

## **Listening Difficulties in Mandarin Tone Identification among Non-Chinese Language Education Students**

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### **ABSTRACT**

Tones are an essential feature of Mandarin Chinese because differences in tone can distinguish word meanings. However, learners from non-tonal language backgrounds often experience difficulties in identifying tones. This study aims to describe the profile of difficulties in listening to Mandarin tones among second semester Non-Chinese Language Education Students at Ma Chung University. A mixed methods approach was employed involving 16 second semester non-Chinese Language Education Students at Ma Chung University. Data were collected through a tone identification test covering vocabulary, sentence, and paragraph levels, as well as semi-structured interviews. The results showed that Tone 2 had the highest percentage of identification errors at the vocabulary (50%), sentence (59%), and paragraph (56%) levels. Meanwhile, the neutral tone ranked second, with error rates of 47%, 56%, and 50%, respectively. These findings were supported by the interview results, which revealed that the difficulties were related to distinguishing the contour of Tone 2, recognizing the neutral tone, and maintaining attention to tones while listening to longer utterances. These findings suggest that Mandarin tone instruction should be conducted progressively through listening practice, beginning with the vocabulary level, followed by the sentence and paragraph levels, to help improve learners' tone identification ability.

**Keywords:** Mandarin Tones; Tone Perception; Listening Difficulty; Non-Tonal Language Learners

### **INTRODUCTION**

Language is an essential means of communication that enables people to interact, cooperate, and express ideas and feelings. This is consistent with Mailani et al. (2022), who state that language serves as the primary means of communication in human social life. In the era of globalization, proficiency in foreign languages has become increasingly important, and Mandarin Chinese is one of the foreign languages that is gaining popularity in Indonesia. However, learning Mandarin

Chinese as a second language is not a simple task for native Indonesian speakers. According to Mulyaningsih (2014), this is mainly due to the tonal nature of Mandarin Chinese, in which lexical meaning is distinguished by differences in the tones assigned to each syllable.

Mandarin Chinese has four primary lexical tones (ˉ, ˊ, ˇ, ˋ) and one neutral tone, all of which play an important role in distinguishing word meanings. The four primary tones consist of a high-level tone (Tone 1), a rising tone (Tone 2), a falling-rising tone (Tone 3), and a falling tone (Tone 4). Differences in tone can change the meaning of a word even when its syllable remains the same. For example, the syllable (*shì*) may mean "to be" (是), "matter" (事), or "city/market" (市), while (*qī*) (七 "seven") and (*qí*) (骑 "to ride") have different meanings because of their different tones. This demonstrates that tones in Mandarin Chinese function as lexical contrasts rather than merely variations in pronunciation. This is consistent with Adji (2020), who argues that in tonal languages, changes in tone have a phonemic function that directly affects word meaning. Furthermore, Hasanah (2017) explains that the ability to distinguish tones depends not only on speech production but also on accurate auditory perception of the tonal contours that are heard.

Because tones have a phonemic function, the ability to perceive and distinguish tones is one of the fundamental skills that Mandarin Chinese learners must develop. Errors in tone perception can lead to misunderstandings of word meaning even when the consonants and vowels are pronounced correctly. According to Adji (2020), tonal differences are often difficult to recognize, especially when produced by native speakers at a natural speaking rate. Therefore, accurate auditory perception of tones remains one of the major challenges for learners of Mandarin Chinese as a second language.

For speakers of non-tonal languages such as Indonesian, this challenge is even greater. According to Ayuri et al. (2024), Indonesian is a non-tonal language, meaning that pitch differences do not distinguish lexical meaning but instead serve pragmatic functions, such as expressing emphasis or emotion. As a result, Indonesian speakers are generally not accustomed to using tonal differences to distinguish word meanings. Consequently, learners of Mandarin Chinese often experience difficulties in recognizing and distinguishing tones, particularly during the early stages of learning. This is further supported by Ulviani (2026), who found that limited phonological experience with a tonal system directly affects learners' ability to perceive Mandarin Chinese tones.

Consistent with these findings, a number of previous studies have examined difficulties in Mandarin Chinese tone perception among learners from non-tonal language backgrounds. Qadriani and Budianingsih (2021a) reported that the perception of lexical tones is one of the most challenging aspects of learning Mandarin Chinese for adult learners. Their study also found that Tone 2 and Tone 3 were the pair most frequently confused because of the similarity of their tonal

contours. These findings suggest that difficulties in listening to Mandarin Chinese tones are influenced not only by learners' first-language background but also by the acoustic similarity between tones.

Although previous studies have contributed to understanding Mandarin Chinese tone perception, most have focused on learners' ability to distinguish tones at the word or syllable-pair level. Comparatively few studies have examined tone perception across different linguistic levels, namely vocabulary, sentences, and paragraphs. These three levels differ in their linguistic characteristics. At the vocabulary level, learners only need to identify the tone of individual syllables. In contrast, at the sentence and paragraph levels, they must process more complex information because tones occur within longer and more natural spoken utterances. These differences in linguistic complexity may affect the level of difficulty learners experience in identifying Mandarin Chinese tones. In addition, most previous studies have relied primarily on test results as their main source of data, providing information only about learners' success or error rates. The reasons underlying these errors have received relatively little attention. Therefore, conducting interviews after the listening test is important to explore, in greater depth, the factors that contribute to learners' difficulties in tone perception based on their own experiences.

Differences in learner characteristics should also be taken into consideration, particularly among Non-Chinese Language Education Students at Ma Chung University. These students study Mandarin Chinese as a compulsory university course with limited instructional time until the second semester. This differs from students in the Chinese Language Education program, who receive more intensive and continuous exposure to the language. The limited amount of instructional time reduces opportunities to practice listening to and distinguishing Mandarin Chinese tones. Hadi et al. (2019) found that the learning environment and the intensity of language exposure are important factors influencing second-language acquisition, including the development of the target language sound system.

