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Importance of Word Recognition in Listening Comprehension of English as a Foreign Language

Tomoko YAMAGUCHI

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This paper first of all focuses on the recognition of individual words by auditory presentation for exploring word recognition in listening comprehension, and reveals the relations between word recognition and listening comprehension from both aspects of the speed and level of activation of word recognition. It also clarifies the relations between word recognition with the effects of sentence context and listening comprehension, raising the level of language materials by auditory presentation from words to sentences. Moreover it refers to the effects of training program to promote word recognition for instruction aimed at the advancement of listening comprehension. As a conclusion, it shows pedagogical implications for practical instruction in English language education.

Key words: word recognition, listening comprehension, Japanese EFL learners

1 Introduction

Language competence for communication with others is one of the representative functions of the human brain. It was acquired when the ancestors of human beings started to walk on two legs, and then a language acquisition device (LAD) developed in the human brain by nature (innatist hypothesis). It goes without saying that the relations between language and the brain is very profound and complicated. In interpreting language the mechanism of the brain cannot be ignored.

Therefore this research explores the situation and development of language ability in Japanese EFL (English as a Foreign Language) learners from a psycholinguistic point of view. Above all the case of listening comprehension, at which they are very poor in communication in English, is described.

Although researchers theoretically capture various kinds of phenomena which are discovered when a person perceives and learns an object, and explore the various factors in cognitive science, there is no practical suggestion to develop cognitive competence further in individuals. So in this paper an effective method of learning for the development of a second (foreign) language from theories proved by psycholinguistic methods is derived and the possibility of utilizing it for foreign language teaching and the teaching materials in practical education is discussed.

2 Survey of Previous Studies on English Word Recognition

Listening comprehension has information processing such as phoneme perception, word recognition, syntactic analysis and propositional construction. Hayashi (1991) describes the cause of difficulty in listening comprehension at sentence level as insufficiency in processing individual words. Hayashi says that word recognition is fundamental to information processing of language. Japanese learners in an EFL environment have few opportunities to be exposed to spoken language, and the frequency of learning basic words by auditory input is low. As a result, it is difficult for them to recognize each word, and they are poor at listening comprehension. Moreover it is pointed out that learners whose proficiency level is low may not

be able to use contextual information at all because they cannot recognize each word.

In dealing with such Japanese EFL learners, Ito (1989) states that although those with low proficiency in listening comprehension feel difficulty in the process of word recognition in particular, if they can accurately recognize words in utterances visually, the degree of listening comprehension of utterances rises greatly. The knowledge of vocabulary and grammar which Japanese learners have is useless unless they can accurately recognize each word contained in English utterances. This reflects the situation that Japanese EFL learners acquire foreign language from written texts at first, and shows that it is difficult for them to understand language information only by auditory input because they depend on visual stimuli more than auditory stimuli. Moreover he describes how comprehension by speech sounds, viz., listening comprehension is useful to distinguish learners' English language competence and appropriate as a method for the testing of their competence because the difference of comprehension between the upper group and the lower group tends to be greater in the case of presenting only speech sounds than when a written text is added.

According to Rivers (1971), the process of listening comprehension consists of three stages; sensing, identification and rehearsal & recoding. The biggest barrier for Japanese EFL learners is in the transition stage from sensing to identification, i.e., the stage of recognizing lexical items contained in English physical sounds after listening to them. Vocabulary which is understood by sight is much less than that by hearing (Ito 1989).

Considering the circumstances mentioned above, we see that listening comprehension is especially difficult for Japanese EFL learners because they have a problem in the first stage of listening comprehension where they cannot recognize speech sounds.

Exploring the point at issue in listening comprehension of Japanese EFL learners, the importance of word recognition in spoken language processing is made clear. There are, however, few studies which pursue word recognition in listening comprehension from different angles with scientific methods in English language education.

