Mental Lexicon

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The paper discusses the concept of mental lexicon and related studies in the area of mental lexicon. How words are learnt, arranged in the mind is an interesting area for both researchers and teachers of language. An understanding of how words are retained would help the teachers in improving the language of their learners. The paper covers research findings in this area.

The term 'mental lexicon' refers to the arrangement of words in one's mind. Franklin and Emmorey (Murthy, 1989) define mental lexicon as follows- "The mental lexicon is that component of grammar that contains all the information-phonological, morphological, semantic, and syntactic- that speakers have about individual words and morphemes." Psycholinguists have found that a word is stored along with its phonological and orthographic (in the case of educated speakers) shapes and which in turn, are related to the syntactic and semantic aspects. Information about lexicon has been chiefly gathered from language impaired individuals, or aphasics, from speech errors like malapropisms, lexical decision tasks (the subject to decide whether a string of letters or sounds is a word of the language or not, and the time taken for judgment is measured). Evidence from these studies suggests that "Information about a word is not represented in a listener's mental lexicon as an indivisible concept. The representation appears instead to have discrete parts…." (Foss & Hakes in Murthy, 1989). Psycholinguists in the area of mental lexicon have conducted many studies on how words are arranged in the mind, on the aspects of memory and retention of both first and second languages. There is a continuous debate on the aspects of acquisition and learning of words which is discussed in the next section.

Acquisition and Learning

Channel (Carter & McCarthy, 1988) suggests that second language is regarded as acquired by a learner when the meaning of a word can be recognized and understood (rather than used), both in and out of context and it can be used naturally and appropriately in a relevant situation. Learning covers the conscious strategies employed by a learner that lead to acquisition. Learning is the process and acquisition is the end result.

Word Acquisition

It is generally assumed that the words a learner comes across in listening and reading are receptive words and the words that are used in speaking and writing are productive words. Taking the definition of acquisition of vocabulary given above, receptive acquisition precedes productive acquisition. Continuous research is going on to find out how acquisition takes place from the stage of reception to that of production and whether the knowledge levels remain the same or not. But it is assumed by many theorists that words remain a part of receptive capacity and not of productive capacity. In this context, Fay and Carter (Carter, 1988) propose that the direction of mapping in mind is *meaning to sound* during production and *sound to meaning* during comprehension. This led to the perception that there could be two listings

of words in the mind. Research into the framework of mental lexicon of bi-linguals or poly-linguals is inconclusive. Some studies seem to point to separate listings of words, while others say that there is only a single lexical store. Researchers are also trying to find out how words are organized in the mind both for mono and multi-linguals. In this context it is apt to quote Milton's description of planets in 'Paradise Lost' to describe the word-store in mind.

> ...Mazes intricate
> Eccentric, intervolved, yet regular
> When most irregular they seem.

Planets appear to the untrained observer to roam randomly round the night sky, yet in fact their movements are under the control of natural laws which are not obvious to the naked eye. There is no doubt that words are organized into an intricate, inter locking system, the underlying principles of which were interpreted from 'speech errors', 'slip of the tongue' etc that would be discussed in the next sections.

The Language and the Memory

When a person knows a word it means (a) that the word is stored in the individual's mind from where it can be retrieved when required, and (b) that the word is stored in a particular manner which enables the individual to not only recall it (that is to bring it out of storage) when necessary, but also to recognize and comprehend it during listening or reading and to produce it while speaking or writing. Both comprehension and production of language are complete processes involving an individual's memory which contains mental lexicon (or lexicons, if the speaker knows two languages) which is also known as the human mental dictionary, or the human word store.

There is a clear distinction between short term memory (STM) and long term memory (LTM). The LTM is said to contain the mental lexicon. In the LTM, a person has a stock of words which are organized and represented in a way enabling easy recall or retrieval, which speaks of a close connection between language and memory.