Based on the discussion above, a research gap remains regarding how Non-Chinese Language Education Students experience difficulties in identifying Mandarin Chinese tones at the vocabulary, sentence, and paragraph levels, as well as the factors underlying these difficulties as revealed through interviews. Therefore, this study aims to describe the difficulties experienced by second-semester Non-Chinese Language Education Students at Ma Chung University in listening to Mandarin Chinese tones by using listening tests and interviews. By combining these two methods, the study seeks to provide a more comprehensive understanding of the participants' tone perception abilities.

## **LITERATURE REVIEW**

### **Mandarin Tone System**

Mandarin Chinese is a tonal language, meaning that it uses tones as one of the features that distinguish word meanings. Unlike non-tonal languages, which rely primarily on consonants and vowels, changes in tone in Mandarin Chinese can produce different lexical meanings even when the syllable remains the same. According to Adji (2020), Mandarin Chinese has four primary tones: a high-level tone (Tone 1), a rising tone (Tone 2), a falling-rising tone (Tone 3), and a falling tone (Tone 4), as well as one neutral tone. Each of these tones has a distinct pitch contour and serves to distinguish word meanings. Therefore, mastering tones is an essential aspect of learning Mandarin Chinese because errors in recognizing or producing tones can change the meaning of words and lead to misunderstandings in communication.

In addition to the four primary tones, Mandarin Chinese also has a neutral tone, which does not have a fixed tonal contour and whose pronunciation depends on the preceding syllable (Chang & Yao, 2019). Although the neutral tone is less prominent than the four primary tones, it plays an important role in producing natural and fluent Mandarin Chinese speech. For learners from non-tonal language backgrounds, including native Indonesian speakers, this tonal system presents a particular challenge. Ayuri et al. (2024) explain that Indonesian does not use tonal differences to distinguish lexical meaning; instead, pitch is used only for pragmatic purposes, such as emphasis or emotional expression. The differences between the phonological systems of Indonesian and Mandarin Chinese require learners to acquire a new sound system, particularly in distinguishing tonal patterns during both listening and speaking (Mulyaningsih, 2014). Therefore, understanding the Mandarin Chinese tone system provides an essential foundation for examining learners' difficulties in identifying tones through listening activities.

### **Tone Perception in Second Language Learning**

Tone perception refers to learners' ability to recognize and distinguish the tonal patterns they hear so that the meaning of a word can be understood accurately. In a tonal language such as Mandarin Chinese, this ability is a fundamental skill because differences in tone can produce different lexical meanings even when the syllable remains the same. Hasanah (2017) explains that tone perception depends not only on the ability to hear differences in pitch but also on learners' ability to accurately recognize tonal contours. Therefore, learners need to develop auditory sensitivity to each tonal contour in order to distinguish word meanings correctly. This ability generally develops through continuous language exposure and intensive listening practice.

In second-language learning, tone perception is closely related to lexical tone processing, which refers to the process by which learners receive, recognize, and

interpret tonal information to understand the meaning of spoken utterances. Cao et al. (2024) explain that successful tone processing depends on learners' ability to distinguish the acoustic characteristics of each tone, including pitch height, pitch direction, and syllable duration. For learners from non-tonal language backgrounds, this process is generally more challenging because they are not accustomed to using tones to distinguish lexical meaning. As a result, learners often have difficulty distinguishing tones with similar tonal contours, particularly Tone 2 and Tone 3. This finding is also supported by Qadriani and Budianingsih (2021a), who found that beginning learners still have limited sensitivity in distinguishing these two tones. Therefore, tone perception is one of the key factors influencing learners' ability to understand spoken Mandarin Chinese.

### **Listening Comprehension in Tonal Language Learning**

Listening is the process of understanding information conveyed through spoken language by recognizing speech sounds, processing linguistic information, and interpreting meaning based on context. In learning Mandarin Chinese, listening is more complex because learners must not only recognize consonants and vowels but also distinguish the tonal patterns associated with each syllable. Kim et al. (2022) explain that listening comprehension is influenced by several factors, including linguistic knowledge, working memory capacity, and the ability to process spoken information efficiently. Therefore, successful comprehension of spoken Mandarin Chinese depends not only on vocabulary knowledge but also on the ability to accurately identify tones during the listening process.

The level of difficulty in listening also varies according to the length and complexity of the spoken input. At the vocabulary level, learners only need to focus on identifying the tone of a single word, resulting in relatively low processing demands. In contrast, at the sentence and paragraph levels, learners must identify tones while simultaneously understanding the relationships between words and the context of the utterance. As the spoken input becomes longer, the demands on memory, attention, and auditory processing also increase. Haerunnisa et al. (2025) state that listening practice introduced in a gradual manner can help improve learners' ability to understand spoken information. Therefore, comparing listening performance across the vocabulary, sentence, and paragraph levels is important for providing a more comprehensive understanding of learners' difficulties in identifying Mandarin Chinese tones.

### **Previous Related Study**

Several previous studies have examined the learning and perception of Mandarin Chinese tones from different perspectives, including tone production, tone perception, and the acoustic characteristics of tones. However, these studies differ in their research focus, participant characteristics, and research methods. As a result, they have not yet provided a comprehensive understanding of the difficulties

in listening to Mandarin Chinese tones among learners from non-tonal language backgrounds, particularly non-Chinese Language Education Students.

The first study, conducted by Wulan and Perdanasari (2015) and entitled Problems in Learning Mandarin Chinese Tones or Intonation, found that university students continued to experience difficulties in producing several Mandarin Chinese tone combinations. These difficulties were attributed to interference from Indonesian, which does not have a tonal system, insufficient intensive practice, and students' tendency to focus more on vocabulary acquisition than on accurate tone production. This study provides valuable insights into problems related to tone production. However, it focuses primarily on pronunciation and does not examine learners' ability to identify tones through listening, which is the focus of the present study.

The second study, conducted by Qadriani and Budianingsih (2021a) and entitled Beginning Students' Perception of Mandarin Chinese Tone 2 and Tone 3, found that beginning learners had limited sensitivity in distinguishing Tone 2 from Tone 3. The results showed that the participants' perception remained at the stage of continuum perception, indicating that they were unable to distinguish the two tones consistently. This study contributes to understanding tone perception difficulties among beginning learners. However, it focuses only on Tone 2 and Tone 3 and therefore does not provide a broader picture of learners' difficulties in identifying all Mandarin Chinese tones across the vocabulary, sentence, and paragraph levels.

