

INTRODUCTION

Recent research in verbal learning has shown increased interest in meaningful verbal materials, in contrast to the traditional Ebbinghaus approach. In particular, research with characteristics indigenous to the English language, such as syntax and rhyme, has increased. Miller and Isard (1963) reported that intelligibility is highest for meaningful grammatical material. This finding was confirmed by Marks and Miller (1964) who varied semantic and syntactic rules independently.

In 1965 Simpson noted that serial learning of word lists occurred more rapidly as approximation to sentence word-order increased. Cofer and Bruce (1965) found that form-class (part of speech) clustering was not effective as a basis for recall of nonassociated words. Glucksberg and Cohen (1965) generated empirical form-classes (verb or noun) for CVC's and subsequently found appropriate paradigmatic (part of speech) associations to these CVC's. Rosenberg (1966) reported superior recall for sentences with grammatical word order than for sentences with ungrammatical word order. Levy and Gentner (1967) found that rhymed paired associates were learned more easily than unrhymed. Fagan (1969) reported that rhymed words, which do not elicit each other as free associates, cluster in

free recall. In that study no control group of non-associative, non-rhymed words was run to determine whether rhyme functioned as a learning-retention variable. Similar results were noted by Bousfield and Wicklund (1969).

Rogers (1970) reported that alliteration functions as a significant retention variable with meaningful verbal materials, but not as a learning variable. This finding was in contrast to the results obtained with most learning variables such as meaningfulness, which do not function as retention variables when degree of original learning is held constant.

Mandler (1967) has suggested that subjects store not only stimulus items or chunks of information, but a retrieval rule utilized in later recall. It seems logical that parameters such as alliteration, rhyme, and meter, with which subjects are familiar through formal language training and casual language usage should function as retrieval rules for meaningful verbal materials.

Results congruent with Mandler's approach to information storage and retrieval have been found for alliteration (Rogers, 1970). This research was designed to assess the possibility of similar retrieval roles for meter and rhyme.

Meter is the primary stimulus parameter investigated in the present research. Meter "is . . . a repeated formalized arrangement of specific rhythmical feet [Wood,

1942].” The most common English meter in poetry is the two-syllable iambic foot, in which an unaccented syllable (˘) is followed by an accented syllable (/). A less common, but still popular meter in English is the two-syllable trochaic foot in which an accented syllable (/) is followed by an unaccented syllable (˘). Three forms of four foot metric sentences were employed: iambic (I), trochaic (T), and mixed (M). Each mixed meter sentence was composed of two iambic and two trochaic feet.

Rhyme was an additional stimulus parameter investigated in this experiment. Rhyme may be defined as the correspondence in two or more words or verses, of terminal sounds (Webster's new collegiate dictionary, 1956). Half of the metered stimulus materials as defined above were rhymed (R) and half were unrhymed (U). Two independent recall intervals were employed for each group (immediate recall and 1-week recall) making a 2 x 2 x 3 factorial design with 2 levels of recall, 2 levels of rhyme, and 3 levels of meter.

It was hypothesized that retention of rhymed material would be superior to that of unrhymed material due to the presence of rhyme as a retrieval cue. It was also hypothesized that retention of iambic and trochaic materials would be superior to that of mixed meter sentences, due to the use of consistent meter as a systematic cue in recall. It was expected that retention

of iambic materials would be higher than that of trochaic materials since iambic meter has traditionally been more popular than trochaic meter in English poetry and therefore subjects have presumably had more experience with iambic meter (Wood, 1942). However, the difference between retention of iambic and trochaic metered sentences was not predicted to be significant since both of these meters occur frequently in English.

METHOD

Subjects

Students in the introductory psychology classes at The University of Arizona served as subjects. Each of the 12 groups consisted of 30 subjects ($N = 360$).

Materials

Six sets of four sentences each were constructed. These sets were as follows: iambic, rhymed (I,R); iambic, unrhymed (I,U); trochaic, rhymed (T,R); trochaic, unrhymed (T,U); mixed, rhymed (M,R); mixed, unrhymed (M,U). Each of the six sets of sentences was presented to two independent recall groups: immediate or short-term recall (S), and 1-week or long-term recall (L). This made a total of 12 groups.

