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# The Correlation between HUIT English Majors' Short - Term Memory and Listening Comprehension Skills at Different Language Proficiency Levels

Trinh Thu Hang 

*Faculty of Foreign Languages, Ho Chi Minh City University of Industry and Trade, Ho Chi Minh City, Viet Nam*

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## Abstract

*The study of short-term memory (STM) is crucial to the study of second language acquisition. STM plays an important role in language acquisition and development since it is an on-line capacity for processing and elaborating new information. A fundamental skill in learning English is listening comprehension. The ability to listen is crucial when learning a foreign language because receiving language input is the key to language learning. More and more academics at home and abroad have started to focus on the relationship between STM and listening comprehension in recent years. STM has been demonstrated to be a crucial component of listening comprehension, making it extremely vital to increase listening comprehension in second languages. STM helps in the immediate processing of incoming auditory information when listening in a second language. This essay investigates the relationship between short-term memory and listening comprehension skills of English - majored students from Ho Chi Minh City University of Industry and Trade. The results' implications suggest that improving short-term memory capacity is necessary to get students ready for the listening IELTS examination.*

**Keywords:** Short-term memory, STM, Listening comprehension, Second Language Acquisition

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<sup>1</sup> **Correspondence author:** Trinh Thu Hang

Email: [hangtt@huit.edu.vn](mailto:hangtt@huit.edu.vn)

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## 1. Introduction

### 1.1. Statement of Problem

In actuality, listening comprehension is a form of passive speech intake that learners is unable to control, as stated by Anderson (1988). And Gilakjani and Ahmandi (2011) said that the second language listening process places a heavy burden on STM. Because complex input materials require the combining of parsed segments during comprehension, they can be particularly challenging to understand in a second language. This puts additional strain on STM, which may already be dealing with un-encoded elements of the new input. However, STM is a storage system that consists of a number of small-capacity subsystems (Cascella and Khalili, 2023). There is an interesting phenomenon in English listening. Despite being a vital

ability in the process of learning a language, listening comprehension is one of the most difficult skills to master (Tran & Duong, 2020). When answering listening comprehension questions, many students respond accurately, but if they are allowed to repeat the listening contents, their performance will not be adequate. Even students who have outstanding oral English skills report finding it challenging to repeat what they had heard. Students are in great distress as well; some of them cannot even recall what they formerly comprehended. However, STM is a storage system that consists of a number of small-capacity subsystems. (Cascella and Khalili, 2023).

## **1.2. Literature Gap**

Universities and schools in Hochiminh city are paying little attention to the connection between listening comprehension and short - term memory. Many course books do not place much emphasis on listening, and most teachers do not focus on the function of short - term memory in their classrooms.

In order to determine the function of STM in listening learning and teaching, we first will examine the connection between them in this paper. The goal of this paper is to raise teachers' awareness of these challenging areas of listening comprehension so that appropriate and useful action will be made. It is hoped that the paper's findings will offer helpful perspectives for STM in listening comprehension to both teachers and students.

## **1.3. Research Aims**

The results of a study looking at the connection between listening comprehension and short - term memory are presented in this article. The goal of this study is to determine how short - term memory affect listening comprehension skills of English - majored students at each of the three different levels of language proficiency (first, second, and third year).

## **1.4. Research Questions**

In light of the aims of this study, the following research question will be pursued:

*- What is the relationship between English majors' STM and listening comprehension skills at different language proficiency levels?*

And the following is the study hypothesis (null hypothesis):

*- There is no significant relationship between short-term memory and listening comprehension skills in English-majoring students at each level of language proficiency.*

## **1.5. The Significance of Research**

The conclusions drawn from the literature review and data analysis are highly significant and can help EFL learners' English listening comprehension skills. Besides, when teachers are aware of the learning challenges and STM difficulties that their students face, they can work with them to create strategies for effective listening, which will help their students overcome their listening problems and enhance their listening comprehension skills.