3 Isolated Word Recognition in Spoken Language Processing

3.1 Word recognition in reading comprehension and listening comprehension

In listening comprehension the speed of processing is important to understand utterances following the current of spoken language controlled by the speaker. Perfetti & Hogaboam (1975) revealed the relationship between single word decoding and reading comprehension skill for native speakers of English. They found that vocalization latencies to single printed words are shorter for the skilled group than the less skilled group, and there is an interaction between word type and comprehension skill. The comprehension groups showed large vocalization latency differences for pseudowords and for low frequency English words, but smaller differences for high frequency English words. In addition, according to Sakaki (1994), the same phenomenon is found in the relationship between listening comprehension skill and word recognition in a lexical decision task (LDT) in Japanese EFL learners. That is to say, skilled listeners identify spoken words quicker than are less skilled listeners. In general language competence in the first language (L1) or second language (L2), it can be realized that the speed of language information processing is important assuming that learners have the linguistic knowledge. It is proposed here to use the speed of language information processing for a measure of learners' competence in English. It, however, cannot be said that sufficient studies have focused on the importance of word recognition in listening comprehension for Japanese learners in an EFL environment.

3.2 Relation between listening comprehension and word recognition speed

It was confirmed that the word translation latency of good learners is significantly more rapid than that of poor learners for both high frequency words and low frequency words in the listening comprehension of L2 (Yamaguchi 1998). It was noticed that good learners can perform smooth, consecutive word processing in listening because the speed with which they perceive the phonemes of a word, retrieve it from the mental lexicon of L2, and recall an equivalent word from the mental lexicon of their L1 is very fast. Paivio, Clark & Lambert (1988) states, according to their bilingual dual coding theory, that the linkage of bilinguals between words of L1 and those of L2 as equivalent terms in translation is stronger than the linkage between synonyms of L1 or L2, and this linkage is strengthened by the experience of learning the words. This means that the higher the proficiency level of L2 learners, the stronger the linkage is between L1 and L2 in the mental lexicon.

This means that there is already a big difference between good listeners and poor listeners when it comes to not only low frequency words but also high frequency words. This fact supports the contention that there is a difference in listening comprehension skills between learners even though the words which are required in listening are much easier, basic words and structures than those of reading.

From this we can see that there is already a big difference in response time between good listeners and poor listeners even at word level. It is taken for granted that a difference comes about in listening comprehension skills when this phenomenon occurs successively. Good learners finish word processing and relate to the preceding words heard, expect the next words coming all while a word is given as auditory input. On the other hand, poor learners remain in the current word.

3.3 Relation between listening comprehension and concept representations of words

In Yamaguchi (2001), a word-association test where the English words were controlled by their concreteness was conducted in order to explore the level of activation in the mental lexicon quantitatively and qualitatively. From this, we can see that the number of response words to the stimulus words by auditory presentation was influenced by the level of listening comprehension and the kind of words. In other words, good listeners can recall many various kinds of related words to stimulus words from their mental lexicon right after listening to a particular word. It is considered that their linkages among words are easy to activate. On the other hand, poor listeners cannot recall many related words from the mental lexicon, and it is considered that their linkages among words are difficult to activate.

As this situation is repeated, the speed of word recognition becomes more rapid because the linkages among words in the mental lexicon of good listeners are often strengthened, or the distances among words are often shortened. On the contrary, in poor listeners the speed of word recognition does not become very rapid because the linkages among words in the mental lexicon are not so strengthened, or the distances among words are not so shortened by the little activation by inputted words.

Moreover it was found that the effect of concreteness was especially remarkable in the good listeners. It can also be seen that the effect of concreteness in poor listeners was not as big as that in good listeners because they could not recall many related words even in the concrete.

For the concrete words, the ratio of relation of Category-Exemplar was the largest by far in both of the good listeners and the poor listeners. It is expected that words representing concrete matters would be categorized in the mental lexicon and each word is stored in order in a certain category. The second largest ratio indicated the relation of Exemplar-Exemplar which means the equivalent relation of individual matters which have common points. All the same it seems that

words are arranged in definite categories in the mental lexicon. The third largest ratio indicated the relation of Syntagma. It is considered that words inputted as syntactic units of phrases, clauses, sentences, etc. are closely arranged also in the mental lexicon.