Each sentence contained four 2-syllable words accented (by dictionary syllabication) according to the appropriate meter group of the sentence. All words were of AA or A frequency according to the Lorge-Thorndike norms (Thorndike and Lorge, 1944), making the sentences equal in frequency of occurrence of words. All sentences were grammatically and semantically correct. No alliterative words were used. Primary associates (as determined by the norms of Bilodeau and Howell, 1965) were eliminated from

each sentence. Two orders of presentation were employed for each set.

Procedure

Materials were presented in 8-1/2 x 7 inch booklets (Bilodeau, Fox, and 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 subjects received a given set of sentences with one order of presentation; half received the alternate order of presentation. For each set of sentences there were two independent recall groups--short-term recall (S) and long-term recall (L). The recall period was 2 minutes for all groups. Sentences were scored for number of correct words regardless of order. Minor spelling errors were scored as correct. All sentences used are shown in the Appendix.

RESULTS

The data were analyzed using a 2 x 3 analysis of variance for the acquisition data and a 2 x 3 analysis of variance for the retention data. Group means for the acquisition and retention data are presented in Table 1. Trochaic sentences were learned more easily than mixed sentences which were learned more easily than iambic materials. This order of acquisition was consistent for both rhymed and unrhymed materials. Rhymed sentences were slightly superior to unrhymed sentences under all three meter conditions.

Table 2 shows the results of the analysis of variance for acquisition and retention. The analysis of variance for acquisition indicated a significant Meter effect ($F = 18.9$, $df = 2/174$, $p < .005$). Rhyme did not produce a significant effect, nor was there a significant interaction.

As indicated above, group means for the retention data are presented in Table 1. These data reflect the same relationships reported above for acquisition. Trochaic sentences were retained better than mixed sentences which were superior to iambic sentences; this result was found under both rhymed and unrhymed

Table 1. Group Means

	Rhymed	Unrhymed
	<u>Acquisition</u>	
Trochaic	15.0	13.9
Mixed	14.2	13.4
Iambic	11.7	11.4
	<u>Retention</u>	
Trochaic	5.5	3.2
Mixed	4.3	3.1
Iambic	1.9	1.5

Table 2. Analyses of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
<u>Acquisition</u>				
Rhyme	1	24.0	3.2	--
Meter	2	140.0	18.9	<.005
Rhyme x Meter	2	2.0	--	--
Within Cells	174	7.4		
<u>Retention</u>				
Rhyme	1	76.0	6.5	<.025
Meter	2	113.5	9.7	<.005
Rhyme x Meter	2	12.0	--	
Within Cells	174	11.7		

conditions. Retention of rhymed sentences was better than unrhymed sentences under all three meter conditions.

As noted previously Table 2 shows the results of the analysis of variance for retention. The analysis of variance indicated a significant Rhyme effect ($\underline{F} = 6.5$, $\underline{df} = 1/174$, $\underline{p} < .025$). There was also a significant Meter effect ($\underline{F} = 9.7$, $\underline{df} = 2/174$, $\underline{p} < .005$). There was no significant interaction. Results of Scheffé tests run subsequent to analysis of variance are reported as they become relevant in the discussion.

DISCUSSION

In the present experiment, rhyme did not have a significant effect in acquisition. This finding is in conflict with the results of Levy and Gentner (1967). This disparity might be due to the difference in stimulus materials. Levy and Gentner used paired associates as opposed to the meaningful sentences employed in the present study. It is possible that rhyme functioned as a more powerful cue in the paired associate task when no unrhymed stimuli were presented. In the rhymed conditions in the present experiment, only the terminal word in each four word sentence was rhymed. In addition, rhyme may have been more easily noticed and therefore utilized in learning in the relatively stimulus-poor conditions of the Levy and Gentner study.

Rhyme was found to have a significant facilitating effect in retention. This finding, coupled with the null result for rhyme in acquisition, suggests the possibility that rhyme may function as an organizational retrieval variable. Similar results have been reported for alliteration (Rogers, 1970) which was found to facilitate retention but not acquisition. No comparison can be made here with Levy and Gentner since no retention group was employed in that study.

The finding that rhyme facilitates retention but not acquisition may be considered to have both theoretical and practical implications. While many learning variables have been found, relatively few retention variables have been demonstrated. These include degree of original learning, length of retention interval, and alliteration. To this list rhyme may be added. With respect to theories of information processing such as that of Mandler, this finding emphasizes the complexity of the processes of storage and retrieval. A subject may use different processes and cues to store (learn) and retrieve (retain) the same item of information. The facilitating effect of rhyme on retention but not on acquisition illustrates this point clearly.