The third study, also conducted by Qadriani and Budianingsih (2021b) and entitled Intermediate Students' Perception of Changes in Frequency and Turning Point Timing of the Mandarin Chinese Falling-Rising Tone, found that changes in frequency and the timing of the turning point significantly affected learners' perception of Tone 2 and Tone 3. The study also showed that the participants were more sensitive to changes in turning point timing than to changes in frequency. These findings contribute to a better understanding of the factors influencing Mandarin Chinese tone perception. However, the study mainly focuses on the acoustic characteristics of tones and does not examine learners' difficulties in identifying tones through listening across different levels of spoken discourse.

### **Research Novelty**

Based on the previous studies, it can be seen that research on Mandarin Chinese tones has addressed tone production, the perception of specific tones, and the acoustic characteristics of tones. Nevertheless, several limitations remain. *First*, most previous studies have focused on specific tones, particularly Tone 2 and Tone 3. *Second*, earlier research has generally assessed learners' performance at the word or individual sound level and has not compared difficulties in tone identification across the vocabulary, sentence, and paragraph levels. *Third*, most studies have relied solely on test results to evaluate learners' performance and have not explored the underlying factors contributing to these difficulties through interviews. In

addition, studies specifically involving non-Chinese Language Education Students as participants remain relatively limited.

To address these limitations, the present study offers several contributions. *First*, it focuses on second-semester non-Chinese Language Education Students at Ma Chung University, who have received less exposure to Mandarin Chinese than students enrolled in the Chinese Language Education program. *Second*, it compares learners' difficulties in identifying Mandarin Chinese tones across three linguistic levels; vocabulary, sentences, and paragraphs thereby providing a more comprehensive understanding of the challenges they experience. *Third*, this study employs not only a listening test but also semi-structured interviews to explore the factors underlying learners' difficulties in identifying Mandarin Chinese tones. By combining quantitative and qualitative data, this study aims to provide a more comprehensive understanding of the difficulties experienced by non-Chinese Language Education Students in listening to Mandarin Chinese tones.

## METHOD

### Design and Samples

This study employed a mixed-methods approach using an explanatory sequential design. This design was selected because the study began with the collection and analysis of quantitative data, followed by the collection of qualitative data through interviews to support and explain the quantitative findings. This is consistent with Catalyst (2021), who states that mixed methods combine quantitative methods to answer the question "what" and qualitative methods to answer the questions "how" or "why" within a single study. Therefore, the use of a mixed-methods approach in this study enabled the researchers not only to describe the level of difficulty in listening to Mandarin Chinese tones quantitatively but also to explore the reasons underlying these difficulties through interview data.

The participants consisted of 16 second semester non-Chinese Language Education Students at Ma Chung University from eight study programs: Management, Accounting, Informatics Engineering, Information Systems, Pharmacy, English Literature, Visual Communication Design, and Industrial Engineering, with two students representing each program. The participants were selected using purposive sampling because the study required individuals with specific characteristics that matched the research objectives (Sugiyono, 2019). The selection criteria included second semester non-Chinese Language Education Students who were currently taking or had completed the compulsory Chinese 2 course, were native Indonesian speakers, had no prior experience learning Mandarin Chinese before entering university, and had studied Mandarin Chinese for two semesters through the compulsory course. These criteria were established to ensure that all participants had relatively similar experiences in learning basic Mandarin Chinese. Given the limited number of participants, the findings of this study cannot be generalized to represent all non-Chinese Language Education Students.

### Instrument and Procedure

This study employed two types of research instruments: quantitative and qualitative. According to Ramadani and Handayani (2024), tests are used as objective instruments for measuring participants' abilities. Meanwhile, Arianto (2024) states that interviews are useful for exploring participants' experiences and cognitive processes in greater depth. Therefore, each instrument used in this study is described below.

*First*, the quantitative instrument. The quantitative instrument was a Mandarin Chinese tone listening test developed by the researchers based on the HSK 1 textbook, specifically Chapters 1–15, as these chapters correspond to the material studied by second semester non-Chinese Language Education Students. Before being administered, the instrument underwent content validation by a Mandarin Chinese language expert to evaluate the appropriateness of the content, the accuracy of tone usage, and the overall suitability of the instrument. The listening test consisted of 10 vocabulary items, 5 sentences, and 1 paragraph, with a total of 68 target syllables for assessment. The vocabulary section contained 20 target syllables, the sentence section contained 28 target syllables, and the paragraph section contained 20 target syllables. The distribution of each tone across the three test *category* is presented in the following table.

Table 1.  
*Distribution of Each Tone Across the Test Category*

| Category   | Tone 1 | Tone 2 | Tone 3 | Tone 4 | Neutral Tone |
|------------|--------|--------|--------|--------|--------------|
| Vocabulary | 4      | 6      | 6      | 2      | 2            |
| Sentences  | 5      | 2      | 10     | 10     | 1            |
| Paragraph  | 3      | 6      | 6      | 4      | 1            |
| Total      | 12     | 14     | 22     | 16     | 4            |

The distribution of tones was not made equal across the test sections because the instrument was developed based on the vocabulary and content in the HSK 1 textbook that had been studied by the participants. As a result, the instrument reflects the natural distribution of tones in the context of elementary Mandarin Chinese learning. An example of the listening test items used in this study is presented in the following table.

