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Comparative Analysis of Tonal Systems in Chinese and Thai and Teaching Strategies for Chinese Tonal Patterns

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Abstract

Thai and Chinese are both tonal languages. Compared with Chinese learners in non-tonal language areas, Thai students can learn Chinese tones relatively easily. However, in my teaching practice, I found that a large number of Thai Chinese learners exhibit the phenomenon of "foreign tones." This study conducts a comparative analysis of Chinese and Thai tonal systems through classroom observation and phonetic comparison, identifying the causes of tonal errors among Thai learners. Based on the analysis, specific teaching strategies, such as gesture-assisted learning and modified tonal teaching sequences, are proposed. The effectiveness of these strategies is supported by pre and post-test results from classroom implementation. The findings highlight the importance of addressing tonal differences in teaching Chinese to Thai learners.

Keywords: Chinese tone, Tone teaching, Comparison between Chinese and Thai

1. Introduction

Chinese and Thai both belong to the Sino-Tibetan language family and are classified as tonal languages, in which tone plays a crucial role in distinguishing lexical meaning. Compared to learners from non-tonal language backgrounds such as English or French, Thai students possess a relative advantage in acquiring Chinese tones due to their heightened sensitivity to tonal variation (Liu Shanglin, 2009). However, in actual classroom settings, it is commonly observed that Thai learners of Chinese often exhibit “foreign-accented tones” (洋腔洋调). Although they can generally distinguish between different Chinese tones, their pronunciation is often influenced by the tonal system of their native language, resulting in tonal errors (Kong Fanrong, 2012). This indicates that, despite the typological similarity of both languages as tonal systems, significant differences exist in pitch values, contour shapes, and tone sandhi rules, leading to negative transfer from the mother tongue which is one of the main obstacles in mastering Chinese tones.

Existing studies have made progress in the contrastive analysis of Chinese and Thai tonal systems. Using experimental phonetics, Rosana (2013) identified that Thai tones tend to have a narrower pitch range and do not feature complex contour tones like the Chinese third tone (214). Zhang Hongjian (2012) further analyzed typical tonal errors made by Thai learners, such as replacing the Chinese falling tone (51) with the Thai falling tone (41), or confusing the Chinese rising tone (35) with the Thai rising-high tone (14). However, most of these studies have focused on theoretical comparisons, and there is still a lack of systematic and evidence-based teaching strategies tailored to Thai learners (Dong Jingjing, 2016).

This study aims to explore the underlying causes of tonal errors among Thai learners of Chinese by conducting a comparative analysis of the tonal systems of both languages. It seeks to propose effective, targeted teaching strategies. Specifically, the research objectives are: (1) to compare and analyze the pitch values, tone contours, and tone sandhi rules of Chinese and Thai in order to identify key differences; (2) to examine common tonal errors made by Thai students through classroom observation and phonetic experiments; and (3) to design and test a teaching approach based on the contrastive analysis.

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Theoretically, this study enhances the understanding of tonal system differences between Chinese and Thai. Practically, it provides applicable teaching strategies to improve Chinese tone acquisition among Thai learners and help them overcome the common problem of “foreign-accented tones,” thereby enhancing pronunciation accuracy.

2. Basic Knowledge of Chinese and Thai Tones

Tone is a suprasegmental phoneme. "A phoneme is a set of sounds in a particular language that are related in nature and do not occur in the same environment within words." (Qiongsi, 1932) Phonemes themselves do not carry meaning, but their function is to distinguish meaning. The study of tone falls within the scope of phonemic system research.

2.1 Introduction to Chinese Tones

The origin of modern Chinese pronunciation can be traced back to the period of Chinese script reform, during which the Chinese Script Reform Committee, including renowned Chinese linguists like Zhou Youguang, developed the linguistic standardization of Chinese. This led to the oralization and phonemicization of Chinese Pinyin, comparable to Arabic phonetics. Chinese consists of 23 initial consonants, 39 finals, and 4 tones.

When learning Chinese as a second language, the tones we refer to are those of Standard Mandarin, which function to distinguish word meanings through tone variations. For example, in Chinese, words like "八 (bā), 拔 (bá), 把 (bǎ), 爸 (bà)" have different meanings due to differences in pronunciation.