The effect of meter in this experiment was significant in acquisition and remained so in retention. Differences in means among metered conditions were comparable for both acquisition and retention, suggesting no recall effect separate from differential amount of original learning. Trochaic (14.5) and mixed meter (13.8) conditions differed by 0.7 in acquisition; in retention, trochaic (4.4) and mixed meter (3.7) conditions also differed by 0.7. Similarly, mixed (13.8) and iambic (11.6) meter conditions differed by 2.2 in acquisition; mixed (3.7) and iambic (1.7) meter conditions differed by 2.0 in retention.

It had been originally hypothesized that recall of iambic meter materials would be better than that of trochaic meter materials which would be better than that of mixed meter materials. It was found, however, that while trochaic was better than mixed meter, iambic was the poorest of the three; this rank order was obtained for both acquisition and retention. Scheffé tests indicated that iambic differed significantly from both trochaic meter ($\underline{A} = 252.2, p < .10$) and mixed meter ($\underline{A} = 149.6, p < .10$) in acquisition. In retention, iambic differed significantly only from trochaic ($\underline{A} = 210.4, p < .10$). Trochaic and mixed meter did not differ significantly in either acquisition or retention.

The superiority of trochaic over iambic meter was unexpected since, as noted before, iambic meter is more common in English poetry than trochaic meter. The mixed meter, composed of half iambic and half trochaic words, was found to be intermediate between trochaic and iambic in both acquisition and retention. These findings suggested that subjects might have failed to respond to the overall meter of a sentence. Subjects may have responded instead only to the meter of the individual words. This would explain why mixed meter sentences were of intermediate difficulty.

The reversal of trochaic and iambic is not so clear. If however, one proceeds with the thesis that

subjects were attending to, chunking, or encoding by word rather than sentence then the question arises as to whether subjects might have had more experience with trochaic than iambic words, excluding the meter of the overall sentence. While the iambic meter is more popular in poetry, there are no norms on footage for prose or conversation. One might obtain an estimate however by taking a random sample of 2-syllable words from the dictionary and calculating the ratio of trochaic to iambic units. Presumably if one foot occurred more frequently, subjects might be assumed to have had more practice throughout life in learning and retention of that meter.

Such a sample was taken from the dictionary (Webster's new collegiate dictionary, 1956). In a 500 word sample 398 words were trochaic and 102 were iambic, a ratio of 4 to 1. It would appear that as discrete units there are more trochaic words than iambic words in English. Subjects then have had greater experience with trochaic words than with iambic words.

Continuing with this line of reasoning, if subjects have had more experience with trochaic units, which are therefore easier to learn and recall than iambic units, one would expect to find evidence of this in the mixed meter groups. The data for all mixed meter groups were examined and all correctly recalled words were tabulated as trochaic or iambic. A comparison of the totals showed that

significantly more trochaic than iambic words were correctly retrieved (Chi square = 6.1, df = 1, p < .02).

In this experiment rhyme was found to have a significant effect in retention, but not in acquisition. This finding is similar to that previously reported for alliteration. Meter, however, was found to have a significant effect in both acquisition and retention. The meter effect appeared to be due to subjects' responding to individual words rather than to the overall meter of the sentences. The lack of interaction between rhyme and meter indicates that subjects responded to these stimulus characteristics independently.

In short, these findings may be added to a growing body of research illustrating the importance of organizational variables in learning and retention. It would be of considerable interest to extend this research to other meters, stimulus materials, and subject populations.

APPENDIX

SENTENCES EMPLOYED IN THE EXPERIMENT

Iambic, Rhymed

Police advance without delay.
Results appear complete today.
Machines require direct commands.
Success provides increased demands.

Iambic, Unrhymed

Correct advice prevents defeat.
Police indeed allow escapes.
Results appear complete today.
Machines require direct commands.

Trochaic, Rhymed

Nature always offers beauty.
Women handle kitchen duty.
Soldiers enter battle dangers.
Churches often welcome strangers.

Trochaic, Unrhymed

Money often causes trouble.
Daughters marry husbands quickly.
Armies seldom question orders.
Children almost never hurry.

Mixed, Rhymed

Machines handle business accounts.
Churches welcome increased amounts.
Women students become delayed.
Sometimes babies remain afraid.

Mixed, Unrhymed

Women alone enjoy money.
Success often provides trouble.
Machines handle business accounts.
Babies remain afraid sometimes.

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