Effects of Different Terminal Sounds on Short-term Memory for Initial Consonant Sounds

If more items are presented than are to be recalled, the additional items produce a large amount of 'stimulus interference' in the recall of the remaining items. This is true under conditions where subjects have complete knowledge of the items that are not to be recalled, this knowledge being possessed by the subjects before, during, and after presentation of the list. Even though subjects know which items to ignore, they cannot ignore them completely, and therefore the extra presented items interfere with the memory trace for the items to be recalled.

The purpose of the present experiment is to investigate stimulus interference in short-term recall under conditions where the number of items presented is constant, but the items in some lists contain more phonemes or 'longer' phonemes than the items in other lists. As in the previous experiment, it is important to control for response interference by holding constant the amount to be recalled. In this experiment subjects are to recall the six initial consonant phonemes of a list of six artificial items, each item consisting of a consonant followed by a vowel (CV) or a consonant followed by a vowel and another consonant (CVC). Within any one list the terminal vowel or terminal vowel and consonant are the same for each item in the list. Some of the terminal vowels and consonants are 'longer' than others in temporal duration in ordinary English speech. The experiment described here is designed to determine: (1) whether items that consist of three phonemes (CVC items) produce more stimulus interference in the recall of the initial consonant of the items than items that consist of two phonemes (CV items); (2) whether temporally longer terminal phonemes produce more stimulus interference in the recall of initial consonants than shorter terminal phonemes.

Subjects listened to a 'ready' signal, followed after 1 sec by a list of six artificial items, followed immediately by recall of the six initial consonant phonemes. Correct recall consisted of filling-in six boxes with the correct consonants in the correct order. Presentation of the artificial items was at a rate of two items/sec, and 15 sec was provided for recall. There were six conditions, each with four sub-conditions. The six conditions are six different types of lists, each type of list being a list consisting of one type of item: (SV) consonant followed by a short vowel ('a' as in father, 'e' as in let, 'i' as in bit, or 'u' as in but), (LV) consonant followed by a long vowel
Table 1. ERRORS IN ORDERED RECALL OF INITIAL CONSONANTS (%)

<table>
<thead>
<tr>
<th>Type of terminal</th>
<th>Terminal phonemes</th>
<th>Vowel (V)</th>
<th>V + k</th>
<th>V + z</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short (SV)</td>
<td></td>
<td>41.5</td>
<td>44.2</td>
<td>45.3</td>
<td>43.7</td>
</tr>
<tr>
<td>Long (LV)</td>
<td></td>
<td>38.2</td>
<td>47.6</td>
<td>45.3</td>
<td>44.0</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>40.3</td>
<td>45.8</td>
<td>45.3</td>
<td>43.8</td>
</tr>
</tbody>
</table>

('a' as in made, 'e' as in eat, 'i' as in bite, or 'o' as in hope), (SV + k) consonant followed by a short vowel followed by the short consonant 'k', (LV + k) consonant followed by a long vowel followed by the short consonant 'k', (SV + z) consonant followed by short vowel followed by the long consonant 'z', (LV + z) consonant followed by long vowel followed by the long consonant 'z'. A typical list of items in condition (SV + k) was as follows: pak, dak, gak, vak, bak, kak. The four subconditions in each condition are the four possible vowels that can be used in each condition. The order of presenting the 6 × 4 = 24 conditions was random in blocks of 24, and there were 5 blocks in the experiment, making a total of 120 experimental lists. Each experimental list contained six different initial consonants chosen from the following set of 13 consonants: b, d, f, g, k, l, m, n, p, t, v, z. Scattered at random through the experimental lists were 15 lists with some initial consonants appearing in more than one item in the list: 5 with one item repeated once, 5 with two items repeated once, and 5 with three items repeated once. The purpose of this was to prevent any strategy based on a belief that no initial consonant was ever repeated. Subjects were 39 M.I.T. undergraduates taking psychology courses who participated in the experiment as a part of their course requirements.

As given by Fletcher, the duration of the different short and long vowels and consonants is as follows: a (0.306 sec), e (0.219 sec), i (0.211 sec), u (0.280 sec), å (0.305 sec), ø (0.341 sec), i (not given), ò (0.325 sec), k (0.075 sec), z (0.230 sec). The average duration for these short vowels is 0.254 sec and for the long vowels is 0.324 sec. Obviously, the absolute duration of each sound depends on the rate of talking; what is important for our purpose is the relative durations of the sounds.

Scoring each item in each list as one opportunity for error yielded the ordered recall error rates for each condition that are reported in Table 1. The results are quite clear. Neither terminal vowel duration nor terminal consonant duration had any effect on recall. Increasing the number of terminal phonemes from two to three by adding a single terminal consonant consistently increased

Table 2. 'k' AND 'z' INTRUSIONS (% OF OPPORTUNITIES FOR ERROR)

<table>
<thead>
<tr>
<th>Type of intrusion</th>
<th>SV</th>
<th>LV</th>
<th>SV + k</th>
<th>LV + k</th>
<th>SV + z</th>
<th>LV + z</th>
</tr>
</thead>
<tbody>
<tr>
<td>'k'</td>
<td>2.3</td>
<td>3.2</td>
<td>2.6</td>
<td>3.1</td>
<td>2.7</td>
<td>3.5</td>
</tr>
<tr>
<td>'z'</td>
<td>2.7</td>
<td>1.4</td>
<td>2.2</td>
<td>3.3</td>
<td>2.5</td>
<td>1.6</td>
</tr>
</tbody>
</table>
Health

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produce the interference.

However, it is clear that it is the presence of an extra

consonant phoneme, not the conceptual distinction, that

producers the interference.

Hence, it is clear that it is the presence of an extra

consonant phoneme that gives rise to these possibilities in the present

form of the semantic priming effects for the initial-consonant

example. In the present case, the number of cases for the initial-

consonant may work against the number of cases for the

remaining consonants. They cannot do so completely. The

remaining consonants, if not edited, may have to ignore the

even though subjects report they do not to ignore the

remaining consonant.

It is clear that the unusual interference of the terminal

consonant is not related primarily to differences in the

interference. There is no significant difference in the

interference is not specific to k, and z, conditions.

and z, conditions, and k, conditions. However, the increase in k,

about 0.5% per cent. Further, the increase in k

approximately 0.5% per cent. Further, the increase in k

The table shows that the interference is not the case. The

shows that the interference is not the case. The

keeps pitting in mind during recall of the

terminal consonants that are different from the terminal

consonants that are different from the terminal

consonant. The possible explanation of the interference found might be

One possible explanation of the interference found might be

100-0

The overall difference between conditions with and without

100-0 > d/z + ΔT and less than that in ΔT + ΔT was significantly less than the

(100-0 > d/z + ΔT) and less than that in ΔT + ΔT was significantly less than the

the error rate for initial consonants. The error rate for