1. Basic Knowledge of Chinese Tones

To describe tone values more precisely, Zhao Yuanren created the Five-Pitch Contour Notation, a method that visually represents the relative pitch and rising or falling changes in tones. The Chinese tones represented using the Five-Pitch Contour Notation are shown in the diagram below

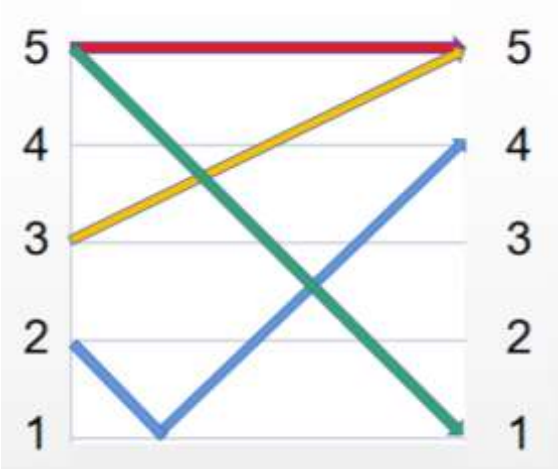

Figure 1 Chinese Tone Value

The overall characteristics of Chinese tones include a prominent high-low pitch contour, showcasing a relatively wide pitch range from the highest to the lowest pitch. Apart from the first tone (55), which maintains a steady level, the other three tones exhibit significant pitch variations. Chinese tones also feature a distinctive “rising-falling” tone, which is neither strictly rising nor falling, but instead displays a complex pitch contour.

Table 1 Chinese Tone Table

Tone	Symbol	Tone Value	Tone Pattern	Characteristics
First Tone	ˉ	55	High-level Tone	The high-level tone has a fast vocal cord vibration with minimal variation in pitch.
Second Tone	ˊ	35	High-raising Tone	The pitch gradually shifts from mid-range to high, with uniform vocal cord vibration that gradually increases in speed, resulting in a high-rising tone.
Third Tone	ˇ	214	Low-raising Tone	Tone modulation involves a complex pitch modulation, starting with a descent followed by an ascent. Vocal cord vibrations slow down initially and then accelerate, resulting in a pitch change from semi-low to low, then back to semi-high or mid-pitch.
Fourth Tone	ˋ	51	Low-falling Tone	Tone modulation is a complete descending pitch, with the tone sliding from high to low and vocal cord vibrations transitioning from fast to slow.

2. Tone Changes in Chinese

In the phonological flow of Mandarin Chinese, the third tone ("上声," **shàng shēng**), "一" (**yī**), and "不" (**bù**) undergo tonal changes influenced by the surrounding syllables. Native Mandarin speakers are able to intuitively produce the modified tones based on their linguistic instincts. However, for many second language learners of Mandarin who lack this linguistic intuition, they need to learn the correct rules governing these tonal changes.

For the third tone, when pronounced in isolation or at the end of a sentence, it remains unchanged. When preceding a syllable with the first tone ("阴平," **yīn píng**), second tone ("阳平," **yáng píng**), fourth tone ("去声," **qù shēng**), or the neutral tone ("轻声," **qīng shēng**), its pitch contour changes from 214 to 21. When two third- tone syllables are adjacent, the first syllable's pitch contour shifts from 214 to 35.

The character "一" (**yī**) does not undergo tonal changes when pronounced in isolation, at the end of words, or when used in ordinal numbers. However, before a fourth-tone syllable, its tone changes from 55 to 35. Before non-fourth-tone syllables, it shifts from 55 to 51. In compound words with reduplication, "一" is pronounced with a neutral tone.

The character "不" (**bù**) remains unchanged when pronounced in isolation or before first tone ("阴平," **yīn píng**) and second tone ("阳平," **yáng píng**). Before a fourth tone syllable, its tone shifts from 51 to 35. When "不" is sandwiched between other words, it is pronounced as a neutral tone.

2. Introduction to Thai Tones

Thai is the official language of Thailand and has a history spanning over seven centuries. It was developed by King Ramkhamhaeng the Great of the Sukhothai Kingdom in 1283, through the transformation of Khmer and Mon scripts. Thai is a tonal language, where tones can differentiate meanings. It consists of 44 consonants, 32 vowels, and 5 tones.