## 2. Literature Review

### 2.1. Review of short-term memory

Memory is categorized into three types: sensory memory, short-term memory, and long-term memory based on the length of the memory and the various methods of encoding, storing, and processing information. The majority of information stored in sensory memory is lost, but information that is focused on with the intention of being remembered may be stored in STM. A little amount of currently relevant information is maintained in STM through persistent brain activity patterns. For instance, a recently recited phone number is stored in short-term memory. Short-term memory refers to the temporary storage of information that is currently being processed or used. (Dew, 2023).

There are two primary characteristics of STM:

(1) It has a limited capacity and can only hold seven items at once (plus or minus two), according to a classic research by Miller (1956). Instead of storing specific numbers or letters, according to Miller (1956), human short-term memory stores 'chunks' of information. This may help to explain why humans can remember things with more than 7 digits, such phone number. After conducting careful research, Cowan (2000) presented many viewpoints, concluding that the short-term capacity was 4.

(2) Limited duration: Unless we repeatedly practice it through a method called maintenance rehearsal, we tend to be able to store items in our short-term memory for just approximately 15 to 30 seconds (Atkinson & Shiffrin, 1971). While the original statement may progressively fade from short-term memory once the information or content in it is absorbed, the data will enter permanent memory, that is, long-term memory (Richards & Schmitd, 2000, p.83).

### 2.2. STM and Listening Comprehension

Listening, speaking, reading, and writing are the four fundamental abilities, but listening is the first link in perception and the primary method of information acquisition. Levels of listening comprehension have an impact on how well students can learn three other skills (Gilakjani & Ahmadi, 2011). Despite its brief duration, STM has undeniable advantages. STM helps in the immediate processing of incoming auditory information when listening in a second language. It enables students to keep and control auditory information, such as individual words or short phrases, while still understanding the overall message's meaning.

However, in practical foreign language teaching, listening is the primary barrier to effective communication and the weakest link for most students. Retelling the listening materials will be challenging for some students in the classroom. Even if they understand at the time, they cannot afterwards recall what they heard. The short-term memory's restricted capacity results in blocked information extraction, which is one of the key causes of this type of phenomena (Zafarghandi & Bahrpeyma, 2016).

From the standpoint of learning a foreign language, researchers began investigating the connection between short-term memory and listening comprehension early on, mainly focusing on comprehensive input. Language acquisition is influenced by intelligible information in terms of comprehensive input. The best listening prediction, according to Rubin's work from 1994, is the recall of isolated sentences and brief narrative chunks. A relevant research by Anderson (1988) have validated the value of dictation input to second language learners' listening and the significance of syntactic memory. The researches conducted later, after the year of 2,000, focused on speech and syntax. Joyce (2019) noted that second language listening comprehension was highly correlated with the width of short-term speech memory. According to Gilakjani & Sabouri (2016), syntactic connection can enhance listening comprehension, which is originally constrained by short-term memory capacity. The significant correlation between listening skills and listening comprehension, which has been confirmed in relevant research by Gilakjani & Sabouri (2016), is due to the fact that listening comprehension is a type of passive speech input where the listener cannot control the speed and where short-term memory load is high during the listening processing process. It is clear that short-term memory is crucial to the process of understanding what is being heard in English.

### **2.3. STM and Listening Learning Efficacy**

When students experience short-term memory problem, they lose track of recent events, like numbers or dates they heard. Numerous things, such as a dietary shortage, lack of sleep, sadness, or tiredness, might contribute to it. Understanding the functions of short-term memory is crucial when teaching English as a second language to ensure listening learning efficacy. Here are several applications of this knowledge:

(1) *Chunking Information*: The amount of information noticed in sensory memory, the amount of information stored in short-term memory, and the amount of information with relevant background knowledge stored in long-term memory are three factors that have a significant impact on listening. Therefore, the capability of chunk integrity extraction is helpful in boosting short-term memory capacity and accelerating listening comprehension (Jialing & Fang, 2019). Listening comprehension is negatively correlated to cognitive load, and chunking can lessen the cognitive load of listening and memorization, as well as the dependence on absorbing and recombining information when providing answers. It is easier to move information from short-term to long-term memory when it is divided up into digestible, smaller pieces or units. Students can better retain and recall knowledge by teaching vocabulary in groups of related terms or grammar rules in simple, unambiguous patterns, for instance.