Table 2.  
*Sample Items from the Mandarin Chinese Tone Listening Test*

| Category   | Test Format                                                                          | Sample Items            |
|------------|--------------------------------------------------------------------------------------|-------------------------|
| Vocabulary | Identify the tone (一, 二, 三, 四, 五, or the neutral tone) of the vocabulary item heard. | <i>Hanyu</i>            |
|            |                                                                                      | <i>Nü'er</i>            |
|            |                                                                                      | <i>Mama</i>             |
| Sentences  |                                                                                      | <i>Zhe shi pingguo。</i> |

|           |                                                                                                         |                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|           | Identify the tone (ˉ, ˊ, ˇ, ˋ, or the neutral tone) of the syllable heard in a sentence.                | <i>Shier dian chifan.</i>                                                           |
|           |                                                                                                         | <i>Ta hui xie hanzi.</i>                                                            |
| Paragraph | Identify the tone (ˉ, ˊ, ˇ, ˋ, or the neutral tone) of the bolded vocabulary item heard in a paragraph. | <i>Ni hao (1)! Wo jiao <b>anna</b>, shi jinnian (2) <b>de xin</b> xuesheng (3).</i> |

The audio used in the listening test was a recording by a native Mandarin Chinese lecturer at Ma Chung University, with a duration of approximately four minutes. Before being used for data collection, the recording was reviewed by a Mandarin Chinese language expert to ensure its quality. In line with Cao (2024), the selection of the audio source considered the clarity of pronunciation, the consistency of tone production, the speaking rate, and its conformity with the standard pronunciation used in formal Mandarin Chinese instruction.

*Second*, the qualitative instrument. The qualitative instrument consisted of a semi-structured interview guide containing 11 main questions designed to explore the participants' experiences in identifying Mandarin Chinese tones. In addition to the main questions, follow-up (probing) questions were used based on each participant's responses and test results to gain a deeper understanding of the reasons behind their difficulties. The interview guide was also validated by a lecturer with expertise in research methodology. Examples of the interview questions included, "Which Mandarin tone is the most difficult for you to identify?" and "What do you think causes this difficulty?"

Data were collected using two techniques: document analysis and interviews. Document analysis was based on the results of the listening test, in which participants listened to audio recordings consisting of vocabulary items, sentences, and a paragraph. The participants listened to each audio recording once and were asked to identify the tone (ˉ, ˊ, ˇ, ˋ, or the neutral tone) of the provided *pinyin*. The entire test took approximately 10 minutes to complete. After the test, the participants' answer sheets were collected. The responses were scored based on the accuracy of tone identification for each target syllable, with one point awarded for each correct answer and zero points for each incorrect answer.

The second data collection technique was interviews. Based on the test results, six participants with the lowest scores were selected for in-depth interviews to explore the difficulties they experienced in identifying Mandarin Chinese tones. The interviews were conducted in Indonesian so that the participants could explain their experiences and difficulties more freely without being limited by their Mandarin Chinese proficiency. Each interview lasted approximately 10–15 minutes, was audio-recorded with the participants' consent, and was subsequently transcribed to support the analysis of the quantitative findings.

### Data Analysis

Data analysis in this study consisted of quantitative and qualitative analyses. The quantitative data were analyzed using descriptive statistics because the purpose of the study was to describe the difficulties in listening to Mandarin Chinese tones rather than to examine relationships between variables. According to Sholikhah (2016), descriptive statistics are used to describe data as they are, while Martias (2021) explains that this technique allows data to be presented in the form of frequencies and percentages, making it possible to identify patterns of errors systematically.

The quantitative data analysis was conducted in three stages. *First*, all test responses were tabulated according to participant codes and item numbers. Each response was then classified as either correct or incorrect for every target syllable, with one point awarded for each correct answer and zero points for each incorrect answer. *Second*, the frequency of errors for each tone was calculated based on all participant responses to that tone. The percentage of errors was calculated using the following formula.

$$\text{Error Percentage (\%)} = \frac{\text{Number of incorrect responses for a tone}}{\text{Total number of responses for that tone}} \times 100\%$$

The total number of responses was obtained by multiplying the number of occurrences of each tone in the instrument by the total number of participants who completed the test. Third, the frequency and percentage of errors were used to identify the most difficult tones in the vocabulary, sentence, and paragraph sections. The results were then presented in charts to facilitate the interpretation of the findings.

The qualitative data were analyzed using the model proposed by Miles, Huberman, and Saldaña (2014), which consists of data condensation, data display, and conclusion drawing. Before the analysis, each participant was assigned a code ranging from "a" to "p" to protect their identity. During the data condensation stage, the interview transcripts were read thoroughly, and all relevant statements were coded. Each interview excerpt was assigned a code indicating the finding category, participant code, and excerpt number to facilitate data retrieval during the analysis. The coding process was conducted inductively, with categories developed from patterns that emerged from the interview data. The coded data were then grouped into categories based on these emerging patterns. The description of each coding category is presented in the following table.

*Table 3. Qualitative Coding Categories*

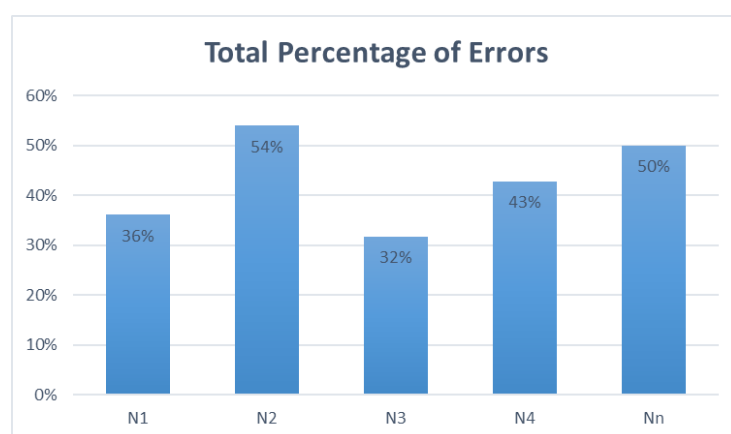
| Code | Category                        |
|------|---------------------------------|
| KP   | Limited Exposure                |
| KN   | Difficulty Distinguishing Tones |
| SM   | Listening Strategies            |

|    |                                                          |
|----|----------------------------------------------------------|
| KK | Influence of Vocabulary, Sentence, and Paragraph Context |
| MK | Misconceptions about Mandarin Tones                      |
| PS | Psychological Factors                                    |
| BI | Influence of the Native Language                         |
| PN | Perceptions of the Importance of Tones                   |

During the data display stage, each category was organized into a narrative and linked to the quantitative findings. The qualitative findings were then used to explain the reasons behind the difficulties identified in the quantitative analysis, such as why participants had difficulty distinguishing Mandarin Chinese tones. Thus, the qualitative data did not stand alone but served to support and explain the quantitative findings, providing a more comprehensive understanding of the difficulties in listening to Mandarin Chinese tones among second semester non-Chinese Language Education Students at Ma Chung University.