1. Basic Knowledge of Thai Tones

Like Chinese, Thai belongs to the Sino-Tibetan language family, specifically to the Tai-Kadai branch within that group. It is also a tonal language with five tones, represented using the Five-Pitch Contour Notation, as shown in the diagram below:

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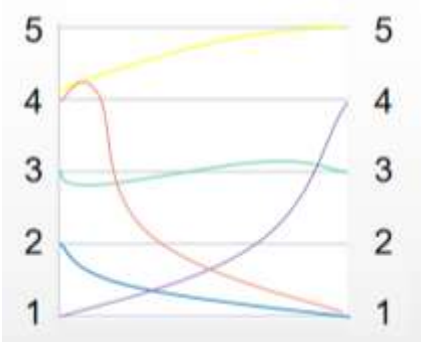

Figure 2 Comparison of Pitch Values in the Five Thai Tones

While Thai is also a tonal language with register tones, its overall tonal characteristics are defined by a relatively narrow pitch range, primarily consisting of relatively simple rising and falling tones, without complex contour tones. Compared to Chinese, the pitch differences between these rising and falling tones are relatively small, lacking the pronounced shifts from the highest to the lowest or vice versa. Thai tones exhibit a less pronounced pitch contour overall.

Table 2 Thai Tone Table

Tone	Symbol	Tone Value	Tone Pattern	Characteristics
First Tone	None	33	Mid-level tone	Tone modulation is a mid-level pitch, with fast vocal cord vibrations and minimal variation in pitch.
Second Tone	่	21	Low-falling Tone	Tone modulation is a descending pitch, sliding from high to low, with vocal cord vibrations that gradually slow down.
Third Tone	้	41	Low Tone	Tone modulation is a descending pitch, sliding from high to low, with vocal cord vibrations rapidly transitioning from fast to slow.
Fourth Tone	๊	45	Low-raising Tone	Tone modulation is a gradual rising pitch, transitioning step by step from mid-pitch to high pitch, with vocal cord vibrations steadily accelerating.
Fifth Tone	๋	14	High-raising Tone	Tone modulation is a high-rising pitch, with vocal cord vibrations that gradually accelerate at a steady pace.

2. Tonal Changes in Thai Language

Firstly, due to the distinction between long and short vowels in the Thai language, the tone can vary when different consonants are combined with long or short vowels. For instance, when a high consonant is paired with a short vowel, it is pronounced with the second tone, whereas when it is paired with a long vowel, it is pronounced with the fifth tone.

Secondly, the presence of initial or final consonants in Thai vocabulary can also lead to tonal changes. For example, when a medium consonant is combined with a short vowel and followed by a clear final consonant, it changes from its original second tone to the fifth tone.

Therefore, unlike the fixed tones in Mandarin Chinese, where the four tones interact predictably, Thai tones exhibit variation based on vowel length and the presence of initial and final consonants. While Mandarin Chinese may have occasional phonetic changes influenced by neighboring syllables, its tonal system is generally stable and straightforward, whereas Thai tones are relatively complex.

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3. Comparative Analysis of Mandarin Chinese and Thai Tones

3.1 Comparison of Chinese and Thai Tones

Comparative analysis is a crucial approach in second language acquisition. Contrastive analysis involves comparing the systems of two languages synchronically to reveal their similarities and differences, serving as a method of language analysis.

This paper systematically compares the tones of Mandarin Chinese with those of the Thai language to uncover similarities and differences. Through contrastive analysis, we can identify the challenges Thai learners of Chinese face when acquiring Chinese tones, highlight teaching priorities for instructors, predict potential errors learners may make, assist learners in overcoming negative transfer from their native language, and enhance the effectiveness of instruction. The following section presents the comparative analysis of Mandarin Chinese and Thai tones.

