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The Influence of Working Memory Ability on Second Language Learners' Language Listening Literacy

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ABSTRACT

Listening comprehension has long been the most challenging part of the English learning process between input and output. Therefore, listening in language learning has always been a tricky part of teaching. Based on this current situation, how to improve the English listening ability of second language learners has gradually become the focus of research on English teaching and reform. Based on the working memory theory proposed by Baddeley, many scholars in cognitive psychology, linguistics, and second language acquisition have put forward some related discussions on the influence of working memory ability on second language learners' listening literacy in recent years. From the cognitive perspective, this paper focuses on the current situation of second language learners' listening literacy, the features of working memory and listening comprehension, the relationship between working memory and listening comprehension, and at the same time, puts forwards some ways to improve second language learners' listening literacy. Moreover, the quality of working memory directly affects the listening literacy of second language learners. Therefore, the relationship between memory and listening comprehension should be given more consideration with the widespread use of English. Working memory theory in listening comprehension, according to many academics, has particular practical significance for teaching English listening comprehension in China.

Keywords: Working memory, Listening comprehension, Second language acquisition, Listening literacy.

1. INTRODUCTION

Listening is a big part of foreign language learning. We need to take in most information through listening. With the ongoing in-depth study of second language learners, they encounter more and more problems, making learners feel difficult. In self-learning, learners only pay attention to whether they can hear and do not think about whether there is a specific function in the brain that can help listening training. Working memory is a memory system with limited capacity for temporary processing and storing information, which plays a vital role in many complex cognitive activities. In this paper, we hope to study the relationship between working memory and listening to help second language learners improve their listening ability.

In previous studies, researchers paid little attention to listening teaching under the background of exam-oriented education in China. Under exam-oriented instruction, students' learning habits, teachers' teaching methods, and the design of listening materials will have a different impact on listening practice than in other educational environments. This article will consider the environment as a significant role.

This paper will discuss the listening status of second language learners, the relationship between working memory and listening, and ways to improve the listening literacy of second language learners.

2.THE PHENOMENON OF SECOND LANGUAGE LEARNERS' LISTENING

2.1 Second language learners generally have errors in the accuracy of foreign language expression and understanding

When the second language obtains information through speech, especially in the listening test, due to the students' attention concentration, it is words, not sentences, that enter the students' brain. After the speaker

narrates, the students must spare no effort to connect the words into sentences. In this process, especially when they don't take notes, students will easily ignore some vital information. There will be missing parts of the sentence, and the whole sentence cannot be a complete one, resulting in the listener's inability to understand the original sentence.

Also, researchers found that listeners sometimes get into misunderstanding. Slang and idiom, which often has a wide gap between the literal meaning and the actual meaning, are considered a challenging part of foreign language learning. Take a simple one as an example, when a person who is not so familiar with the English proverb hears "It rains cats and dogs," what emerges in his mind is the dropping of cats and dogs from the sky. Still, the speaker wants to express that it's raining heavily outside.

2.2 Second language learners seldom do deliberate practice on their initiative

In second language learning, most Chinese students aim at exam-oriented education and only consider English as a subject to pass the exam. Learners read articles, memorize words, and take the listening practice teachers require as the primary learning content. In the second language listening learning beyond the learning content specified by the teacher, students' second language listening learning is not carried out. Students listen to teachers' requirements mechanically and ignore the cultivation of listening ability in second language learning. After finishing the second language listening task given to students by teachers, they will no longer carry out listening practice independently.

In listening learning, second language learners have limited ability to identify high-quality listening training materials, and the use of digital products is limited under some conditions[1]. To adapt to different levels of listening literacy training materials, we should strengthen the compilation; at the same time, teachers should give appropriate guidance. Schools, society, and families should provide better material support, so that second language listening learners can get better listening training.

Accustomed to the slow speed of the narrator, students will find it difficult to fully capture the vocal language expression of native English speakers when they are placed in an English environment[2]. Teachers give rich listening strategies. High school students have mastered the ability to grasp keywords and complete the teaching test task. However, when asked about the topic content of the listening literature, few students can answer correctly. The way students interpret foreign language listening is deeply rooted, which doesn't seem helpful in the real world.

2.3 Second language learners' ability of storing and processing is low

In the past 12 years of text-based learning for Chinese second language acquisition learners, students only received the training of recording what the teacher said and memorizing. Few of them have received training in education and processing learned information. In addition, teachers only pay attention to the examination scores obtained by students and teach students how to do listening literature strategies while ignoring letting students know how to deal with complex sentences.

