

## On Cultivation of Learners' Short-Term Memory Competence in College English Listening Instruction

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**Abstract:** As the research of cognitive psychology and psycholinguistics develops in great width and depth, short-term memory is supposed to have played an increasingly vital role in the course of English listening comprehension; meanwhile, research findings show that short-term memory affects learners' listening comprehension to considerable extent. By means of literature review, this paper briefly introduces short-term memory theory, and on the basis of other scholars' research in this field, the author puts forward some suggestions on how to improve college English learners' short-term memory competence in the college English listening instruction.

**Keywords:** short-term memory; listening instruction; college English

### 1. INTRODUCTION

Listening comprehension ability is one important part of communicative performance, which not only helps promote the ability of reading, writing, speaking, but also is an indispensable channel of absorbing knowledge like reading. Recently, the Ministry of Education has announced National College English Test Band 4/6 Reform Plan, which is concerned with the reform of the test structure, scoring system, record report, etc., in which scores of listening comprehension section are increased from 20% to 35%. Evidently, listening plays an increasingly important part in college English instruction. However, there are many factors that prevent college English learners from improving their English listening. Wu Jianqiang (2005) concludes these factors in the following two aspects: 1. The limitation of linguistic knowledge (phonology, morphology, syntax, semantics, etc.), 2. The limitation of background knowl-

edge (pragmatics). His summarization only refers to the linguistic aspects, ignorant of cognitive and psychological mechanism of listening comprehension. As research of cognitive psychology and psycholinguistics develops considerably, short-term memory is supposed to have played an increasingly vital role in the process of listening comprehension. Some scholars (Tang, 1981) has begun to realize the importance of short-term memory in listening comprehension by intuition. Wang Chuming (1990) pointed out only two worthwhile experiments made by scholars from abroad in the discussion of short-term memory in his book *Applied Psycholinguistics*. Recently, some scholars (Chen, 2002; Zheng & Li, 2002; Xu, 2005) in China have been interested in this topic and conducted some relevant experiments in the EFL context which have testified Call's experiment (1985) valid that short-term memory is a very important part of listening comprehension and can predict what comes next by means of syntactic structures in listening. In

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the meantime, short-term memory imposes a bottleneck restriction on listening comprehension process (Chen, 2002), which is worthy of much more consideration. However, so far, no one in China has put forward some comprehensive and systematic suggestions on how to cultivate short-term memory competence of college English learners in the listening instruction. By means of literature review, this paper will introduce some research on short-term memory, and based on other scholars' research, explores how to cultivate college English learners' short-term memory competence comprehensively and systematically, and tries to fill in this research blank.

## 2. SHORT-TERM MEMORY

### 2.1 Definition

In recent years, memory is a hot research topic in psychology, especially in cognitive psychology, and is generally divided into three types in terms of storage time and function in information processing, that is, sensory memory, short-term memory, and long-term memory. A great deal of fruitful research on short-term memory has been done in this period from the 1950s to the 1970s. Short-term memory refers to that part of the memory where information which is received is stored for short periods of time while it is being analyzed and interpreted. Once the message or information in an utterance is understood, the data may become part of long-term memory. The utterance itself is now no longer needed and may fade from short-term memory (Richards, Platt & Platt, 2000). Actually, features and functions of short-term memory have been given in this definition. Now let us come to the following two aspects in detail.

### 2.2 Characteristics

As for short-term memory, there are two basic features: 1. short time. Information just stays in short-term memory for about 17 seconds. Once the information in short-term memory is encoded, it will be immediately transferred into long-term memory. If information in short-term memory is not rehearsed, it will disappear in a very short while. 2. Limited capacity. Chunk is considered a unit to measure infor-

mation capacity of short-term memory. Chunk can be defined as a stimulating independent entity that people are familiar with from the previous cognitive experiences such as letters, words, numbers, idioms, sentences, etc. In 1956, G.A. Miller, American psychologist, published his well-known paper *The Magical Number Seven plus or minus Two: Some Limits on Our Capacity for Processing Information*, and he thought that there are 7+2 chunks with regard to short-memory capacity.