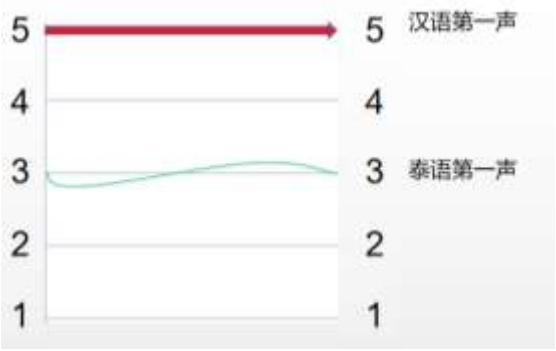

Figure 3 Comparative Analysis of Thai and Chinese First Tones

According to Figure 3, there are differences between the first tones in Mandarin Chinese and Thai. Firstly, the Thai first tone is a low-level tone represented as 33, whereas the Mandarin Chinese first tone is high and level, maintaining a pitch of 55. Secondly, while the Mandarin Chinese first tone remains flat without any pitch contour changes, the Thai first tone exhibits some fluctuations, as indicated by, instrumental analysis showing a pattern of initial descent, subsequent rise, and then another descent.

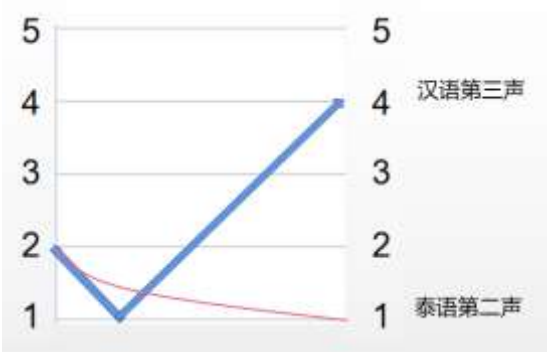

Figure 4 Comparative Analysis of Thai Second Tone and Chinese Third Tone

According to Figure 4, there are similarities and differences between the second tone in Mandarin Chinese and the third tone in Thai. Firstly, both the Thai second tone and Mandarin Chinese third tone start with a 2, but the Thai second tone undergoes a slow descent and ultimately reaches 1, making it a low-level tone represented as 21. The Mandarin Chinese third tone is a contour tone represented as 214, but in practice, when the third tone is followed by the first tone, the second tone, or the fourth tone, it changes from 214 to a falling tone represented as 21. In this case, it becomes similar to the Thai second tone as a transition from a high pitch to a low pitch, resulting in similar relative pitch heights.

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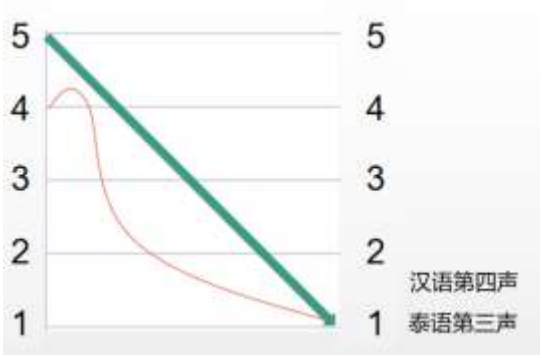

Figure 5 Comparative Analysis of Thai Third Tone and Chinese Fourth Tone

According to Figure 5, the differences and similarities between the fourth tone in Mandarin Chinese and the third tone in Thai can be observed. Both the Mandarin fourth tone and Thai third tone are generally falling tones. However, Mandarin's fourth tone is represented as 51, while Thai's third tone is represented as 41. Additionally, the fall in the Thai third tone is not a direct drop like in Mandarin's fourth tone, but it includes a brief rising phase before descending. Furthermore, in Thai etiquette and culture, pronouncing falling tones too abruptly is considered impolite, so in practice, the Thai falling tone is pronounced with a longer-duration.