## RESULT AND DISUSSION

This section presents the findings of the quantitative and qualitative analyses on the difficulties experienced by second semester non-Chinese Language Education Students at Ma Chung University in identifying Mandarin Chinese tones through listening activities. The findings are presented across three linguistic levels: vocabulary, sentences, and paragraphs, and are further supported by interview data to explain the reasons underlying the participants' difficulties. Overall, the results of the Mandarin Chinese tone listening test indicate that participants made errors in tone identification. The percentages of these errors are presented below.



*Figure 1. Overall Percentage of Errors in Mandarin Chinese Tone Identification*

As shown in Figure 1, Tone 2 had the highest error percentage (54%), followed by the neutral tone (50%). These findings indicate that Tone 2 was the most difficult tone for the participants to identify. In comparison, the error percentages for Tone 4, Tone 1, and Tone 3 were 43%, 36%, and 32%, respectively, indicating lower error rates than those for Tone 2 and the neutral tone. These results suggest that

difficulties in tone identification were not evenly distributed across the five tones, with Tone 2 and the neutral tone showing the highest error percentages. To provide a more detailed understanding of these findings, the results are presented according to three linguistic levels: vocabulary, sentences, and paragraphs.

*Table 4.*

*Summary of Error Percentages in Mandarin Chinese Tone Identification Across the Test Category*

| <b>Tone</b>  | <b>Vocabulary</b> | <b>Sentences</b> | <b>Paragraphs</b> |
|--------------|-------------------|------------------|-------------------|
| Tone 1       | 39%               | 48%              | 38%               |
| Tone 2       | 50%               | 59%              | 56%               |
| Tone 3       | 22%               | 41%              | 22%               |
| Tone 4       | 41%               | 48%              | 44%               |
| Neutral Tone | 47%               | 56%              | 50%               |

Table 4 summarizes the error percentages in Mandarin Chinese tone identification across the vocabulary, sentence, and paragraph sections. Overall, Tone 2 and the neutral tone showed the highest error percentages in all three sections. This table provides an overview of the patterns of tone identification difficulties before the findings are discussed in greater detail for the vocabulary, sentence, and paragraph sections.

### **Analysis of Difficulties in Listening to Mandarin Chinese Tones at the Vocabulary**

Difficulties in listening to Mandarin Chinese tones at the vocabulary level refer to the challenges experienced by participants when identifying the tones of individual words presented in isolation, without the support of sentence or paragraph context. Vocabulary consists of all the words in a language and serves as the primary means of expressing concepts and meanings in communication. This is supported by Chaer (as cited in Syahfitri & Arianto, 2020), who states that vocabulary comprises all the words in a language used to convey various concepts and meanings. The larger an individual's vocabulary, the greater their ability to communicate effectively. In Mandarin Chinese, vocabulary acquisition plays a particularly important role because each word is associated with a specific tone that is inseparable from its meaning. Therefore, learning Mandarin vocabulary cannot be separated from learning its tones. Figure 2 presents the error percentages in tone identification at the vocabulary level, providing an overview of the patterns of difficulties experienced by the participants.

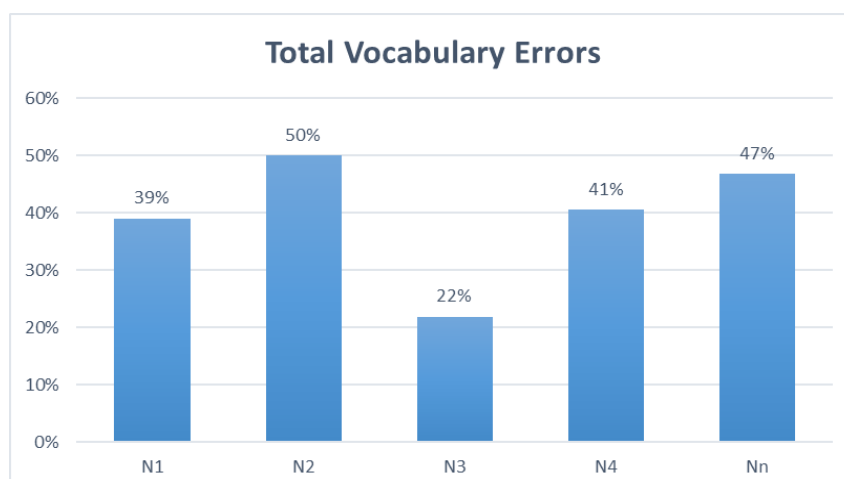


Figure 2. Percentage of Errors in Mandarin Chinese Tone Identification at the Vocabulary

As shown in Figure 2, Tone 2 had the highest error percentage (50%), followed by the neutral tone (47%), Tone 4 (41%), Tone 1 (39%), and Tone 3 (27%). These findings indicate that Tone 2 and the neutral tone were the two most difficult tones for the participants to identify at the vocabulary level. Examples of errors involving Tone 2 are presented below.

For the vocabulary item (*jīnnián*), which consists of Tone 1 followed by Tone 2, several participants incorrectly identified the tone of the second syllable (*nián*), which should have been Tone 2. Six participants identified it as Tone 1, three as Tone 3, and one as the neutral tone. A similar pattern was found in the vocabulary item (*xuéshēng*), which consists of Tone 2 followed by Tone 1. For the first syllable (*xué*), which should have been Tone 2, six participants identified it as Tone 3, while two identified it as Tone 4.

These findings indicate that Tone 2 was most frequently confused with Tone 1, Tone 3, Tone 4, and the neutral tone. To better understand the factors contributing to these errors, the test results were further explored through interviews with the participants.

