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The Letter Position as Facilitative or Debilitative in Word Retention of EFL Learners

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ABSTRACT

This study concerns the effect of letter position on the retention of words by EFL learners. Given the fact that everyone has a mental lexicon, we would suggest that words are possibly organized in alphabetical order, then it would be likely for the learners to retain the words easily when exposed to the first letters of given words. The study attempts to find whether the letter position enhances word retention. Three different positions of letters were selected: first, middle, and final letters. The chosen words have the same number of syllables and stress pattern. Running repeated measures ANOVA, as the appropriate statistical analysis, The 212 subjects of this study demonstrated much better retention when exposed to the first letter in comparison with the middle and final letters. The finding can be used in the classroom to help students recall the words that they already knew.

INTRODUCTION

It is mostly believed that knowing the language is tantamount to knowing the vocabulary or words of that language. According to Fromkin and Rodman (1988), speakers of any language know how to pronounce words in varied contexts. They also know what these words mean and how to combine them in different ways to make simple phrases and complex sentences. This signifies that they are well aware of their syntactic category (word class or part of speech). Fromkin and Rodman view this knowledge as a component of the grammar called the Lexicon.

In order to derive meaning while listening or reading, the reader/listener must trigger his/her stored knowledge about words that are presented to him/her either visually or orally. The mental state of knowledge about words, i.e., mental lexicon, contains the same kinds of information that are found in a good dictionary, although the organization of this dictionary is perhaps quite different from ordinary dictionaries available. The lexicon incorporates all the words and morphemes in our vocabulary and that is why it can be thought of as our mental dictionary by specifying the spelling of the words, their pronunciation, meaning and part of speech.

This internal lexicon has been the subject of studies of different sorts since there are some questions that call for accurate and adequate answers. Garman (1990) states that internal lexicon

can be taken as the representation of words in long-term memory. If we believe this fact, then we should be able to provide answers for the following questions:
1. How are words stored?
2. What are they made of?
3. How are words related to each other?
4. How do we use them?
5. What is actually listed in the mental lexicon: phonemes, morphemes, words?
6. How do we activate the meaning of words, i.e., lexical access and word recognition?

Garman (1990) views lexicon as “comprising two components, stored word meanings and stored word forms, together with access paths that allow these components to communicate with each other, and with other elements in the processing hierarchy” (p. 243).

It is believed that lexicon exists although there is no consensus on its components. Now the question is how these pieces of information included in the lexicon are accessed? Traditionally, lexical access has been conceptualized as follows: lexical access begins with word identification. Tsai (2001) asserts that the orthographic or phonological input is encoded and then the encoded input is used to find the best match in the mental lexicon. According to Garnham (1985), "lexical access is the retrieval of a word from the lexicon on the basis of perceptual and conceptual information" (p. 43). Word recognition is achieved when the input has been identified. Words are recognized in different ways among which we can name Morton's (1969, 1970, 1979, 1980) Logogen model and Forster's (1976, 1979) Search model. Master File or Mental Lexicon in Forster's Search model plays a significant part in word recognition. After constructing a full perceptual representation of the input, a comparison is made between this representation and the representation of words stored in access files. Access files are subdivided into bins. Bins are searched to find a word; when a match is found, information becomes available from the corresponding entry in the Master file or Mental Lexicon. One way in which the access file is used in word recognition could be that they are divided up into bins by the initial letter or sound. Forster suggests that when we look up a word in a dictionary or any other alphabetically organized listings, we scan the input word for its letter sequence; during the search process, “the stimulus properties of the auditory signal guide the search initially to the right area, or bin of the relevant access file, but subsequent search of the bin is in order of frequency of the items stacked in it, from the topmost, high frequency, items of downwards” (p. 268), Garman (1990) contends. However, the exact nature of the search model, Garman continues, is vague. He says that “it might be based mainly on initial elements, or initial and final elements, or syllable structure, or stressed-vowel qualities, or some mixture of these” (p. 268). This study is prompted by the idea that the letter sequence may have an effect upon retention of the words stored in the lexicon.