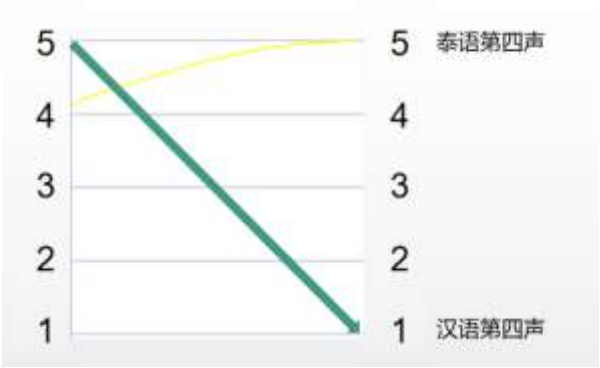

Figure 6 Comparative Analysis of Thai Fourth Tone and Chinese Fourth Tone

According to Figure 6, there appear to be significant differences between the fourth tone in Mandarin Chinese and the fourth tone in Thai. As previously mentioned, the Mandarin fourth tone is a falling tone represented as 51, characterized by a relatively sharp and brief descent. In contrast, the Thai fourth tone is a high-level tone, transitioning from 4 to 5. Due to the influence of Thai etiquette and culture, the actual pronunciation of the Thai fourth tone involves an initial rise followed by a level tone, forming a distinct pitch pattern.

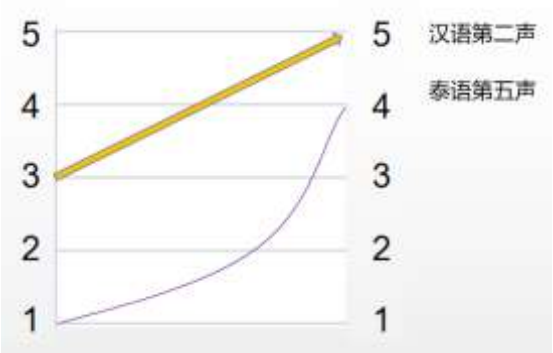

Figure 7 Comparative Analysis of Thai Fifth Tone and Chinese Second Tone

According to Figure 7, there appear to be notable differences and similarities between the second tone in Mandarin Chinese and the fifth tone in Thai. Both the Thai fifth tone and the Mandarin second tone are rising tones, but their starting and ending points differ. Mandarin's second tone is represented as 35, while Thai's fifth tone is represented as 14. Moreover, the Thai fifth tone exhibits a slight descent before the rise.

3.2 Analysis and Discussion of Tone Differences between Chinese and Thai

Firstly, in terms of pitch values, both Thai and Mandarin have level, rising, and falling tones. In Thai, the level tone is considered mid-level, the falling tones can be further divided into light falling and heavy falling, and there are also light rising and heavy rising tones. However, Thai lacks the Mandarin third tone (214), which combines a fall and a rise. Secondly, Mandarin's pitch range variations are generally larger than Thai's, except for the Thai fourth tone (45) which is slightly higher. Overall, Thai tones have a pitch range approximately one unit lower than Mandarin tones. This contributes to the perception that Thai sounds smoother, while Mandarin has a more pronounced musicality.

(1) Error Effects from Pitch Value Differences:

Confusion of high-level tones (Mandarin 55 vs. Thai 33): Thai learners often pronounce the Mandarin high-level tone (55), such as **mā** ("妈"), as a mid-level tone [ma33], which corresponds to Thai's mid-level tone. The fundamental reason lies in the narrower pitch range of Thai tones, which is approximately one degree lower than that of Mandarin (Rosana, 2013). This causes Thai students to underperform in both the perception and production of the Mandarin 55 tone. Simplification of the falling-rising tone (Mandarin 214): Since Thai lacks complex contour tones like Mandarin's third tone (214), learners tend to simplify it into a falling tone (21), such as pronouncing **hǎo** ("好") as [ha**ʊ**21]. This supports the theory in second language acquisition that "phonetic simplification often results from gaps in the native language system" (Ellis, 2015).

(2) Cultural Interference in Tone Contours:

Differences in falling tone duration (Mandarin 51 vs. Thai 41): In Thai, the falling tone tends to be prolonged due to cultural taboos or speech conventions (e.g., mài may be pronounced as [ma˧˧i41]), while Mandarin's fourth tone (51) requires a sharp and brief drop. This difference leads to a common tonal error in which Thai learners produce an overly prolonged falling tone in Mandarin. This phenomenon highlights the importance of incorporating cultural considerations into tone instruction.