Variables Affecting Memory

Studies cited by Aitchison (1997) on the relationship between language and memory reveal that verbal as well as non-verbal memory is affected by a number of variables, such as the frequency of the word- which refers to how often the word occurs in common speech and writing and the image arousing capacity of the word. Imagery is considered to be the most important variable affecting memory, for it has been observed that high-imagery words are easier to remember than the abstract words. The more often the word occurs, the greater the possibility of it being remembered. Almost all studies on memory have found that high frequency words, that is, those words that are used most in verbal communication, are the easiest to remember. Meaningfulness of a linguistic unit too aids better recall and helps better retention unlike the nonsense words which are difficult to recall, as was found by a number of experimental studies **(**Murthy, 1989).

Studies were also conducted on the variables affecting memory for both verbal as well as nonverbal units. Results have shown that a number of factors like linguistic variables such as the phonological structure, and grammatical category of the word affect retention. Verbal material, therefore, has to be structured and organized in a particular way in the mental lexicon for the individual's long term memory.

Retention and Storage of Words in the Mental Lexicon

Native speakers of a language almost certainly know more words than they imagine. Most people behave like rustics in the *Deserted Village* by Oliver Goldsmith. The rustics gather round the village school master, whose verbal knowledge amazes them:

Words of learned length
and thund'ring sound
Amazed the gazing rustics
rang'd around
And still they gaz'd, and still
the wonder grew,
That one small head could
carry all he knew.

While admiring the word power of the school master, the rustics did not realize that the word-store within each of their heads was probably almost as great as that of the teacher. Many are perplexed by the use of words by certain people and even wish to have word power like them. How is it that some can speak well while others not, though their knowledge of words is the same? Psychologists have shown that human memory is both flexible and extendable, provided that the information is properly structured. Random facts and figures are extremely difficult to remember, but enormous quantities of data can be remembered and utilized, as long as they are well organised. How the words are retained and recollected quickly is still being researched upon.

Experiments on Word Recollection and Errors in Speech

Not only do native speakers have such a huge storage of words, they can also recognize a word of their language in 200 ms (milliseconds) or less from its onset. Aitchison (1997) discusses some experimental studies on mental lexicons which can be summarized as follows:

1. One of the experiments, "speech shadowing task" is a fairly common technique in psycholinguistic experiments. The experimenter asks the subjects to wear headphones into which a stream of speech is played. Subjects repeat what they hear. People who are good at shadowing can repeat the speech with a delay of a little more than 250 - 275 ms around one quarter of a second. If 50 - 75 ms is taken up for the actual response, when it is deducted from the overall time, a figure of 200 ms (one fifth of a second) is the time taken for "processing" words (For more details of such studies refer Aitchison 1977). One fact is clear. Based on the large number of words known to humans and the speed at which they are recollected, the existence of a highly organized mental lexicon is evident.

2. Another experiment relates to non-words. Here the subjects will be given words and non-words, and be asked to press a bell as soon as they hear a non-word. In an experiment the subjects did this surprisingly fast, in just less than half a second (450 ms) from the point at which the sound sequence diverged from being a possible real word. This suggests that speakers are able to conduct an orderly search through their mental word store in a surprisingly short length of time. Though many are very fast at producing words as they speak, the process of production is difficult to measure. Some researchers tried by giving explanation as to why pauses occur before major local items like word searching for difficult words. Many subjects in a study had the experience of not being able to think of a particular word, though they were given other clue words to get the right word. However, the knowledge of words and the speed at which they are located indicates a highly organised mental lexicon.

3. People search for words in real life as the psychologist William James has rightly said, "We make search in our memory for a forgotten idea, just as we rummage our house for a lost object. In both cases we visit what seems to be the probable neighborhood of that missing item" (Aitchison, 1997). The intermediate stage in which a person struggles to get the right

word gives clues to the general idea of word organisation in mind. Closely related words may be stored together or they may be more distant but have strong links binding them. Sometimes a searcher remains completely blocked in the mind and speakers use round about ways to get the target word.