(2) *Rehearsal*: Repetition of knowledge to be retained is the process of rehearsal, which purportedly keeps the information in short-term memory. The information is stored in short-term memory again after each repeat, where it remains for an additional 10 to 20 seconds (the typical storage time for short-term memory). Because new knowledge is constantly being introduced and old information can be excluded from short-term memory at any time, students cannot maintain information permanently in short-term

memory (Jialing & Fang, 2019). Important language components, such vocabulary words and grammar rules, should be repeated and reviewed frequently to assist reinforce the knowledge in long-term memory. Regular practice and revision sessions help to strengthen recall skills and consolidate knowledge. Rehearsing knowledge in working memory is one approach to keep it from fading from short-term memory.

### **3. Methodology**

The goal of this study is to determine how test takers' listening comprehension skills across a range of language proficiency levels relate to their short-term memory. The following approach was used to identify precise responses to the research questions:

#### **3.1. Research Design**

Because of the nature of correlational analysis, this study used a quantitative research design with SPSS application to achieve its goals. The variables under investigation include:

- Independent variables: listening and short-term memory span
- Dependent variables: listening comprehension score
- Moderator variables: proficiency level (first, second, or third year)

#### **3.2. Research Participants**

There were 150 participants in this study, 50 of whom were freshmen, another 50 were sophomores, and the rest 50 were juniors. All of 150 participants were English - majored students from Hochiminh city University of Industry and Trade, they all were familiar with English as a second language. Class-time was allotted to this study with the participants' lecturers' permission.

#### **3.3. Research Materials**

1) Memory Span Tests (MST): The L2 random digit test was the first testing instrument. A test of verbal short-term memory is called Digit Span, according to Battista (2023). Digit Span measured how well participants could recall a series of numbers that show up on the screen one at a time. They were required to click on the numbers they just saw, in order, when they heard a beep. The next sequence would be one number longer if participants could remember every number in the sequence correctly. The next sequence would be one number shorter if they make a mistake. The test would end after three incorrect answers.

2) Auditory Memory Span Tests (AMT): The test consisted of 5 unrelated single-syllable words. Stimuli were shown one every half second for every test. To assess listening comprehension, an examiner read aloud series of items, and participants were asked to record the information in the same order that they heard it. In this instance, a set of items was taken from a relevant dictionary and applied to the process.

3) IELTS listening comprehension test - Every study session included a test. The test can be found in the book "IELTS 7," which is part of the Cambridge Books for Cambridge Exam series. The book's first

test was used. The tests in the book are actual exams from the University of Cambridge's ESOL exams. There are four sections in the IELTS listening comprehension test. While the first two sections are general listening scenarios, the final two sections are academic in nature. Typically, Section 4 is a lecture. The listening test lasted for thirty minutes, plus an additional ten minutes at the conclusion for test takers to write their answers on the answer sheet.

### **3.4. Research Procedure**

Every individual participant took part in two testing sessions. Firstly, the participants' memory span was assessed using the "Memory Span Test" and the "Auditory Memory Span Test." Next, the IELTS listening test was given. It lasted roughly forty minutes per session and was conducted in a manner quite similar to the actual IELTS test, with speakers' audio files playing, students using their test booklets and separate answer sheets to write down their answers.

After data collection, each instrument's reliability was examined. To determine whether the two memory span tests are a reliable indicator of these factors, Cronbach's Alpha was measured. The reliability statistics indicated that short-term memory span tests have a fair reliability index when compared to the other measures used, with a Cronbach's alpha of .66. The second tool was the auditory memory span tests, for which Cronbach's Alpha was also computed. The results of these tests indicated very high reliability (Cronbach's Alpha of .73). Cronbach's alpha was also used to report the reliability of the IELTS Listening tests. With an alpha of .81, this assessment was regarded as trustworthy metric.