REVIEW OF RELATED LITERATURE

The Mental Lexicon

Garman (1990) states that the mental state of knowledge about words is referred to as the mental lexicon, as it contains the same kinds of information that are found in a good dictionary, although the mental lexicon and, say, the Oxford English Dictionary are organized very differently; the mental lexicon specifies how a word is spelled, how it is pronounced, its parts of speech and what it means; two kinds of information are used in word recognition: perceptual and contextual; the perceptual information, in the case of written words, comes from a pattern recognizer that detects such things as straight lines and curves, their relative position and possibly the overall shape of words; contextual information comes from the preceding part of the current words, from pictures associated with the words (for example, in advertisement), from objects in the real world (for example, in scenes that are being described) and from shared knowledge, including knowledge of cultural norms. There exist a number of definitions for mental lexicon among which is the followings:

- The mental lexicon is the repository/storehouse of unpredictable information. (Stonham, 2004)

- Internal lexicon is the representation of words in long term memory. (Garman, 1990)

- Mental lexicon contains information such as, pronunciation, word class/part of speech, meaning, spelling. (Garnham, 1985)

As for the above-mentioned definitions, mental lexicon has been compared to a mental dictionary, but there are some differences between dictionaries and mental lexicon. First dictionaries are inflexible -- fixed at point of publication whereas the mental lexicon is fluid – adapts to changes, e.g. new words. Second, dictionaries often contain information not normally available to the speaker: etymology, cognates (related words in other languages), and obscure or obsolete forms, etc. Also, dictionaries often lack information on the most recent forms and meanings of words. However, what matters is the systematicity found in both on the basis of which some predictions can be made on the order on which mental lexicon is arranged.

The question of how words are stored in the mental lexicon – the brain's repository of lexical knowledge – has attracted a large volume of research in recent decades. A number of powerful paradigms have been developed for studying speech production and perception. As Shillcock, Kirby, McDonald, and Brew (2001) cite, several major themes have emerged.

First, the role of phonology has been investigated. There have been many strong claims that the phonological form of words determines the functional structure of the mental lexicon. We can name Fay and Cutler (1977) who pointed out that in malapropisms the target word (e.g., monotony) and its erroneous substitute (e.g., monogamy) are alike in their initial segments, number of syllables and stress pattern. They conclude that there is a single mental lexicon organized for speech perception and production. Thus, the exigencies of spoken word recognition take precedence, being the aspect of language processing that is under the individual listener's control. A second claim for the priority of phonological representation comes from those researchers who argue that the point at which a word is first learned – its Age of Acquisition – conditions its processing in adulthood (Brown & Watson, 1987; Gilhooly & Logie, 1982). In this view, the first words to be stored in the mental lexicon's phonological space are at an advantage compared with later arrivals, which must accommodate themselves to the presence of the earlier words.

Secondly, the role of meaning is considered. According to Ellis, Young, and Critchley (1989), such impairments as category specific impairments, happening when the processing of a particular semantic class of words may be disproportionately impaired, can give us some information on the organization of lexical and conceptual knowledge. They provide an example of a patient who might be able to recognize a stimulus as a dog but be unable to identify it as Lassie, the collie that starred in the popular TV series. This idea, perhaps, constitutes some of the most provocative evidence concerning the organization of lexical and semantic knowledge (McKenna & Warrington, 1993; McNeil, Cipolotti & Warrington, 1994). Connectionist models have been presented in which feature-based semantic representations allow such effects to emerge, either as the result of sparser coding for certain classes of word (Plaut & Shallice, 1993) or because the lexicon organizes itself topographically, so that similar words are grouped together in a semantically organized physical space (Miikkulainen,1997). Unlike Fay and Cutler's (1977) earlier proposal for single, phonologically arranged lexical entries, this last proposal involves separate systematic coding of semantic and phonological information.

Third, localist and distributed representation are envisaged. Both Morton (1969) and Forster (1976) believe that mental lexicon involve localist lexical representations, in which a word is stored at an individual address or node. Over the last fifteen years, the lexicon has also been modeled in terms of distributed mappings between orthographic, phonological and semantic representations (Hinton & Shallice, 1991; Plaut, McClelland, Seidenberg & Patterson, 1996; Plaut & Shallice, 1993; Seidenberg & McClelland, 1989). Such connectionist models involve superpositional storage: all the lexical information of a particular type is stored across the same representational substrate. In this sense, an individual word's role in the lexicon is constrained by all of the rest of the words in the lexicon. The notion of a single linguistic entity being defined in relation to all other such entities also emerged many years earlier in the structuralism developed by Saussure, but without a concern for processing behavior and without any computational implementation.