For the abstract words, the ratio of relation of Category-Exemplar was the largest by far for both of the good listeners and the poor listeners. It is also expected that words representing conceptual matters would be categorized in the mental lexicon and each word is stored in order in a certain category. The second largest ratio indicated the relation of Syntagma. It shows that words inputted as syntactic units at the same time are closely arranged in the mental lexicon just as they are regardless of word concreteness. The third largest ratio indicated the relation of Antonym/Pair. It is considered that more antonyms and pairs of words exist as the association of pairs in the mental lexicon for conceptual matters than for concrete matters.

In both conditions of the concrete words and the abstract words, the smallest ratio indicated the relation of Synonym. It seems that words which have almost the same meaning were not so much inputted in the mental lexicon and the expression of paraphrases was still poor at the present stage of learning of the subjects.

Considering the properties of response words of good listeners, it is expected that if learners are made to input as many as possible words based on a definite rule, an effective lexical instruction can be developed because the categorization of English words is explicitly held before being inputted to the mental lexicon. A practice of producing many words one after another by the input of a word is considered to be a kind of instruction for listening comprehension.

4 Word Recognition in Context in Spoken Language Processing

4.1 Context effects of word recognition

Word recognition in sentence context differs from word recognition of individual words, and is constrained by context semantically and phonetically. Namely there is a semantic aspect and a phonetic aspect in context effect to word recognition. In the former the competence to identify a word works as top-down processing and word recognition is promoted by the influence of the other words in a sentence. By this influence the meaning of synonyms is defined and smooth processing is maintained. On the other hand, the latter makes phoneme perception difficult because the phonetic changes of words, e.g. liaison, elision, assimilation etc., happen in a sentence. Word recognition is carried out including automatic inference by lexical effect and phoneme restoration effect in listening comprehension where many words in sentences have to be processed on line.

Not only long-term memory which retains the knowledge of words but also working memory which maintains information inputted through echoic memory in phonological loop and process searching words from long-term memory has a great influence on listening activity. Hutatsuya (1999) describes that the content of information in phonological loop is maintained just as it is when authentic utterance is inputted and only the number of items able to be pronounced within two seconds can be maintained. Moreover short-term memory span is determined by the speed of repeating, i.e., the number of items to able to be pronounced within two seconds. When a sentence becomes long in listening comprehension, learners at a certain level have difficulty in recognizing words because its length exceeds the number of items able to be pronounced within two seconds and spoken language processing cannot catch up with speaker utterance.

In this way word recognition with sentence context includes both aspects of the effect of promotion and the effect of restraint, and the degree of difficulty in comprehension seems to be determined by their interaction. In this regard, the recognition of individual words and words with sentence context is different. Good learners in listening comprehension can fully utilize the effect of promotion and minimize the influence of the effect of restraint by top-down processing.

On the other hand, poor learners in listening comprehension cannot fully utilize the effect of promotion in context, and it is likely to maximize the influence of the effect of restraint. Therefore it is expected that the difference between good listeners and poor listeners increases in the recognition of words with sentence context as against individual words.

In Yamaguchi (2001), a partial dictation task was conducted for 15 minutes in the experiment. List A including high frequency words as target words was presented to one group, and List B including low frequency words as target words was presented to another group. The English sentences were presented for only one time at random one by one from a tape recorder. Right after the auditory presentation of each sentence, a sentence where only the target word was a blank was visually presented with a flash card for 10 seconds. The subjects were instructed to fill in the blank in the answer sheet for the word which they listened to.

As a result, it was revealed that when the length of sentences is long, the difference between the good listeners and poor listeners becomes large in word recognition. In these circumstances, the possibility was suggested that good listeners can fully utilize the effect of promotion and minimize the influence of the effect of restraint by top-down processing, but poor listeners cannot fully utilize the effect of promotion in context and maximize the influence of the effect of restraint.

4.2 Relation between reading comprehension and word decoding speed

Listening comprehension and reading comprehension converge at word level, and words performed in an auditory or visual process share the same mental lexicon (Sinatra 1990). It is thought that the relationship between the processing speed of word recognition in reading and reading comprehension is equivalent to that between the processing speed of word recognition in listening and listening comprehension. The speed of word recognition in listening is argued from preceding studies focused on that of reading.