(3) Transfer Conflicts in Tone Sandhi Rules:

Mandarin tone sandhi for the third tone (214 ⟶ 35 or 21) significantly differs from Thai's tone alternation rules, which are often triggered by final consonants (e.g., unvoiced final consonants can cause abrupt tonal shifts). Thai learners frequently transfer these native tonal adjustment patterns to Mandarin. For instance, in the phrase **nǐ hǎo** ("你好"), the tone of **nǐ** should change from 214 to 35, but learners may still pronounce it as 214. This case confirms the contrastive analysis hypothesis, which states that "the greater the structural difference between two languages, the more significant the negative transfer" (Lado, 1957).

4. Teaching Strategies for Thai Chinese Tonal Pronunciation

The Thai language has tone distinctions, and Thai students, compared to learners from non-tonal language backgrounds, have a certain awareness of tones, making it easier for them to perceive the tones in Mandarin Chinese. However, this can also lead them, unconsciously, to associate Mandarin Chinese tones with their corresponding tones in Thai, substituting Mandarin tones with similar Thai tones, resulting in phonetic interference. This phenomenon, known as native language transfer, can lead to the fossilization of language if not corrected through proper phonetic training. Based on classroom observation, Thai learners tend to replace Mandarin tone 35 with Thai tone 14, and often prolong tone 51 due to cultural influences. These patterns consistently appeared during pronunciation drills across multiple classes. Therefore, teachers and students

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need to pay adequate attention to Chinese phonetics from the outset of their Mandarin learning journey. By utilizing a comparative approach between Mandarin and Thai tones and drawing on prior teaching experiences, the author has summarized the following teaching strategies to help students understand the similarities and differences between Mandarin and Thai tones, ultimately assisting them in achieving correct pronunciation.

Comparing Chinese and Thai Tones through gestures to enhance tonal perception.

(1) Mandarin High-Level Tone (55) vs. Thai Mid-Level Tone (33)

To illustrate the difference between Mandarin's high-level tone (55) and Thai's mid-level tone (33), the teacher can begin with the Thai mid-level tone (33) while performing a gesture using the left-hand gliding smoothly from right to left in front of the chest. Mandarin's high-level tone (55) is demonstrated by moving the left hand from right to left near the shoulder area. By combining these gestures with the teacher's tonal pronunciation, students can better appreciate that Mandarin's high-level tone (55) is higher in pitch than Thai's mid-level tone (33).

(2) Mandarin Falling-Rising Tone (214) vs. Thai Rising Tone (14/45)

For the comparison between Mandarin's falling-rising tone (214) and Thai's rising tone (14/45), the teacher can incorporate gestures. Start by placing the left hand at the right shoulder, then slide it diagonally down to the abdomen, and finally move it upward to the top of the head, forming a "V" shape. In addition to gestures, the teacher can also use head movements. When demonstrating the pronunciation of Mandarin's 214, the teacher can lower the head to the turning point and then raise it, guiding students to experience the pitch variation in 214.

(3) Mandarin Falling Tone (51) vs. Thai Falling Tone (21/41)

To compare Mandarin's falling tone (51) with Thai's falling tone (21/41), the teacher can start by demonstrating the Thai falling tone using a gestural approach. The left hand can move slowly from the shoulder area to the left and then slide downward to the left. Subsequently, the teacher can demonstrate Mandarin's falling tone (51) by pronouncing it and accompanying it with a gesture that involves swiftly slicing the left hand from the shoulder area to the lower left. Through this comparison, students can perceive that Mandarin's falling tone (51) is shorter and quicker than Thai's falling tone (21/41). When teaching the falling tone, it's essential for the teacher to encourage students to overcome any cultural inhibitions, as using a falling tone in Mandarin is not considered impolite.

(4) Mandarin Rising Tone (35) vs. Thai High-Level Tone (33)

To strengthen students' understanding of the "straight rising" nature of the Mandarin rising tone (35) and to reduce the tendency to produce an initial curve, it is effective to contrast it with the Thai high-level tone (33). For example, when teaching the pronunciation of **chá** ("茶") [tɕa33], teachers can utilize gesture-based instruction. The teacher may use the left hand, starting at the abdomen (pitch level 3) and quickly moving upward to the shoulder (pitch level 5), to visually emphasize the sharp, linear rise. At the same time, the teacher can provide a mnemonic phrase for this tone: "from mid to high, rise quickly, no bending," contrasting it with the flat gesture used to represent Thai tone 33. This method reinforces the tonal distinction and helps learners internalize the correct tonal contour in Mandarin.

