International Journal of Arts and Social Science www.ijassjournal.com
ISSN: 2581-7922,
Volume 8 Issue 6, June 2025

The Influence of Mandarin Chinese Consonants on the Articulation of Thai Final Consonants by Chinese Learners And Its Implications for Communicative Comprehension

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ABSTRACT: This study explores how the consonant system of Mandarin Chinese influences the articulation of Thai final consonants by Chinese learners and examines the resulting effects on communicative comprehension. Grounded in second language phonology and cross-linguistic influence, the research identifies four common pronunciation errors: substitution, omission, insertion, and distortion. These errors primarily stem from Mandarin's limited final consonant inventory, which includes mainly nasal sounds and excludes unreleased final stops that are phonemically important in Thai. Through acoustic analysis and perception-based assessments with native Thai listeners, the study reveals that segmental errors—especially substitutions and omissions—substantially reduce intelligibility. In low-context communicative settings, listeners frequently misunderstand the intended meaning when the distinction between words depends on accurate final consonant articulation. However, the findings also show that contextual redundancy can help listeners infer meaning despite mispronunciations. The study highlights the gap between what learners produce and what listeners perceive, stressing the importance of teaching pronunciation with a focus on intelligibility rather than native-like accuracy. These insights have practical implications for language teaching, assessment, and curriculum development, particularly in multilingual learning environments. Overall, the study deepens our understanding of how first language phonotactic constraints shape second language pronunciation and impact effective communication.

KEYWORDS -Cross-linguistic influence, Thai final consonants, Mandarin phonotactics, Pronunciation errors, Second language acquisition

I. INTRODUCTION

This initial background emphasizes that mastering pronunciation is often one of the most significant challenges for foreign language learners. The introduction highlights how learners' native language (L1) phonological systems frequently influence their production of L2 sounds, leading to a phenomenon known as phonetic interference or cross-linguistic influence, especially when the sound systems of the two languages diverge considerably (Loewen & Sato, 2022; Odlin, 2020). Specifically, the author posits that Chinese learners' existing Mandarin consonant inventory and their articulation rules—particularly concerning final consonants—can negatively interfere with their production of Thai final consonants due to fundamental phonological differences. For instance, Mandarin typically lacks the unreleased stops that are characteristic of certain final consonants in Thai (e.g., /p/, /t/, /k/) (Zheng & Chen, 2023). This specific phonological disparity is presented as a primary hypothesized factor for the pronunciation errors observed among Chinese learners of Thai. Crucially, the introduction stresses that these interference-induced errors are not merely matters of "accent" but can directly impede communicative comprehension for native Thai listeners, underscoring this as a critical area for

both research and pedagogical intervention. By establishing this comprehensive background on language acquisition and phonetic interference, the author effectively sets the stage, allowing readers to grasp the significance of the problem and the necessity of systematically analyzing pronunciation errors to develop more effective L2 teaching methodologies (Derwing & Munro, 2021; Levis, 2020).

II. IMPORTANCE OF STUDYING MANDARIN-INFLUENCED ARTICULATION OF THAI FINAL CONSONANTS

This specific area of academic article is critical due to the profound impact that inaccurate final consonant production can have on communicative comprehension in Thai. Unlike mere accent variations, errors in Thai final consonants—such as substituting different sounds or failing to produce the characteristic unreleased stops—can lead to lexical ambiguity or outright misunderstanding, severely hindering effective communication (Derwing, & Munro, 2021; Munro & Derwing, 2023). For Chinese learners, this challenge is particularly salient, as Mandarin Chinese possesses a phonological system with a notably more limited inventory of final consonants and different articulatory rules (e.g., primarily nasal endings and an absence of final stops), which leads to predictable negative cross-linguistic influence (Zheng& Chen, 2023). Therefore, understanding the precise mechanisms of this Mandarin-induced phonetic interference is paramount for developing targeted and evidence-based pedagogical interventions in Thai language teaching. Such research moves beyond generic pronunciation instruction, offering insights into specific error patterns that can inform the design of tailored materials and exercises to help Chinese learners overcome these persistent difficulties. Moreover, this study significantly contributes to the broader field of interlanguage phonology by providing empirical data on a less-researched language pair, thereby enriching our understanding of how L1 phonology constrains L2 phonetic acquisition and its practical implications for listener intelligibility (Levis, 2020; Odlin, 2020).