4. Slips of the tongue or involuntary errors that occur in spontaneous speech give clues about speech mechanisms. First, when speakers pick a wrong word and make an error, momentarily they think that they got the right word. Unlike word search they do not try for a round about way of getting meaning and it helps in witnessing the results of normal retrieval process. Secondly slips of the tongue are recurring types of errors from which the nature of normal process involved can be investigated.

5. Error on meaning and similarity in sound or both provide clues to the storage of words in mind, e.g. *I wonder who invented crosswords (jigsaws)?*

He came tomorrow (yesterday).

Sound

The emperor had porcupines (concubines)

Meaning and Sound

You can near the clarinets (castanets) clicking.

Meaning Blend

I don't expose (expect / suppose) anyone will eat that.

Sound Blend

Akbar Khan was an illustrious (lustful / illustrious) and passionate man.

Sound and Meaning Blend

My tummach (tummy /stomach) feels funny.

Source : Murthy (1989)

Findings on Storage of Words in Mind Network Models

Research in memory suggests that words are stored and remembered in a network of associations. These associations can be of many types and linked in a number of ways. Words in our mental lexicon, for example, are tied to one another not only by meaning, form and sound but also by sight (Nattinger, 1988).

Collins and Quillian's Network Model

Collins and Quillian's Network Model, (Aitchison, 1994**)** proposes that words are organized in hierarchical networks and each node in the network has a label and is related to other nodes through relationships such as hyponymy or super-ordination, antonymy, collocations and coordination.

Collocational and co-ordinate links have been found to be the strongest, as the results of a number of word association tests reveal. Co-ordinates are words that are generally grouped together on the same level of detail, e.g. 'hot and cold' or 'tall and short'. Speech errors, particularly blend, show how strong co-ordinate links can be between words, e.g. *'herrible'* for *terrible/ horrible'*, 'boast' for *best /most, Romsky* for *rose/Chomsky'* (Murthy 1989).

Similarly, collocation links are easy to activate since such words occur together frequently and the presence of one calls for the other. Super ordinates or hyponyms do not form such strong links. e.g. 'dogs', 'cats', 'tigers', 'lions' etc., are all hyponyms of the super-ordinate category, 'animal'. Yet, the relationship among each of these hyponyms is stronger than their relationship with the super ordinate term, 'animal'. Word substitution errors rarely involve super ordinates; rather hyponyms (which amongst themselves are coordinate) are given as substitutes in such errors. e.g. the four blind children instead of four deaf children. Links between a larger category and its members

appear to have more strength, generally, if the members happen to be prototypical members of a category.

Set Model Theories

The semantic feature theory put forward by Katz and Fodor (Aitchison 1994) was based on the assumption that every word has a core meaning, with a number of non-essential facts surrounding it. Katz and Fodor proposed a list of what they considered to be the hard-core essential meaning of a word in terms of features. The often-quoted example of the word 'bachelor'; to explain the notion of features: the essential core meaning of the bachelor is 'unmarried'. But just this one feature is not adequate, for people do not say 'a tadpole is a bachelor' or 'she is a bachelor'- 'human', 'male' and 'adult' also essential features of the word. Thus, 'unmarried, human, male and adult, can be considered the component of 'real meaning' of 'bachelor', that is each of these features is absolutely necessary to label a person 'a bachelor'.

Prototype Theories

One way the fuzzy, diffused meanings of words are represented, suggest the proponents of the prototype theories, is that people have a concept of what constitutes a class of things and tend to match features of the objects encountered, which as they consider as composing of the essence of that particular class of objects. The essence of the theory of prototype is that an entry in the mental dictionary is centered on a representation of the prototype members of the class that the word denotes. The fuzzy theory also takes into account the fuzziness of meaning, because new and damaged members of a class can be included in the set, e.g. *a lame dog* is still judged sufficiently like a dog to be accepted as an example of the class '*dogs'*, though it has only three legs as against the prototypical one which has four legs.