"I think Tones 2 and 4 are difficult because they sound quite similar to me." (KN12)

"Yes, they're hard to tell apart. I'm often confused about which tone rises, which one falls, or how the pitch changes." (KN13)

"Sometimes I feel that Tone 2 and Tone 4 sound like Tone 3. So whenever I'm unsure, I usually choose Tone 3." (KNo4)

"I think Tone 1 and Tone 2 are more difficult because the difference between them isn't very noticeable." (KNk1)

Based on the interview findings, the participants' difficulty in identifying Tone 2 was not only related to recognizing its tonal contour but also to their perception that Tone 2 sounded similar to Tones 1, 3, and 4. This perception caused the participants to hesitate when identifying the tones they heard, leading them to misidentify Tone 2 as another tone. These findings support the test results, which showed that Tone 2 had the highest error percentage at the vocabulary level, and suggest that the perceived similarity among tones was an important factor contributing to tone identification errors. This finding is consistent with the study by Qadriani and Budianingsih (2021a), which reported that Tone 2 is one of the most difficult tones for beginning learners of Mandarin Chinese to identify.

In addition to Tone 2, the neutral tone showed an error percentage of 47%. This result indicates that the participants had difficulty distinguishing the neutral tone from the four full tones at the vocabulary level. The vocabulary items containing the neutral tone in this study included (*xièxie*) and (*māma*). For (*xièxie*), which consists of Tone 4 followed by the neutral tone, the second syllable (*xie*), which should have been pronounced with the neutral tone, was identified as Tone 1 by one participant, Tone 3 by one participant, and Tone 4 by six participants. Similarly, for (*māma*), which consists of Tone 1 followed by the neutral tone, the second syllable (*ma*), which should have been pronounced with the neutral tone, was identified as Tone 1 by six participants and Tone 3 by one participant.

These findings indicate that the participants tended to identify the neutral tone as one of the four full tones, namely Tone 1, Tone 3, or Tone 4. This suggests that they had not yet clearly distinguished the characteristics of the neutral tone from those of the four primary tones in Mandarin Chinese. To better understand the reasons behind these identification errors, the test findings were further explored through interviews with the participants, who reported the following.

"I thought the first syllable (*mā*) and the second syllable (*ma*) each had their own full tone." (MKm2)

"Yes. It sounded like both syllables had tones. I mean, it sounded as if they were both Tone 4." (MKk1)

"I thought I heard a tone on the second syllable." (MKl2)

Based on the interview findings, the participants' difficulty in identifying the neutral tone was influenced by their understanding that every syllable in Mandarin Chinese has a full tone. This understanding led them to identify syllables that should have been pronounced with the neutral tone as Tone 1, Tone 3, or Tone 4. These findings support the test results, which showed a high error percentage for the neutral tone, and suggest that the participants had not yet clearly distinguished the characteristics of the neutral tone from those of the four primary tones in Mandarin Chinese. This finding is consistent with Chang and Yao (2019), who explain that the neutral tone

has a shorter duration, weaker stress, and no distinct tonal contour, making it difficult for learners from non-tonal language backgrounds to recognize.

### **Analysis of Difficulties in Listening to Mandarin Chinese Tones at the Sentence**

Difficulties in listening to Mandarin Chinese tones at the sentence level refer to the challenges experienced by participants when identifying the tones of words embedded within complete sentences. Unlike the vocabulary section, in which words were presented individually, this section required participants to identify tones while simultaneously processing the relationships among words within a sentence. A sentence is a linguistic unit consisting of a sequence of words that conveys a complete meaning. This is consistent with Ghufon et al. (2020), who state that a sentence is the smallest unit of language that plays an essential role in communication. In Mandarin Chinese learning, identifying tones at the sentence level requires more complex listening skills than identifying tones in isolated words because, according to Haerunnisa et al. (2025), listening comprehension involves not only perceiving spoken language but also simultaneously maintaining attention, understanding linguistic input, and interpreting meaning. The error percentages for tone identification at the sentence level are presented below.



*Figure 3. Percentage of Errors in Mandarin Chinese Tone Identification at the Sentence*

As shown in Figure 3, Tone 2 had the highest error percentage (59%), followed by the neutral tone (56%), Tones 1 and 4 (48% each), and Tone 3 (41%). These findings indicate that Tone 2 and the neutral tone remained the two most difficult tones to identify at the sentence level. Compared with the vocabulary section, the error percentages increased for all tones, suggesting that tone identification became more challenging when words were presented within complete sentences rather than in isolation. To provide a more detailed understanding of these findings, examples of Tone 2 identification errors at the sentence level are presented below.

The first example was found in the word (*píngguǒ*) in the sentence (*Zhè shì píngguǒ*), which consists of Tone 2 followed by Tone 3. Of the 16 participants, five correctly identified Tone 2, while one identified it as Tone 1, two as Tone 3, five as Tone 4, and three as the neutral tone. The second example was found in the word (*Shí'èr*) in the sentence (*Shí'èr diǎn chīfàn*), which consists of Tone 2 followed by Tone 4. Of the 16 participants, eight correctly identified Tone 2, while one identified it as Tone 1, one as Tone 4, and six as the neutral tone.

These findings indicate that Tone 2 was not only frequently confused with Tone 1, Tone 3, Tone 4, and the neutral tone, but also showed a higher error percentage when it appeared in sentence contexts. To better understand the factors contributing to these errors, the test findings were further explored through interviews with the participants, who reported the following.

When it's just a single word, I can still recognize the tone. But when it's part of a sentence, like in everyday speech, I still find it difficult to distinguish the tones. I can understand the meaning of the sentence, but I'm still not able to identify the tone correctly. (KKp2)

"Actually, I identified it without really realizing it. I think I was distracted by (*Zhè shì*). It seems that the tone of the previous words influenced how I heard the target word." (KKk3)

Based on the interview findings, the participants' difficulty in identifying tones at the sentence level was influenced by the increased amount of information that had to be processed simultaneously during listening. Some participants reported that they were still able to recognize tones when words were presented individually but experienced difficulties when the same words appeared within complete sentences. In addition, several participants stated that their attention was distracted by other words in the sentence, making it more difficult to accurately identify the tone of the target word.

