

# The Impact of Working Memory Capacity and Listening Anxiety on College Students' English Listening Comprehension

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**Abstract:** This study aims to explore the impact of working memory capacity and listening anxiety on college students' English listening comprehension. By conducting tests and surveys on 100 college students, the study analyzes the correlation between working memory capacity and listening comprehension scores, as well as the negative effects of listening anxiety on listening comprehension. The results indicate that working memory capacity is positively correlated with English listening comprehension scores, while listening anxiety significantly hinders listening comprehension. Based on these findings, the study proposes corresponding teaching suggestions to improve college students' English listening comprehension ability.

**Keywords:** Working memory capacity; Listening anxiety; English listening comprehension

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## 1. Introduction

English listening is an important part of college English teaching system. It is the key link of language learning and plays an indispensable role in the comprehensive improvement of students' language ability. In the actual college English teaching scene, it is not difficult to find that many college students encounter difficulties in English listening comprehension. This dilemma has many influences, which not only hinders the overall effect of their English learning, but also limits their ability to use English in real communication situations to a large extent. Among many factors that affect English listening comprehension, working memory capacity and listening anxiety are particularly critical. In view of this, it is of great significance to explore the influence of these two factors on college students' English listening comprehension, both theoretically and practically.

## 2. Theoretical Basis

### 2.1 Working Memory Theory

Working memory is a memory system that temporarily stores and manipulates information. It consists of multiple subsystems, including the phonological loop, the visuospatial sketchpad, and the central executive. The phonological loop is responsible for processing phonetic information, the visuospatial sketchpad handles visual and spatial information, and the central executive coordinates and controls the activities of the other subsystems. Working memory capacity is limited, and there are individual differences among individuals. In English listening comprehension, working memory needs to store and process the heard phonetic information to understand its meaning.

### 2.2 Anxiety Theory

Anxiety is a complex emotional state that typically accompanies feelings of tension, worry, and unease. In learning situations, anxiety may affect learners' cognitive processes and learning outcomes. Listening anxiety refers to the anxiety experienced by learners during listening learning and testing. Listening anxiety can lead to problems such as inattention, decreased memory, and rigid thinking, thereby affecting the effectiveness of listening comprehension.

## 3. Research Methods

### 3.1 Research Subjects

This study selected 100 college students from Xi'an Peihua University as research subjects, covering different majors and grades to ensure the representativeness of the sample.

### 3.2 Research Tools

#### 3.2.1 Working Memory Capacity Test

The Digit Span Test was used to test the working memory capacity of students. This test mainly assesses the working memory capacity by asking students to remember and repeat a series of numbers, words, or sentences.

#### 3.2.2 Listening Anxiety Questionnaire

The Foreign Language Listening Anxiety Scale was used to investigate the degree of students' listening anxiety. This questionnaire includes 20 items, involving students' emotional experiences, concerns, and self-evaluations during the process of listening learning and testing.

#### 3.2.3 English Listening Comprehension Test

The College English Test Band 4 Listening Comprehension was used to test the English listening comprehension ability of students. This test includes listening materials of different difficulty levels and corresponding questions to comprehensively evaluate the students' listening comprehension level.

### 3.3 Data Collection and Analysis

The research subjects were tested for working memory capacity, surveyed for listening anxiety, and tested for English listening comprehension, and relevant data were collected. Then, SPSS 25.0 was used to analyze the data, mainly including descriptive statistical analysis, correlation analysis, and regression analysis, to reveal the relationships between working memory capacity, listening anxiety, and English listening comprehension.

## 4. Results and Discussion

### 4.1 The Relationship between Working Memory Capacity and English Listening Comprehension

#### 4.1.1 Results of Descriptive Statistical Analysis

Through descriptive statistical analysis of the working memory capacity test scores and the English listening comprehension test scores, it was found that the mean value of the working memory capacity test scores was 45.2 (standard deviation was 8.3), with individual differences, and the mean value of the English listening comprehension test scores was 28.6 (standard deviation was 6.5), also showing different levels. As shown in Table 1.