(5) Adjusting the Order of Tone Instruction and Emphasizing Key Features

In traditional tone instruction, teachers often follow the order of "**yīn píng, yáng píng, shàng shēng, qù shēng**" (first tone, second tone, third tone, fourth tone). However, practical experience has shown that this order is not conducive to students' tone mastery. It is important to follow the principle of starting with the easiest and progressing to the more challenging tones. For Thai students, the tone instruction order should be "**yīn píng, qù shēng, shàng shēng, yáng píng**" (first tone, fourth tone, third tone, second tone). After implementing the revised tone instruction order (Tone 1 ⟶ 4 ⟶ 3 ⟶ 2), students showed clearer differentiation of rising

and falling tones during oral practice. To minimize native language transfer, after Thai students learn the first tone in Mandarin, teachers can immediately introduce the fourth tone, allowing students to quickly move from a high pitch to a low pitch. Next is the third tone, helping students distinguish the internal variations between the first tone and third tone. Lastly, students can compare the second tone with the fourth tone, one rising and one falling, to grasp the pitch variations in Mandarin tones effectively.

Based on the above analysis, the following conclusions can be drawn:

(1) Cognitive Mechanism of the Gesture-Contrast Method

Mapping tonal pitch to spatial gestures (e.g., tone 55 represented at shoulder height, tone 33 at chest level) aligns with the theory of embodied cognition (Gibbs, 2006), effectively transforming abstract tonal concepts into concrete, visual representations. This approach helps learners internalize pitch differences more intuitively. During tone gesture practice, students responded positively and were able to reproduce more accurate tonal contours, especially in tones 3 and 4, which had previously caused difficulty.

(2) Rationale for Optimizing Tone Instruction Sequence

The traditional teaching sequence (first tone ⟶ second tone ⟶ third tone ⟶ fourth tone) may inadvertently trigger interference from Thai tonal patterns—for instance, the Mandarin second tone (35) is often substituted with the Thai rising-high tone (14). By adjusting the sequence to “first tone ⟶ fourth tone ⟶ third tone ⟶ second tone,” the contrast between the Mandarin fourth tone (51) and the Thai falling tone (41) reinforces the sharp, brief nature of the Mandarin tone. Furthermore, teaching the third tone (214) before the second tone helps prevent confusion between similar rising contours.

(3) Necessity of Addressing Cultural Interference

Thai learners often exhibit prolonged falling tones due to cultural norms related to politeness. To counter this, it is essential to explicitly clarify that Mandarin falling tones do not serve a politeness function. Context-based pronunciation drills—such as practicing imperative expressions like “Kuài！” ("快！")—can help reshape pronunciation habits and correct prosodic misinterpretations.

5. Conclusion

Through the comparative analysis of Mandarin Chinese and Thai tone systems in this paper, it is evident that there are many similarities and differences in tonal values and patterns between the two languages. For Mandarin learners who have already mastered the Thai tone system, the similarities and differences between the Mandarin and Thai tone systems may lead to native language transfer. Therefore, when teaching Mandarin tones, it is essential to proactively familiarize oneself with the students' native tone system, compare the similarities and differences between their native tone system and the Mandarin tone system, and predict what kind of negative or positive transfer their native tone system might have on Mandarin tone learning. Based on these reasonable predictions, more scientifically designed teaching strategies for Mandarin tones can be formulated, resulting in significantly improved teaching outcomes.

The tonal range differentiation mechanism, cultural interference model, and dual-track strategy of gesture and instructional sequencing revealed in this study can be directly integrated into Chinese language teaching materials for Thai learners—for example, by incorporating tone comparison charts and contrastive tone sandhi tables. By anticipating “high-risk points of negative transfer” (such as the falling-rising tone 214 and the falling tone 51), teachers can design targeted pronunciation correction exercises, thereby overcoming key bottlenecks in tone instruction and improving overall tonal accuracy in Mandarin learning.

This study was limited by the lack of large-scale quantitative data and was primarily based on classroom observation. Future research should include controlled experiments and longitudinal studies to validate the effectiveness of gesture-based instruction and optimized tone sequencing across diverse learner groups.

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