### 2.3 Working memory

As short-term memory research continuously develops forward, its conceptualization and theories are much improved and modified. Based on plenty of research on short-term memory. Baddeley and Hitch (1994) put forward a new term: working memory. Carroll (2000) has systematically analyzed the distinction between short-term memory and working memory. Working memory differs from short-term memory as follows. The former conveys a more dynamic view of memory processes and has storage and processing functions respectively, whereas the latter has usually been supposed as a passive repository of information. The storage function of the working memory is identical with that of short-term memory. The processing function of working memory has something to do with the concept of processing capacity. Processing capacity refers to the total amount of cognitive resources we may invest into a task, which is assumed to be also limited. When tasks are new or difficult to learners, they require more processing capacity, thereby leaving less space available for the storage function. Therefore, they coexist together, and one cannot work independently of the other.

## 3. SHORT-TERM MEMORY AND LISTENING COMPREHENSION

Listening comprehension (Ge, 1996) involves the recognition of and the interaction between the following elements: sounds, lexicons, syntax, semantics, pragmatics, personal experiences, and mental encyclopedia. In other words, successful listening comprehension consists in learners' linguistic knowl

edge as well as non-linguistic knowledge (schemata) that are stored in the long-term memory. Recently scholars have explored the cognitive and psychological mechanism in the process of listening comprehension, and short-term memory draws their attention and is considered a vital part of information processing and listening comprehension.

We can have a good understanding of the important role of short-term memory in the process of listening comprehension by getting acquainted with the process in which sounds are subtly converted into meaning. When learners receive sounds, which just stay in the sensory memory for approximately 2 to 3 seconds, they will combine with each other into several meaningful units. Once they are recognized, they will enter the short-term memory in the form of words. In the course of language processing, we generally define "memory unit" in terms of syntactic structure. "Memory unit" often exists in the form of words, phrases or sentences. Once words enter the short-term memory, and some appropriate syntactic units are formed, which stay in the short-term memory for a short while so as to be interpreted and paraphrased. Then the meaning of syntactic units is retrieved and gets into the long-term memory. Meanwhile, not encoded information will be forgotten very soon. If information existing in the long-term memory is retrieved, they will act on the short-term memory and reappear (Clark, 1977). Figure 1 is used to illustrate this process vividly, from which we see the vital role of short-term memory in the process of listening comprehension.

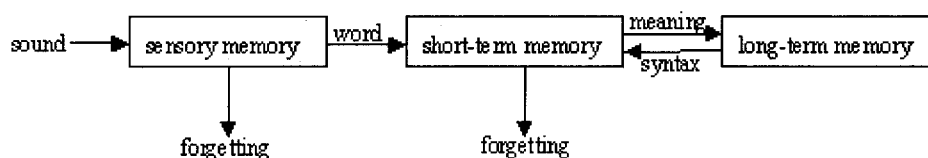


Figure 1: the process of listening comprehension

#### 4. CULTIVATION MEASURES

Chen (1997) thinks that there are two elements of short-term memory that hinders learners' listening comprehension in EFL context: 1. Limited capacity and short-time information processing in the short-term memory, 2. Differences between Chinese and English thinking patterns. Since short-term memory contributes enormously to listening comprehension, it is essential for EFL teachers to take some comprehensive and systematic measures to help college English learners overcome these two barriers and improve their short-term memory competence in the process of listening instruction.

##### 4.1 Using chunking strategy and expanding short-term memory capacity

Chunking theory was first put forward by G. A. Miller in 1956. Since then, it has been widely used in second language acquisition. Gui Shichun (1991) thought that chunking is an effective way to overcome limitations of short-term memory. Chunking strategy is used to increase information load of individual units and to expand the capacity of the short-term memory. With reference to this, there are mainly two reasons: 1. Chunking can make each information unit rich and relieve the burden of short-term memory by decreasing amounts of information units. 2. When all the information is grouped into several large chunks, and information in each chunk is closely connected with each other, representations in each large corresponding chunk of long-term memory will be activated. It is generally

acknowledged that short-term memory can store approximately 7+2 chunks. And information capacity of each chunk depends on the size of each chunk. In the meantime, there must

be three prerequisites for chunking. 1. Enough time, 2. The nature of information in each chunk, 3. corresponding chunks in the long-term memory before chunking (Liu, 2005).