Table 1 Descriptive Statistical Analysis of Working Memory Capacity Test Scores and English Listening Comprehension Test Scores

Test Items	Mean	Standard Deviation	Minimum	Maximum	Data Distribution Situation
Working Memory Capacity Test Scores	45.2	8.3	25	65	Approximately Normal Distribution
English Listening Comprehension Test Scores	28.6	6.5	15	45	Approximately Normal Distribution

#### 4.1.2 Results of Correlation Analysis

The results of correlation analysis showed that there was a significant positive correlation between working memory capacity and English listening comprehension scores ( $r=0.62, p<0.01$ ). This means that the larger the working memory capacity, the higher the students' English listening comprehension scores.

#### 4.1.3 Results of Regression Analysis

The regression analysis further confirmed the positive influence of working memory capacity on English listening comprehension. After controlling for other factors that may affect listening comprehension, working memory capacity could still significantly predict the English listening comprehension scores ( $\beta = 0.58, p < 0.01$ ).

### 4.2 The Relationship between Listening Anxiety and English Listening Comprehension

#### 4.2.1 Results of Descriptive Statistical Analysis

Through descriptive statistical analysis of the listening anxiety questionnaire results and the English listening comprehension test scores, it was found that the mean value of the listening anxiety degree was 3.2 (standard deviation was 0.8), with individual differences, and the English listening comprehension test scores were 28.6 (standard deviation was 6.5), also different. As shown in Table 2.

Table 2 Descriptive Statistical Analysis of Listening Anxiety Questionnaire Results and English Listening Comprehension Test Scores

Test Items	Mean	Standard Deviation	Minimum	Maximum	Data Distribution Situation
Listening Anxiety Degree	3.2	0.8	1.5	5.0	Approximately Normal Distribution
English Listening Comprehension Test Scores	28.6	6.5	15	45	Approximately Normal Distribution

#### 4.2.2 Results of Correlation Analysis

The results of correlation analysis showed that there was a significant negative correlation between listening anxiety and English listening comprehension scores ( $r = -0.55, p < 0.01$ ). This indicates that the higher the listening anxiety degree, the lower the students' English listening comprehension scores.

#### 4.2.3 Results of Regression Analysis

The regression analysis further verified the negative impact of listening anxiety on English listening comprehension. After controlling for other factors that may affect listening comprehension, listening anxiety could still significantly predict the English listening comprehension scores ( $\beta = -0.48, p < 0.01$ ).

### 4.3 Discussion

#### 4.3.1 The Influence Mechanism of Working Memory Capacity on English Listening Comprehension

Students with larger working memory capacity have an advantage in English listening comprehension. They can better store and process the heard phonetic information and combine it with the existing knowledge structure, thus more accurately understanding the meaning of the listening material.

#### 4.3.2 The Influence Mechanism of Listening Anxiety on English Listening Comprehension

Listening anxiety interferes with students' attention and information processing abilities during the listening process. Anxious students often focus too much on their own performance and possible mistakes, thus ignoring important information in the listening material.

## 5. Teaching Suggestions

### 5.1 Improving Students' Working Memory Capacity

Teachers can design some memory training activities to improve students' working memory capacity. In English listening teaching, teachers can guide students to combine the information in the listening material with previously learned words, grammar, and cultural knowledge to improve students' understanding of the listening material.

### 5.2 Relieving Students' Listening Anxiety

Schools can equip professional psychological counselors to provide psychological counseling for students with listening anxiety.

### 5.3 Comprehensive Training

In the teaching process, the training of improving working memory capacity and relieving listening anxiety can be combined.

## 6. Conclusion

This study found that the working memory capacity of college students is positively correlated with their English listening comprehension, while listening anxiety hinders listening comprehension. Based on this, the author puts forward some teaching suggestions: to improve working memory capacity through diversified memory training and knowledge integration; to alleviate hearing anxiety, schools are equipped with psychological counselors, teachers adjust teaching methods; comprehensive training, combining the two training, using a variety of ways. These suggestions are of great value to improve English listening comprehension. However, there are limitations in the study, the sample size is limited, may not represent all college students, and the research tool is single. Future studies should expand the sample and use a variety of tools to explore the impact of working memory capacity and listening anxiety on English listening comprehension in a more in-depth and comprehensive way, so as to provide more effective guidance for teaching.

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