These findings suggest that the increased complexity from the vocabulary level to the sentence level affected the participants' attention during tone identification. When listening to complete sentences, the participants not only had to process tonal contours but also had to comprehend the spoken utterances simultaneously. As a result, their attention to tonal features was reduced, increasing the likelihood of tone identification errors. This finding is consistent with Izza et al. (2021), who reported that learners of Mandarin Chinese identify tones more accurately when words are presented in isolation than when they appear in sentence contexts. In addition, Hao (2018a) explains that in connected speech, tonal contours may influence one another, making tone perception more complex.

In addition to Tone 2, the findings also showed that the error percentage for Tone 3 increased from 27% at the vocabulary level to 41% at the sentence level. This result suggests that the participants' ability to identify Tone 3 in isolated words did not

fully carry over when the tone appeared in sentence contexts. Although familiar words, such as (*wǒ*) (I), were correctly identified by all participants, less familiar words showed higher error percentages. These findings suggest that familiarity with vocabulary helped the participants recall tone patterns stored in memory; however, this advantage decreased when they had to process multiple sources of information simultaneously within a sentence. This finding is consistent with Zou et al. (2022), who reported that learners of Mandarin Chinese from non-tonal language backgrounds rely on tone representations stored in memory during tone identification.

Overall, the findings indicate that tone identification at the sentence level is a more complex process than at the vocabulary level. The increase in error percentages suggests that sentence context imposes a greater attentional demand during listening. As a result, participants were required not only to recognize tonal contours but also to process the relationships among words simultaneously.

### **Analysis of Difficulties in Listening to Mandarin Chinese Tones at the Paragraph**

At the paragraph level, the target words were no longer presented in isolation but appeared within a longer spoken passage. The participants listened to an entire paragraph and were asked to identify the tones of the words printed in bold. Although they only needed to identify the tones of specific target words, they still had to listen to the entire paragraph in order to locate those words. This task required the participants to process sounds, meaning, and tones simultaneously during listening. Rostina (2021) explains that a paragraph consists of a sequence of sentences presented continuously, requiring more complex listening skills than those needed at the vocabulary or sentence level. Similarly, Laia (2020) states that listening is an active process involving continuous attention, comprehension, and interpretation of spoken sounds. The error percentages for tone identification at the paragraph level are presented below.

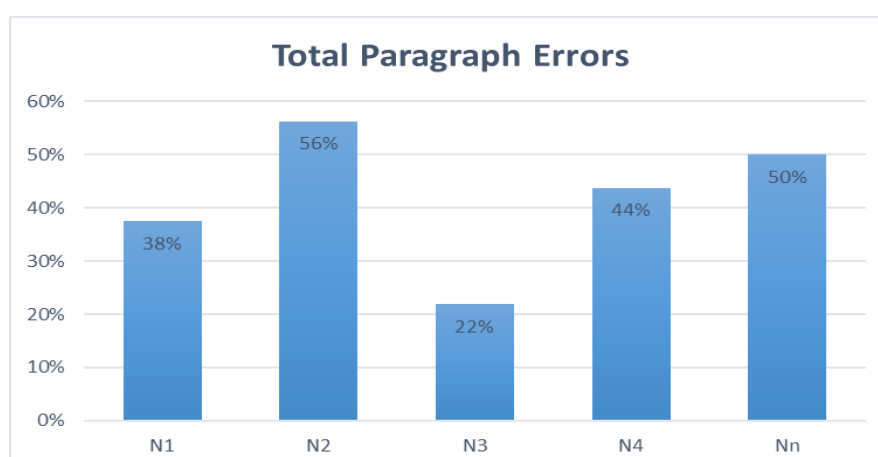


Figure 4. Percentage of Errors in Mandarin Chinese Tone Identification at the Paragraph

As shown in Figure 4, Tone 2 had the highest error percentage (56%), followed by the neutral tone (50%), Tone 4 (44%), Tone 1 (38%), and Tone 3 (22%). These findings indicate that Tone 2 and the neutral tone were the two most difficult tones for the participants to identify at the paragraph level. To better understand the factors contributing to these errors, the test findings were further explored through interviews with the participants, who reported the following.

The audio was played continuously as one complete paragraph. Since I only had to identify the tone of one target word, I had already forgotten how it sounded by the time I reached the answer. I couldn't replay it in my head. (KKm2)

"Everything seemed to blend together. In the sentence and paragraph sections, I sometimes felt like I lost track of the tones halfway through because I was too focused on the next word." (KKn2)

"When listening to a sentence or a paragraph, I think the previous word influences how I hear the next one. Sometimes the tone of the previous word seems to carry over to the following word." (KKk4)

Based on the interview findings, the participants reported that their difficulty in identifying tones at the paragraph level was related to the increased processing demands involved in listening to longer spoken passages. They explained that they had difficulty retaining the sounds they had heard, lost focus on tonal information while processing subsequent words, and perceived the tone of a target word as being influenced by the preceding utterance. These findings suggest that difficulties in tone identification at the paragraph level are not only related to the characteristics of the tones themselves but are also influenced by the cognitive demands of processing continuous spoken discourse. This finding is consistent with Kim et al. (2022), who explain that second-language listening comprehension is influenced by working memory capacity, particularly when listeners are required to process longer spoken utterances.

In addition to the high error percentages in tone identification, the findings also revealed inconsistencies in the identification of several vocabulary items that had previously been presented in the vocabulary section. Some participants assigned different tones to the same vocabulary items when they appeared in the paragraph context. To better understand this phenomenon, the test findings were further explored through interviews with the participants, who reported the following.