The notion of prototype also attempts to link perceptual or physical identities of objects with semantic memory by positioning what is known as the 'basic level category'. For example, certain members of a class have optimal prototypical features to differentiate them from others. Apples, oranges, potatoes, carrots and honey share some important features of the class 'food', but retain their difference as individual categories such as fruit, vegetables etc. within the class of 'food'. Such models relate to stereotyped notions that people have about things around them, for instance, a particular breed of cats being more of cat rather than others. However, in all the three major theories discussed so far, meanings are decomposed into features or labeled networks each time words are processed.

Interpretation

The natural word acquisition process (as this occurs in first language acquisition) consists of a gradual acquisition of various properties of a word through repeated exposures in a wide range of authentic contexts. This idea illustrates various concepts: there is a general agreement that in a natural (mother tongue) word acquisition process several stages may be recognised. They cannot always be clearly distinguished because learning a word is an incremental process that gradually develops with repeated exposure and because of constant interaction among the various stages.

Conclusion

From the above discussion it is clear that repetition of the words in the classroom and association of words into groups would facilitate better retention. The findings of psycholinguists provide greater insight into retention of vocabulary. Words of the same category are retained better than de-contextualised teaching. Teachers can develop tasks for second language vocabulary teaching based on the theories suggested in

the paper. Since the mental lexicon reveals the fact that words of the same type are retained better than words learnt in isolation, various strategies that involve contextual guessing, categorizing words into types, repetition of words through activities that revise words at various intervals should be introduced by the teachers and the material developers to facilitate learning of a new language.

References

Aitchison, J. (1994). *Words in the Mind: An Introduction to the Mental Lexicon*, second edition, Oxford, Blackwell.

Aitchison Jean. (1997). *The Language Web The Power And Problem of Words*. Cambridge, Cambridge University Press.

Brumfit, C. (2001). *Individual Freedom in Language Teaching*. Oxford, Oxford University Press.

Carter, R & Michael McCarthy. (1988). *Vocabulary and Language Teaching*: USA, Longman INC.

Coady, J. & Huckin (Eds) (1997). *Second Language Vocabulary Acquisition.* Cambridge, Cambridge University Press.

Cohen, A. D. (1987). The Use of Verbal and Imagery Mnemonics in Second Language Vocabulary Learning. *SSLA, 9.* 43-62.

Cowan, J. R. (1974). Lexical and Syntactic Research for the Design of EFL Reading Materials. *TESOL Quarterly. 8,* 389-399.

Drummond, D. & Edna, W.N. ed.(1979). *Reading A Resource Book.* London, Heinemann Educational Books.

Ellis, N.C. (1997). *Vocabulary Acquisition: word structure, collocation, word class and Meaning.* In Schmitt & MaCCarthy eds. (1997). pp.122-139.

Fowler, H.G. (1962). *A Wealth of Words.* London, Macmillan &Co.

Gairns, Ruth & Stuart Redman. (1986). *Working With Words*. Cambridge, Cambridge University Press

Gallo Patrick & Deng Xudong. (2002). *Getting On Line Help With Words*. Guidelines December. 24, 21

Hedge, T. (2000). *Teaching and Learning in the Language Classroom*. Oxford, Oxford University Press.

Hunt, R. & Henry, C et al., (1972). *Fundamentals of Cognitive Psychology.* New Delhi, TaTa Mc Graw Hill.

Laufer, B. (1997). *What's in Word that Makes it Hard or Easy: Some Internal Factors that Affect the Learning of Words*. In Schmitt & MaCCarthy eds. (1997) pp. 140-155.

Murthy,L.(1989*). The Representation of Hyponyms in the Bilingual's Mental Lexicon. A Psycholinguistic Study.* Unpublished M. Phil Dessertation. Hyderabad. CIEFL

Schmitt & MaCCarthy ed. (1997) . *Vocabulary Description Acquisition and Pedagogy .* Cambridge. Cambridge University Press.

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