## **4. Results and Discussion**

The research question was answered by running multiple regression analyses through SPSS 17. The question of whether there is a relationship between STM and IELTS listening comprehension scores in each language proficiency level group was answered using multiple regressions.

As previously indicated, test results were divided into three groups according to the participants' proficiency levels, allowing us to determine which group's IELTS listening score—first year, second year, third year—is more dependent on memory scores.

According to the results of the memory tests, 35.9% of the participants had an L2 memory span of 7, 35.8% had an L2 memory span of 8, and 28.3% had an L2 memory span of 9. 40% of participants in the auditory memory test had a span of 7, 40% had a span of 8, and 20% had a span of 9.

Multiple correlation must be zero ( $R=0$ ) if we assume that there is no relationship between the participants' IELTS listening comprehension score and their memory span. After grouping the scores, a regression analysis was performed for each of the three participant levels to determine whether the result was correct or incorrect.

Among the participants, 33.3% of the participants were freshmen, 33.3% were sophomores, and the remaining were juniors.

*Table 1. Participant frequencies and percentage of their level of language proficiency:*

		LEVEL			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	FRESHMAN	50	33.3	33.3	33.3
	SOPHOMORE	50	33.3	33.3	66.7
	JUNIOR	50	33.3	33.3	100.0
	Total	150	100.0	100.0	

*Table 2. Participant frequencies and percentage of their IELTS listening score:*

		SCORE			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.50	9	6.0	6.0	6.0
	3.00	4	2.7	2.7	8.7
	3.50	2	1.3	1.3	10.0
	4.00	3	2.0	2.0	12.0
	4.50	13	8.7	8.7	20.7
	5.00	16	10.7	10.7	31.3
	5.50	27	18.0	18.0	49.3
	6.00	24	16.0	16.0	65.3
	6.50	20	13.3	13.3	78.7
	7.00	20	13.3	13.3	92.0
	7.50	2	1.3	1.3	93.3
	8.00	7	4.7	4.7	98.0
	8.50	3	2.0	2.0	100.0
	Total	150	100.0	100.0	

In the junior group, the calculation was completed first. The following table displays the findings.

Table 3. An overview of the junior level regression analysis:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.913 <sup>a</sup>	.833	.826	.51670

a. Predictors: (Constant), AMT, MST

According to the data, there is a common variance of .83 between test takers' L2 Auditory Memory Span and L2 Memory Span scores and their IELTS listening comprehension test scores. This suggests that test takers' L2 Auditory Memory Span and L2 Memory Span accounts for 83.3% of the test takers' IELTS listening score.

The following outcomes applied to the sophomore participants:

Table 4. An overview of the sophomore level regression analysis:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.875 <sup>a</sup>	.766	.756	.67353

a. Predictors: (Constant), AMT, MST

The table above shows that for sophomore participants, the common variance between L2 Auditory Memory Span test scores, L2 Memory Span test scores, and IELTS listening comprehension test scores is .77. This indicates that 77% of the test takers' L2 Listening Span and L2 Memory Span scores can be used to explain their IELTS listening score.

The following findings were obtained from the same analysis for freshman participants.

Table 5. An overview of the freshman level regression analysis:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.752 <sup>a</sup>	.565	.547	.85814

a. Predictors: (Constant), AMT, MST

The table shows that for freshman participants, the common variance among L2 Auditory Memory Span test scores, L2 Memory Span test scores, and IELTS listening comprehension test scores is .57,



meaning that test takers' L2 Auditory Memory Span and L2 Memory Span accounts for 57% of the test takers' IELTS listening score.

## 5. Conclusion

The results of this study demonstrated that, at the junior level (advanced level), there is a significant correlation between students' listening span and their ability to comprehend spoken English, and that performance on the listening comprehension section of the test can be influenced by short-term memory. Furthermore, the study's findings indicated that the correlation between short-term memory and IELTS listening comprehension is weaker at lower proficiency levels (sophomore and freshman). According to the study's findings, there was only a significant correlation between the L2 listening span test and IELTS listening comprehension test scores for test takers at the advanced level (junior level).