"When I listened to the audio, it sounded like the tone was different, so I identified it differently." (MK11)

"It sounded like a different tone, so I wrote down a different one." (MK13)

I think it was supposed to be Tone 2 followed by Tone 2, but I identified it differently in the two sections. At that time, that's how I heard it. In the vocabulary section, I thought I heard a level tone followed by a rising and then a falling tone, but it turned out that wasn't the case. Later, in the paragraph section, I heard it differently again. (MKo2)

Based on the interview findings, several participants reported that their perception of tones changed when the same vocabulary items appeared in a paragraph context. They explained that words they had previously identified in the vocabulary section were perceived as having different tones when heard within a paragraph, resulting in inconsistent responses. These findings suggest that longer spoken contexts can influence participants' perception of the tones of the same vocabulary items.

The inconsistencies were also reflected in the basis on which participants made their judgments. The interview findings indicated that some participants relied not only on the sounds they heard but also on their memory of the vocabulary, the context of the utterance, and their overall auditory perception when identifying tones. To provide a more detailed understanding of this process, additional interview excerpts are presented below.

"I guessed the tone based on whether the word sounded familiar, and then I matched it with the context." (SMI5)

"First, I listened to it. Then I tried to remember the *pinyin* that our teacher had taught us. After that, I made my guess based on what I heard." (SMp1)

"I based my answer on how the word sounded to me. For example, if it sounded like it was rising, I identified it as Tone 2." (SMo4)

I guessed the tone based on the sentence. For example, in (*Zhè shì píngguǒ*), I already knew what (*píngguǒ*) meant in Indonesian. That helped me picture the word and recall what I had learned in Mandarin before deciding on the tone. (SMk3)

The participants' approaches to tone identification indicate that second-language speech perception does not rely solely on the sounds they hear but also involves cognitive processes during listening. When they had difficulty distinguishing tonal contours directly, they drew on their memory of vocabulary, *pinyin*, and the context of the utterance to determine their answers. This suggests that tone identification is influenced not only by the ability to distinguish tonal contrasts but also by the use of prior knowledge during the identification process.

These findings support the view of Nofindra (2019), who argues that understanding spoken information involves drawing upon knowledge and experiences stored in memory. In the present study, this was reflected in the participants' use of their memory of vocabulary, *pinyin*, and utterance context to help identify the tones they

heard. Furthermore, the findings are consistent with Hasanah (2017), who explains that accurate tone identification depends on auditory perception of tonal contours. The results of this study indicate that when participants were unable to perceive tonal contours accurately, they tended to rely on their existing knowledge to support the tone identification process.

Based on the overall findings, Tone 2 and the neutral tone consistently showed the highest error percentages across the vocabulary, sentence, and paragraph levels. This indicates that the difficulty in identifying these two tones was not limited to a single linguistic level but persisted even when vocabulary items were presented in increasingly complex spoken contexts. The test and interview findings revealed that the difficulty with Tone 2 was related to its perceived similarity to Tones 1, 3, and 4, causing participants to hesitate when identifying the correct tone. In contrast, most participants identified syllables with the neutral tone as one of the four full tones. These findings suggest that the participants still assumed that every syllable in Mandarin Chinese should carry a full tone and had not yet clearly recognized the characteristics of the neutral tone.

The findings also showed that the increasing complexity of spoken input, from isolated words to sentences and paragraphs, affected the participants' ability to identify tones. At the vocabulary level, participants only needed to focus on a single word, allowing them to devote their full attention to tone identification. In contrast, at the sentence and paragraph levels, they had to identify tones while simultaneously understanding the relationships among words and following the continuous flow of spoken information. These additional attentional and processing demands increased the likelihood of tone identification errors. This study also extends previous research, which has generally examined difficulties with either Tone 2 or the neutral tone separately, by demonstrating that both difficulties consistently occurred across three linguistic levels: vocabulary, sentences, and paragraphs.

The findings also have important implications for Mandarin Chinese instruction, particularly for beginning learners. Tone instruction should not be limited to practice with isolated vocabulary items but should be introduced progressively through sentences and paragraphs so that learners become accustomed to identifying tones in continuous spoken contexts. In addition, more intensive practice should be provided for Tone 2 and the neutral tone, as these two tones consistently showed the highest error percentages across all three levels. Therefore, tone instruction should focus not only on recognizing tonal contours but also on developing learners' ability to maintain attention and accurately identify tones in increasingly complex communicative contexts.

## CONCLUSION

Based on the findings of this study, it can be concluded that Tone 2 was the most difficult tone for the participants to identify across all three linguistic levels:

vocabulary (50%), sentences (59%), and paragraphs (56%). This was followed by the neutral tone, which showed error percentages of 47%, 56%, and 50%, respectively. The findings indicate that the difficulty in identifying Tone 2 was primarily caused by its perceived similarity to Tones 1, 3, and 4, leading participants to hesitate when selecting their answers. In contrast, the difficulty with the neutral tone was mainly due to the assumption that every syllable in Mandarin Chinese carries a full tone, causing the neutral tone to be frequently identified as one of the four primary tones.

The study also showed that increasing the complexity of spoken input, from isolated words to sentences and paragraphs, affected the participants' ability to identify tones. At the sentence and paragraph levels, the participants' attention was divided between identifying tones and processing other information in the spoken utterances. In addition, some participants relied on their memory of vocabulary, *pinyin*, and utterance context when they were unable to identify tones based solely on the sounds they heard.

These findings have important implications for Mandarin Chinese instruction, particularly for beginning learners. Tone instruction should be introduced progressively, beginning with tone discrimination practice using isolated vocabulary, followed by activities that increase learners' awareness of the characteristics of the neutral tone, and then listening practice using sentences and paragraphs. This approach can help learners not only recognize tonal contours in isolation but also identify tones accurately in continuous spoken discourse.

This study has several limitations. *First*, the number of participants was relatively small, and all participants were drawn from a single university, limiting the generalizability of the findings. *Second*, the study employed a limited number of vocabulary items, sentences, and paragraphs in the listening test, which may not fully represent the range of tone usage in Mandarin Chinese.

Based on these limitations, future research is recommended to include a larger number of participants with varying levels of Mandarin Chinese proficiency, compare Chinese Language Education students and non-Chinese Language Education Students, and combine perceptual analysis with acoustic analysis to provide a more comprehensive understanding of the tone identification process.

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