Under the background of the Internet + era, second language learning has a new platform and broader space. The application of multimedia technology in second language learning provides a unique, convenient, and direct means for language listening learning[3]. When contemporary young people cannot recognize and rely on Internet information, adverse effects will arise. Second language learners enjoy the information that can be read and understood in a few minutes, followed by many short digest videos. The uploader chooses the core of the information, making the reader lose the ability to select the essential information when listening.

Besides, the fact shows that while doing the listening text, what students have to do is not just listen to the narrators. Take Chinese TEM-4 text as an example. The first part is dictation, during which students have to take down the whole passage word for word after the passage was played four times at different speeds. While listening, students not only have to pay attention to whether the words are written without spelling mistakes but are also concerned about the pause time of the recording. English primary students who have been trained intensively can deal with this multi-task situation, but what about those students without drailing? Their brain cannot support too much information, and soon they will forget the original purpose of listening.

3. WORKING MEMORY AND LISTENING COMPREHENSION MEMORY

3.1. Basic theory of working memory

Based on the previous study (Baddley&Hitch, 1974), working memory is a limited capacity memory system that temporarily stores and processes information during the information processing procedure [4]. Furthermore, Baddeley (1992) suggests the working memory model, claiming it comprises three distinct subcomponents: the central executive, the phonological loop, and the visuospatial sketchpad [5]. The first two subcomponents are closely related to second language listening. The central executive is assumed to be an attentional-controlling system. The phonological loop stores and rehearses speech-based information and is necessary to acquire native and second-language vocabulary

(Baddeley, 2003) [6]. Based on Baddeley's multicomponent theory, this paper states some points from the perspective of second language acquisition in listening comprehension using working memory.

3.2. Features of working memory

There are three noticeable features of working memory:

3.2.1. Small capacity

Miller, G. A. (1956) claims that working memory has a limited capacity of 7 ± 2 units for processing information [7]. While the brain can store a person's lifetime knowledge in hundreds of millions of neural connections, the number of items kept in awareness for short periods is restricted - about seven. This unit is referred to as a chunk of speech during language processing. Apart from that, the capacity depends on the types of information. If it is about numbers or letters, the capacity will be more; on the contrary, it will be less if about words. In conclusion, the length of information significantly impacts the limitation of capacity.

3.2.2. Short information retention time

Xie (2018) claims that working memory information retention typically lasts between 0.5 to 1.8 seconds [8]. Although working memory is only active for a brief time, it is critical for human information storage and processing, reasoning, decision making, language, thinking, and other higher-level cognitive tasks in human activities.

3.2.3. Individual variation

Working memory varies from individual to individual. In general, the working memory capacity of each man is stable. However, the differences among individuals become significant, affected by various factors and stimuli, such as age, information extraction skills, brain and nervous systems, language competence, or cognitive competence. For some people, specific cognitive tasks will be more demanding and challenging.

3.3. Features of English listening comprehension

Listening is about how humans actively think, restructure linguistic elements, creatively absorb, and integrate information. Humans also convert external language into internal language through intellectually cognitive activity. There are some features of English listening comprehension:

3.3.1. Informativity

Citing the case of English teaching in high school shows that an average listening material consists of at least five language points. So, the hiding information in listening is plentiful enough for high school students. It requires high language knowledge. Language knowledge is the foundation of listening comprehension. For instance, spelling, vocabulary, phrases, and grammar are the primary English language knowledge. If the basic language knowledge is too weak, it will have an unfavorable effect on the understanding of the conversations.

3.3.2. Interculturality

The term interculturality refers to any aspect of any cultural interaction (Callan, Hilary 2018) [9]. There are a great number of significant differences in diverse cultural backgrounds. This feature thoroughly reflects the linguistic elements and the listening material like a mirror. Therefore, specific oral language, such as slang and accent in the listening material, will make some English as a Foreign Language learners (EFL learners) confused because of the diversity of cultural differences. It requires EFL learners to know different cultures to improve the effectiveness of understanding the second language. Therefore, it can not do without discussing the study of language cultural features in promoting EFL learners' listening ability and efficiency.

3.3.3. Instantaneity

Compared with reading and speaking, listening is more instant and unabiding because it cannot cost much time to repeat the conversations in English tests and even in daily life. The input speed of language materials is up to the speaker during the listening comprehension process. The listener has no opportunity to look back. Therefore, it needs the audience to make a reaction promptly while doing listening activities. Also, because of its specificity, it requires a high demand for information extraction speed and rapid response of learners.