Lastly, it is important to note that the results do not imply a cause and effect relationship due to the nature of correlational analysis, and the moderate correlations between the independent and dependent variables make it difficult to generalize the findings. Even so, the STM plays a quite important role that cannot be neglected. The purpose of this study was to raise awareness among teachers and students of other potentials influence on the listening comprehension skills. As a result, before taking listening tests or exams, language teachers in particular need to help their students develop longer memory spans by assigning them memory exercises and teaching them various study techniques.

## References

- Anderson, A. and T. Lynch (1988). *Listening*. New York: Oxford University Press.
- Atkinson, R. C., and Shiffrin, R. M. (1971). *The Control Processes of Short-Term Memory*. Institute for Mathematical Studies in the Social Sciences, Stanford University.
- Battista, M. (November 2023). What is the digit span test?. *Resource Center - Cambridge Brain Sciences*. Retrieved November 1<sup>st</sup>, 2023 from <http://help.cambridgebrainsciences.com/en/articles/624895-what-is-the-digit-span-test>
- Cascella, M. and Khalili, Y. A. (July 2023). *Short-Term Memory Impairment*. StartPearl Publishing.
- Cowan, N. (200). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavior Brain Science*, 24(1), 87-185. DOI: <http://dx.doi.org/10.1017/S0140525X01003922>
- Dew, C. (September 2023). 25 short-term memory examples. *HelpfulProfessor*. Retrieved November, 7<sup>th</sup>, 2023 from <https://helpfulprofessor.com/short-term-memory-examples/>
- Gilakjani, A. P. and Ahmadi, M. R. (September 2011). A study of factors affecting EFL learners' English listening comprehension and the strategies for improvement. *Journal of English Teaching and*

*Research* 5(2), 977-988. Retrieved November, 8<sup>th</sup>, 2023 from <https://www.academypublication.com/issues/past/jltr/vol02/05/05.pdf>

Gilakjani, A. P. and Sabouri, N. B. (2016). Learner's listening comprehension difficulties in English language learning: A literature review. *English Language Teaching* 9(6). DOI: <http://dx.doi.org/10.5539/elt.v9n6p123>

Jialing, L. and Fang, G. (2019). A review of short – term and listening comprehension. *Journal of English Language and Literature (RJELAL)*. DOI: <http://www.rjelal.com/>

Joyce, P. (2019). The relationship between L2 listening proficiency and L2 aural language processing. *PASAA* 57. Retrieved November, 9<sup>th</sup>, 2023 from <https://files.eric.ed.gov/fulltext/EJ1224420.pdf>

Miller, G. (1956). [The magical number seven, plus or minus two: Some limits on our capacity for processing information](#). *The psychological review*, 63, 81-97. Retrieved October, 3<sup>rd</sup>, 2023 from <https://img3.reoveme.com/m/049764c53e25268b.pdf>

Richards, J. C. and Schmitd, R. (2010). *Longman Dictionary of Language Teaching & Applied Linguistics (4th ed.)*. Edinburgh: Pearson Education Limited.

Rubin, J. (1994). A review of second language listening comprehension research. *The Modern Language Journal*, 78(2). 199-221. DOI: <https://doi.org/10.2307/329010>

Tran, T. Q. & Duong, T. M. (2020). Insights into listening comprehension problems: A case study in Vietnam. *PASAA* 59. Retrieved September, 15<sup>th</sup>, 2023 from <https://files.eric.ed.gov/fulltext/EJ1239999.pdf>

Zafarghandi, A. M. & Bahrpeyma, M. (June 2016). The relationship between short-term memory and listening comprehension ability of IELTS test takers at different language proficiency levels. *International Journal of Research Studies in Language Learning* 6(3). DOI: <http://dx.doi.org/10.5861/ijrsl.2016.1441>