Next, the issue of lexical neighbors was approached. When researchers have approached the issue of interference or facilitation between lexical representations, the relationships studied have overwhelmingly been between close neighbors in lexical space, such that might exist by changing one segment in a spoken word or one letter in a written word (Coltheart, Davelaar, Jonasson & Besner, 1977; Luce & Pisoni, 1998). Sometimes these neighbors share a ryhme (e.g., Marslen-Wilson, Moss & vanHalen, 1996), a word beginning (Marslen-Wilson & Welsh, 1978), or a sequence of segments representing the whole of the smaller word (McQueen, Norris & Cutler, 1994; Shillcock, 1990), but the two words in each relationship have typically sounded similar in a clear, intuitive sense. Demonstrations of interactions between such words have allowed researchers to make inferences about the functional architecture of the mental lexicon.

Afterwards, lexical categories were deemed significant in the architecture of the mental lexicon and lexical access thereof. Words fall into different syntactic categories: noun, verb, adjective, adverb, preposition, pronoun, and so on. These categories themselves fall into two broader types: function words and content words. This latter distinction has attracted a large volume of research built around the observation that function words and content words may be differentially impaired, as in Broca's aphasia (Goodglass & Kaplan, 1972; Menn & Obler, 1990), and differentially processed in normal speaking and listening (Cutler, 1993) and reading (Chiarello & Nuding, 1987). Such differences may partly depend on physical distinctions between the two word types; in English, function words tend to be shorter, more frequent and less acoustically prominent than content words. However, function words are also seen as being more closely

involved in the articulation of syntactic structure (Cann, 2000), and seem to be better processed in the left hemisphere (Mohr, Pulvermüller & Zaidel, 1994). Significant distinctions in typical phonological form have also been observed between different types of content word: for instance, in English, nouns tend to contain more nasals than verbs, whereas verbs tend to contain more front vowels than nouns (Sereno, 1994). All these differences between lexical categories suggest possible large-scale distinctions in the functional and even the physical architecture of the mental lexicon.

Finally, we are to consider the question of lexical variables and their effect on lexical processing. There has been a consistent interest in developing and testing individual dimensions of lexical variation, such as word frequency (Howes & Solomon,1951; Whaley, 1978, Monsell, 1991), polysemy (Jastrembski, 1981), concreteness-abstractness, imageability (Paivio, Yuille & Madigan, 1968), age of acquisition (Gilhooly, 1984), ease of predication (Jones, 1985), and contextual distinctiveness (McDonald, 2000; McDonald & Shillcock, 2001). The goal in each case has been to demonstrate that the variable in question can account for a unique and significant part of the variance in participants' performance in lexical processing tasks, and to provide an independent motivation for that variable. Word frequency is the paradigm example: typically it accounts for a substantial fraction of the variance in tasks such as visual lexical decision or naming, and can be motivated by the Hebbian notion that a frequently activated representation becomes progressively more securely stored and easily activated (Monsell, 1991). However, word frequency is correlated with the age at which an individual tends to acquire a particular word, and several researchers have proposed that Age of Acquisition is the true cause of the effects previously attributed to word frequency (Brown & Watson, 1987; Morrison, Ellis & Quinlan, 1992). Many of the lexical variables listed above are similarly interrelated, often very highly, and there are substantial problems in experimentally disconfounding the roles they may play in processing (Morris, 1981). The way that these variables interrelate remains a subject of continuing research.

Now it is worthy to ask a question on the content of mental lexicon, that is to say, lexical entry. According to Levelt (1989):

> A lexical entry is an item in the mental lexicon, consisting of a lemma, its lexical concept (if any), and its morphemes (one or more) with their segmental and metrical properties. Each lexical entry is composed of lemma and lexeme. Lemma contains semantic and syntactic information such as word meaning and part of speech while lexeme contains morphological and formal information such as different morphological variants of a word, spelling and pronunciation. (p. 182)

Collins and Quillian (1969) Hierarchical Network model assumes that lexical entries are stored in a hierarchy, with features attached to the lexical entries. Either stored in a hierarchy or in any other way, the point of significance is the systematicity which dominates not only access, recognition, storage but retention of these entries as well. Now the question is how these pieces of information are accessed.

Morton's (1969, 1979) Logogen model put forth the idea of direct access stating that if perceptual input contains a feature of a particular word, then the feature count of its logogen is incremented, for example, whenever low level visual analysis identifies the feature 'curve at left-hand end of word', the feature count of all logogens for words beginning with C, G, O, Q goes up, if the word is in capital letters. Each logogen has a threshold level at which it 'fires'. The threshold is set so that it is reached only if it is almost certain that the input is the word corresponding to the

logogen. When the logogen fires the corresponding word is made available as a response, and all the logogens return to their resting level (zero feature count), though this process takes some time. In this original version of the model once a logogen fires, a word has been recognized and the logogen system prepares for the next input.