As I have mentioned before, it is clear from Perfetti & Hogaboam (1975) that skilled and less skilled comprehenders differ in the speed with which they decode single words. Perfetti says that since the same limited capacity processor has to be used to remember words already read and to think about the meaning of what is read, it is possible that slow decoding will in fact lead to poorer comprehension. Moreover Harris (1970) states that some very slow readers do poorly in comprehension because their many repetitions and hesitations break up the continuity of thought.

According to Fleisher, Jenkins & Pany (1979), there are at least two implications of a bottleneck or automaticity model which claim that "being fast at decoding leads to high comprehension" (Perfetti & Lesgold, in press), depending on whether one formulates a strong or weak hypothesis concerning the effects of successful decoding training. In the strong form, fast decoding is a sufficient condition for high comprehension. That is comprehension is expected to benefit rather directly and automatically from instruction that increases decoding speed. In the weak form, the bottleneck model would predict that fast decoding is a necessary but not sufficient condition for good comprehension. From these they conducted experiments considering that if the bottleneck model is correct and if the training procedures are adequate, one would expect to observe a reduction in the comprehension discrepancy that distinguishes skilled from less skilled readers. However, in spite of increasing the decoding speed of less skilled readers, their comprehension was not sufficiently improved. We see that skilled readers are more accurate decoders and take more advantage of syntactic and semantic information inherent in context than do their less skilled peers. Judging from the results, they concluded that short-term isolated word practice is possibly an inadequate strategy for producing the level of decoding automaticity that is required to enhance comprehension. It also means that if decoding speed is implicated in comprehension, the relationship may be one of necessity rather than sufficiency. Dahl (1974) and Samuels (1979) certainly suggest that long-term repeated reading

practice of words in context is a viable instructional strategy for improving comprehension. The procedure has the potential to affect comprehension by facilitating "chunking" of information, or by familiarizing readers with vocabulary and syntactical structures, as well as reducing the attentional burden of slow decoding.

On the other hand, van den Bosch, von Bon & Schreuder (1995) state that it is the main difficulty in reading comprehension that learners can not read words rapidly, and practice with limitation on time is effective to increase the decoding speed of less skilled readers. In the experiment subjects were young pupils who could not read, and were given training in reading out similar words of one-syllable. Group A had training in looking at them for a short time, group B had it without limitation on time, and group C had no training. In result, group A increased the processing speed without reduced accuracy in both the material used in the practice and the material unrelated to it. We notice that the processing speed of activating words mentally is applicable. Practice for automatizing basic language skills should be included in an effective L2 training program.

In this way the speed of decoding can be increased but the comprehension of content is not improved in reading. These previous studies, however, are few and have some problems: First of all, the period of training was short or the numbers of sessions were few. It is not obvious if the speed of decoding increased in a true sense. That is, it might be a temporary phenomenon only for the duration of the experiment. Secondly since the subjects were native speakers of English, they were given only a decoding task. So it is not evident if they had clearly understood the meaning of words.

Furthermore it is considered that the speed of word processing in listening is more important than that of reading because in listening the speed of utterance is committed to speakers and listeners can not interpret back to speech sounds outputted once unless they ask for repetition. It is also estimated that if the speed of word processing increases, we can avoid the situation where the acceptance of following speech sounds collapses like a domino as word recognition delays, and the comprehension of content can be enhanced by smooth word processing. The effects of increasing the speed should appear more transparently in listening than reading. For, as I have mentioned before, listening is an activity within the brain which requires speed of language processing more than reading owing to the nature of the language mode. In addition to this, the utterances do not consist of complicated structures of grammar which need syntactic processing involving a high cognitive burden. This means that, among many factors which constitute the activity, the rate occupied by the speed of word processing in listening is larger than that of reading.

In Yamaguchi (1999), it was examined whether listening comprehension skills could be developed in poor learners if semantic memory is strengthened, distance of linkages for activation is shortened, and speed of word recognition is increased without any visual support.