#### 4.2 Converting thinking pattern and raising memorization rates

Thanks to influences produced by historical, geographical, and cultural aspects, there definitely exist many differences between Chinese and English languages. Meanwhile, influenced by Grammar Translation Method, our traditional English teaching, we tend to understand English materials by translating English into Chinese. If English is analyzed according to the Chinese thinking pattern, inevitably "negative transfer" will be resulted in. In addition, foreign language listening is a fleeting code-switching process, in which many elements such as sound discriminating, word ordering, syntactic formulating, semantic compounding, pragmatic associating, etc are involved. Therefore "negative transfer" interferes with the information processing in the short-term memory. Interference in nature results from thinking the target language by way of native language (Chen, 1997). Therefore, it is very necessary for EFL teachers to take several measures to minimize the effects of "negative transfer". Firstly, western culture should be often introduced to learners, and comparison between Chinese and English should be emphatically made in class. Secondly, they should be given much advice to read original literary works, newspapers, magazines, etc. as many as possible, and are trained to use idioms in their writing. Finally, learners should be trained to think in English as much as possible in the listening comprehension, that is to say, they should be told that as soon as they hear a signal, they should not respond to the Chinese corresponding and forms and meanings, but those of English, and predict next signal in accordance with their connotation pattern, and then integrate with these signals, which will be organized into coherent and meaningful sentences.

#### 4.3 Using note-taking strategy and grasping key information

Note-taking strategy is an explicit, observable cognitive strategy, and can be used to recall the pre-

vious forgotten information. This strategy can prolong the memory time of input information, and improve listeners' short-term memory. Learners should be recommended to use this strategy, because it not only relieves their memory burden, but also promotes their understanding and retrieval of information, and reduces the limitations of their short-term memory and linguistic competence. In the meantime, they should be told to follow some basic principles during note-taking: 1. Grasp the opportunities to note down some key information discriminatingly. 2. Short-hand measures should be taken to relieve writing burden. 3. Try to be systematic and clear. 4. Note-taking is only an auxiliary method; do not overuse it.

#### 4.4 Having a good command of syntactic rules and quickening information switching

From the point of view of FLL (foreign language learning), cultivating learners' short-term memory competence should not be divorced from studying syntactic structures. Call thought that syntax plays a very important role in foreign language input, and trying to understand English materials without being familiar with syntactic rules equals recalling those randomly arranged words which makes nonsense (Wang, 1990). If learners do not have enough syntactic knowledge, but want to have a good understanding of long sentences with complex structures, only attention does not work. Short-term memory stores the surface forms of sentences, and maintains for just a short while. Once meaning takes shape from the surface structure in the short-term memory, which will give way to the long-term memory soon. Therefore, English grammar should be taught to learners, and they should be trained to have a good knowledge of syntactic rules and structures until they use them automatically. Only in this way, can they quicken information switching from long-term memory to short-term memory, and as can information encoding from short-term memory to long-term memory.

#### 4.5 Improving long-term memory and accumulating schemata

Long-term memory can be used to compensate for the limitations of the short-term memory. Infor-

mation in the long-term memory should be activated and then understood. Experience knowledge is the manifestations of long-term memory, and has familiarity and activation spreading effects on short-term memory. Based on these effects, information in short-term memory is well connected, spread, and maintained. Recently in second language acquisition, much more attention has been paid to schema theory, which emphasizes that new information should be constructed on the basis of the previous information. So learners should be encouraged to accumulate experience and background knowledge in and outside the class, and to construct and perfect their schemata, so that they can be used to make up the short-term memory limitations to some extent.

## 5. CONCLUSION

In conclusion, to improve short-term memory ability is a systematical and complicated project, which simultaneously involves the participation of such factors as learning strategy, culture, linguistic knowledge, cognition, etc., in which case, it is demanding and challenging for EFL teachers. Therefore, on the one side, teachers transform traditional listening instruction model—pre-listening hinting, while-listening answering, and post-listening explaining (Chen, 2002), and take all the factors that affect short-term memory into consideration in the course of listening instruction. On the other side, according to the principle of instruction varying from learner to learner proposed by Confucius, teachers should meticulously select listening materials that learners take great interest in, and improve learners' short-term memory ability emphatically. On the whole, this paper discusses cultivation of short-term memory ability only from the point of view of theory for the purpose of attracting EFL teachers' attention to this topic. Much instruction practice will be needed to testify it. You are welcome to give some valuable advice.

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