Forster (1976, 1979) provided another model called Search model. Contra direct access model, a complete perceptual representation of the input is first constructed. This representation contains the featural information that, according to Morton, is fed directly into logogens. In order to discover which word the perceptual representation corresponds to, it is compared with representations of what words look like or sound like, stored in access files. The comparisons are made one after the other in an order that is determined by the listing of the entries in the access file – i.e., the access files are searched for a match. The access files are peripheral to the mental lexicon itself, and allow entries in it to be retrieved. There are three access files, the orthographic for recognizing written words, the phonological for recognizing spoken words, and a syntactic/semantic access file used in language production. This last access file allows words with given syntactic and semantic properties to be located for insertion into sentences. The entries in the access file are searched in order, and when a match is found, information becomes available from the corresponding entry in the master file or mental lexicon proper. This entry contains all the information about the word, duplicating much from the access files. Forster's model is not a pure search model. He suggests that the access files are subdivided into bins. Only one bin needs to be searched to find a word, and access to the appropriate bin is direct. However, Forster proposes that when a non-word is presented, almost all of the bins may be searched. One way in which the access file used in word recognition could be divided up into bins is by initial letter or sound.

This prompted the researchers to investigate the effect of phoneme position on the retention of words. For the purpose of this study, it is assumed that mental lexicon is organized alphabetically; therefore supplying subjects with initial letters of words helps the access and the following retention. This, as a matter of fact, brings up the following question to which we attempt to find an answer. These hunches, if turned out to be true in the course of the study, assist us in putting forward the idea that if words are organized in alphabetical order in mental lexicon, they are easily retainable when first letter of a given word is presented vocally or in print. The main question, thus, is as follows:

1. Are there any differences between the letter position in words and the learners' retention of words?

METHOD

Participants

The participants of the study are Persian speakers learning English as a foreign language. Two hundred and twelve adult students studying in an English institute took part in the study. They

are a heterogeneous group since they are from different ages, with different fields of study and various levels of English command.

Instruments

The instruments consist of eight different tests, each appropriately-developed to be within the realm of students' knowledge since they are selected from the book -- *New Interchange* -- taught in eight different levels. For each level, there are 15 words divided into three groups providing first, middle, or the last letters with their definitions provided. These words are chosen considering their similar stress patterns and syllables. Below you can find the sample words for these positions: in number 1, the first letter has been provided; in number 2, the middle letter has been exposed; and in number 3, the last letter has been placed as a cue for the learners to find the right word with regard to the definitions provided on the right column. . As is clear, the number of syllable, stress pattern and in most cases the number of letters are the same.

1.	**b** e- a- c- h-	**sandy place near the sea**
2.	e- a- **r** l- y-	**not late**
3.	p- a- r- t- **y**	**a gathering, e.g., birthday, wedding**

PROCEDURES

It is noteworthy that for every word the meaning is provided so that semantic features of the words help the learners to retain the previously-learned words. These words have been taught in the course of one semester. Towards the end of the term, the subjects are exposed to the list of 15 words with meanings during one session with a limited time for answering. This action is practiced to control recognition time, since if they have much more time, they probably resort to some other strategies such as guessing to fill out the blanks somehow. Therefore, due care has been taken to limit the amount of time available for the learners to go through the required task.

DATA ANALYSIS

By comparing the means of subjects' performances on words with different letter positions in Table 1, the superiority of first letter over the other two gets substance. Also, the final letter has a more determining role in retaining words in comparison with the middle letter.

Table 1. Descriptive Statistics of Three Letter Positions

Letter position	Mean	Std. Deviation	N
First letter	4.09	1.078	212
Middle letter	3.02	1.437	212
Last letter	3.45	1.350	212

Now to see if the difference among the three letter positions in retention of words by learners is significant or not, repeated measures analysis of variance is run, since the independent variable i.e., letter positions, has three levels: first letter, middle letter, and ending letter. Table 2 shows that tests of within subject effects demonstrated the priority of the first letter position in the words.

Table 2. Repeated Measures ANOVA Results for Differences between the Three Letter Positions

	Type III sum of squares	df	Mean square	F	Sig.
Letter position	123.123	2	61.561	86.922	.000
Error	298.877	422	.708		

Table 3 illustrates pairwise comparisons revealing that the difference between the first, middle and last letters are of significance, i.e., F > L > M. Moreover, the last letter takes the second place while the middle letter is the least effective one.