The training was held for 30 minutes every day and 70 English words were practiced for one lesson with them repeated twice. First of all, words were given by auditory presentation using the tapes recorded by native speakers of English, and the subjects were asked to translate so that the experimenter could confirm the recognition by the subjects of the meaning of words. It was intended that paths would be activated by increasing the linkage of each word in the mental lexicon of the subjects, additions would be made to the options of paths taken when they meet the word the next time, and the speed of word recognition would be enhanced. The training was held for two months and finally the 2000 target words were learned with them repeated four times. The results show that the score of listening comprehension in the experimental group increased significantly more than the control group.

From these results, it can be shown that the training in translation tasks by the auditory presentation of individual words, which makes learners raise their consciousness of time, is useful in increasing the speed of word recognition and

improving listening comprehension skills. It can also be seen that poor listeners acquired a score equivalent to the good listeners after training for only two months.

5 Conclusion

The cognitive burden of the human brain is very large in listening activity in a foreign language in which one has to understand without written input. In future English language education, instruction in which the speed of word recognition is regarded as important in listening has to be needed, adding psycholinguistic theories to usual instruction.

From the results of the studies, exploring how to have real instruction in English language education, poor learners should have practice not only in comprehending sentences but also in progressing the rapid word recognition of individual words by auditory presentation. To be concrete, we can give learners practice in retrieving the meaning of each word as soon as possible by using tapes recorded by native speakers of English as teaching materials with a cassette tape recorder which has a function to regulate the speed. In the beginning, learners are asked to translate into mother tongue (Japanese), in slow speed to confirm whether they recognize the correct meaning or not. There is another method to make themselves confirm whether their retrieval of meaning is correct or not, using a tape in which equivalent terms in translation are recorded after a pause following English words. This can also be utilized for studying by themselves as homework. If the stage of learning advances and learners can smoothly retrieve the meaning of English words following the speed of the tape, the next time it should be gradually increased to raise the speed of word recognition. Finally learners come to process smoothly spoken language which is simply the enumeration of English words without translating into mother tongue any more. At that time, if teaching materials whose words are arranged considering semantic relations are made, the activation of the linkages of each word in the learners' mental lexicons is progressed, and at the same time learners can have practice like a natural listening activity. Of course, the teaching of new words using tapes is a common teaching method, but it is used by confirming the English letters of words on the textbook in advance, listening to the tape or the pronunciation of the teacher and repeating after it. The conscious activity of identifying the word from speech sounds and identifying the meaning is not done in current teaching in Japan. In such instruction, even if auditory input is given, when learners retrieve words from their mental lexicon, they primarily depend on the written language and the speed of word recognition is not increased. In fact, it is confirmed as the feature of EFL learners by the introspective report of the subjects in the experiments that learners tend to spell the letters of English words in their mind if words by auditory presentation are difficult to recognize. However it is considered that if this practice is intensively given to learners for a long time, the efficiency of learning will tend to fall because it is a monotonous activity of learning. It is suggested to introduce it into daily classes as a warm-up because English classes need to include various kinds of activities.

It is a quite conscious activity of learning because it is mental work of retrieval to increase the speed of word recognition, viz., the speed of finding out the target word from a mental lexicon. It is originally desirable that this kind of activity is given to a few learners as in the experiment, but in the case of instructing a whole class, it is difficult to judge whether every student does the conscious work together or not. Although it is possible to make learners with high motivation do it as homework as they can practice even by themselves, students with low motivation who are apt to be poor learners need the attention of a teacher. In instruction for many students, it is good that a teacher calls on students at random rhythmically corresponding to the speed of a tape and make them translate aloud.

Moreover if the school or university is equipped with a CALL (computer assisted language learning) classroom, the task can be given by auditory presentation, utilizing the recent

technology of computers, and each learner can do it at their own pace; for example in a system where if learners translate English words by auditory presentation from the computer, they are informed of the accuracy of their answers and translation latency on each time, and when a series of tasks is finished, the result is presented to them. It is considered that this instruction with computers would enable them to enhance their motivation and to be more willing to learn. However CALL classrooms are present in facilities with the most advanced computer technology for foreign language learning, and at present they have not spread enough. In addition, there are some problems, for example few computer programmers can make such kinds of teaching materials using hyper cards and oracle media objects (OMO), and costs are extremely high. We, language teachers must learn how to program teaching materials with computers positively and offer them to language learners.

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