3.4. The correlation between working memory and listening comprehension

Cao and Zhang (2015) state that listening is a complex cognitive process that involves converting perceived sounds into information using the auditory organs and the brain's cognitive activity and phonological, lexical, grammatical, and other nonverbal knowledge [10]. Working memory is a crucial part of the listening comprehension process, and information storing and listening comprehension need to proceed successfully. There are two functions of working memory: store and process information. At the same

time, when EFL learners input the listening material, working memory begins to play an integral part in the processing, judging, and solving of the new information.

4. THE WAY TO IMPROVE SECOND LANGUAGE LEARNERS' LISTENING LITERACY

It is essential to understand how to take advantage of working memory in the teaching process of listening. Based on working memory theory, there are mainly three methods:

4.1. Designing appropriate and effective English listening materials

4.1.1. Order matters

The order of question setting in the listening materials should be consistent with relevant information (Yu, 2015) [11]. It means the order of the question should accord with that of the answer. If not, it will make second language learners dubious. Moreover, it requires a lot of time and energy for students to search for critical information when doing listening practice. Apart from that, it will cause a heavy and unnecessary cognitive load.

4.1.2. Visual aids matter

In general, visual aids involve text, video, graphs, diagrams, blackboard, and even body language. To some extent, they have a significant impact on EFL classes. However, if there are only some texts in the listening materials, it will cause some fatigue in reading. Therefore, teachers can take advantage of the information in the materials, design some diagrams, and simplify the critical information in listening materials in advance. For example, teachers can demonstrate them on PowerPoint or blackboard to students before listening practice, thus reducing working memory capacity consumption and cognitive load. However, listening materials should avoid the simultaneous appearance of audio, video, and text because students cannot focus on text while watching a clip, and vice versa.

4.1.3. Format matters

Questions and answers to listening should be typeset on the same page. It can avoid some unnecessary time focusing on something that is not important. If they are separated, it will cause an extra memory load for memorizing the content on the last page. So it is necessary to formulate the listening materials appropriately for the TESOL learners.

4.1.4. Multimedia technology matters

Xie (2018) claims that Internet information and advanced multimedia technology provide students with cultural background knowledge [8]. Only then can learners develop the ability to learn English by listening and searching for information and accelerating the speed of information extraction. Moreover, create a natural and positive language environment for students to discover their interest in English learning and expand their working memory capacity from various resources.

4.2. Expanding working memory capacity

4.2.1. Word block matters

Yu (2015) states that word blocks include idioms, word collocations, phrases, and complete sentences [11]. While teaching listening, the teacher should use more word blocks as the foundation for students' learning because English is a kind of language that consists of many combinations rather than just one word. For second language learners, memorizing word blocks is more beneficial to increase their memory capacity for daily listening practice.

4.2.2. Positive transfer matters

Since English and Chinese belong to different language families, Chinese students confront more difficulties learning English. They mainly occur in learning and applying English and manifest in the perspective of phonetics, vocabulary, and grammar learning. Affected by negative transfer in second language learning, many students are used to the thinking mode "Listening-Translating-Understanding." It costs a lot of time. So while listening, teachers should help EFL learners use the English way of thinking rather than using "translation into Chinese" as an intermediate link between listening and understanding. Therefore, teachers need to help EFL learners identify the similarities between these two languages in the teaching process to improve "positive transfer" and minimize the impact of "negative transfer."

4.3. Making the teaching instructions clearer

It would be better for teachers to ensure that EFL learners can comprehend each question's requirements in some cases. For example, considering the large-scale class teaching, teachers can ask some learners to translate the task requirements of the questions to avoid the situation in which some do not understand what they will do next to the full extent. It would be more beneficial for EFL students to improve their working memory capacity and ameliorate concentration abilities. Also, it would be more effective for English classes in the meanwhile.

5. CONCLUSION

In this paper, the effects of working memory on second language listening were investigated. The author introduces the current listening status of second foreign language learners, explains the relationship between working memory and listening, and sums up how to use working memory for listening teaching in today's learning environment. On the one hand, most of them have difficulty in understanding; on the other hand, their working memory operation speed can not keep up with listening reception. During the research, the author found that working memory and listening, especially in the information processing part, are closely related. Listening is characterized by Informativity, Interculturality and Instantaneity. Using these characteristics of working memory, students can carry out listening exercises more reasonably, and teachers should arrange listening exercises reasonably according to the operation mode of most students' working memory. At the same time, more listening training tools should be developed to reduce the interference of non-listening factors, so as to better improve the listening ability of second language learners.

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