Table 3. Pairwise Comparison of the First, Middle, and Last Letter Positions

Letter positions		Mean difference	Std. Error	Sig.
First	Middle	1.071*	.085	.000
	Last	.642*	.070	.000
Middle	First	-1.071*	.085	.000
	Last	-429*	.088	.000
Last	First	-642*	.070	.000
	Middle	.429*	.088	.000

As can be seen in Figure 1, the first letter has priority over the other positions.

Figure 1. The Difference between Letter Positions in Learners' Retention of Words

CONCLUSIONS

Data analysis indicated a significant difference between letter positions and learners' ability to retain words, that is to say the result corroborated the hypothesis made at the beginning of the study. What this result is indicative of is the systematicity of mental lexicon upon which many have consensus. When learners are able to retain a word when exposed to first letter as a cue, it shows that it is very likely that the words are represented, accessed, and retained in the brain not in random, but in an organized way. If we can compare the lexicon in our brain to some sort of mental dictionary, it seems logical to think of some order in the organization of this dictionary. We can think of alphabetical order, or rhyming order or meaning-based order. Standard dictionaries are usually based on alphabetical order and if lexicon is akin to standard dictionaries, then the initial letter gets significance in the organization of words.

Now one may ask if this is the case, why can learners retain words easier when they are provided with the last letter than middle letter? The following hunches have passed the researchers' mind: In English language consonants accompany other consonants or vowels. The word *frost*, for example, has a CCVCC pattern. If this is the case, then the syllable segmentation of words more than one syllable is much easier for the last letter/s than the middle one, since the number of the vowels occurring in the middle are galore and since learners cannot match or put the vowel in the right cluster, not only access is more difficult but the touching the right word seems unlikely as well. When a word is broken into its syllables, vowels are often clustered with consonants while a consonant, by itself, can make up a syllable; therefore, the retention would be easier when the learners try to put at least two phonemes together rather than one single phoneme in the form of a vowel. However, learners express difficulty finding the right word for both middle and last letter.

Tip-of-the-tongue (TOT) phenomenon is the state of knowing a fact or name, but not being able to recall or retrieve the information from memory right away. Brown and McNeill (1966) used definitions of the dictionaries and asked the students to guess the initial letter. Although they

could not guess the right words, they could come so close to that particular word. According to Collins and Quillian (1969) in TOT state, people can often recall partial information about the word (e.g., length, number of syllables), or letters of sounds within the word, and related words. People guess the first letter about 50% of the time better than chance. People use partial information to cue memory for the word or fact e.g., knowing a name begins with J lets us narrow down to John, James, and Jenny, etc. If we take the first letter as a cue for the learners to retain the word, then the aim of our study becomes crystal clear. We can suggest that standard dictionaries be organized alphabetically regarding the language orthographical system; accordingly, the first letter plays a vital role in the classification of dictionaries.

However, the results of the study showed that middle letter has the weakest influence of the three positions, while this could have been the case with the final letter position if we believed in the alphabetical order of the words, since the middle letter appears prior to last letters. Therefore, further research is required to delve into the grounds for better performance of subjects on final letters than middle letter positions.

SUGGESTIONS FOR FURTHER RESEARCH

It is worth noting that the study has some delimitations. First, the participants were a heterogeneous group as far as their proficiency is concerned; therefore, the result may have been different if we had taken proficiency into account. Second, the age of them ranged from 20 to 35, so the result could have been affected if the age was controlled. It would be a new idea to further investigate the probable effect of age on the retention of words by providing partial information that is to say, exposing learners to letters of words in different positions. Besides, time limitation is not tightly controlled so the other variables may have had some effects on the retention of words by learners. Finally, they were just exposed to written cues while there is a possibility of having quite different performance if they are exposed to oral cues.

APPLICATIONS OF THE STUDY

This study not only helps psycholinguists to put forth the idea of the ordering of mental lexicon, but aids the teachers to adopt some cognitive strategies in order to assist students remember and in consequence retain words longer in their memory. Teachers can present the previously mentioned words by their first letter visually or orally and ask students to guess what the word is either individually or collaboratively; in so doing, the students can probably keep the words in their mind much longer; this happens, for they have been involved in performing the task which activated their mind to reach the intended lexical item.

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