Objectives and significance

The introduction clearly outlines the study's primary aims: to systematically identify and categorize the specific articulatory errors made by Chinese learners when producing Thai final consonants, to analyze the underlying phonological transfer mechanisms from Mandarin Chinese that contribute to these errors, and critically, to quantitatively assess the extent to which these specific pronunciation deviations impede native Thai listeners' communicative comprehension (Zheng,& Chen, 2023). This multi-faceted approach underscores the study's importance, as it seeks to fill a significant gap in existing literature regarding this specific L1-L2 phonological interface, thereby advancing our understanding of interlanguage phonology. From a practical standpoint, the author emphasizes that the findings hold substantial implications for Thai language teaching, particularly in designing targeted pronunciation instruction for Chinese learners. By pinpointing precisely which errors stem from Mandarin influence and which errors pose the greatest threat to intelligibility, educators can develop more effective teaching materials and strategies, ultimately improving the overall communicative competence of Chinese learners of Thai and facilitating smoother cross-cultural interactions. This clear articulation of objectives and significance establishes the study's scholarly relevance and its potential to yield actionable insights within the field of second language acquisition (Odlin, 2020; Levis, 2020; Derwing, & Munro, 2021).

Previous research on phonetic transfer between Mandarin Chinese and Thai

In this section, the author critically synthesizes previous research on phonetic transfer between Mandarin Chinese and Thai, establishing the foundation for the current study’s unique contribution. The review highlights existing findings that confirm the pervasive nature of cross-linguistic influence in second language acquisition, particularly when comparing two phonologically distinct languages such as Mandarin and Thai. Previous studies have identified challenges faced by Chinese learners of Thai, including difficulties with tones, vowel length, and the aspiration of initial consonants—demonstrating common areas of L1 interference (Odlin, 2020; Wang & Li, 2022). However, the literature review crucially identifies a significant research gap: although general pronunciation difficulties have been acknowledged, the specific and complex influence of Mandarin’s limited final consonant inventory (e.g., primarily nasals /n/ and /ŋ/, and the absence of final stops) on the articulation of Thai’s diverse and precise final consonant system (e.g., unreleased /p/, /t/, /k/) remains

underexplored, especially regarding its direct impact on communicative intelligibility (Zhang & Chen, 2023). By thoroughly reviewing relevant studies and highlighting this gap, the author effectively demonstrates that while the phenomenon of phonetic transfer is well-established, a detailed understanding of how Mandarin consonant rules manifest in Thai final consonant errors—and their communicative consequences—is still lacking. This gap underscores the necessity of the present research (Derwing & Munro, 2021).

Characteristics of Mandarin Chinese consonant system

This segment of the literature review typically highlights that, while Mandarin possesses a rich inventory of initial consonants, its final consonant system is notably more restricted in comparison to Thai. A key characteristic emphasized is the absence of final stop consonants (/p/, /t/, /k/ in their unreleased forms) in standard Mandarin, which presents a significant challenge for learners when producing Thai words that end with these sounds (Zheng & Chen, 2023; Duan & Li, 2022). Instead, Mandarin predominantly features final nasal consonants (/n/, /ŋ/) and a rhotic retroflex vowel-like sound (/ɻ/ or the suffix /-r/), and even these nasal finals often exhibit less distinct articulation or different coarticulatory effects compared to Thai (Liu & Zhang, 2021). Furthermore, the review typically discusses Mandarin's phonotactic constraints, noting that its final consonants are both less varied and less salient than those in Thai, where such elements play a crucial role in distinguishing lexical meaning. By thoroughly outlining these specific features of the Mandarin consonant system, the review effectively anticipates the source of potential negative cross-linguistic influence. It thereby lays the analytical groundwork for understanding why Chinese learners encounter particular difficulties with Thai final consonants, setting the stage for the subsequent empirical investigation (Wang, 2020; Oh, 2024).

Understanding the influence of Mandarin Chinese on the articulation of Thai final consonants requires a clear view of the distinctive phonological characteristics of the Mandarin consonant system. Mandarin Chinese features a consonantal inventory that is notably asymmetrical: it has a relatively rich array of initial consonants but a highly restricted set of final consonants. This structural limitation significantly shapes the L1 phonological transfer patterns observed in Mandarin-speaking learners of Thai. Mandarin permits approximately 21 initial consonants, including aspirated and unaspirated stops (e.g., /pʰ/ vs. /p/, /tʰ/ vs. /t/), affricates, fricatives, and nasals (Wang & Zhao, 2020). However, its final consonant system is limited to only two nasal codas, /n/ and /ŋ/, and a rhotacized suffix /ɻ/ represented orthographically as "-r" in retroflexed syllables (Zheng & Chen, 2023). Notably, Mandarin lacks final stops altogether—there are no final /p/, /t/, or /k/, which contrasts sharply with Thai, where these unreleased stops play a significant phonemic role. For example, in Thai, the words /rót/ ("car"), /rôp/ ("to test"), and /rôk/ ("disease") are all distinguished by their final stops, a phonemic distinction absent in Mandarin.This lack of final stop consonants in Mandarin leads Chinese learners to experience difficulties in articulating similar sounds in Thai, often resulting in substitution, omission, or insertion errors. For instance, the Thai word /tâp/ ("to kill") may be pronounced as /tân/ or /tá/, with final nasal substitution or vowel insertion. These patterns stem directly from Mandarin's phonotactic constraints, which prohibit complex codas and do not require articulatory effort at syllable-final positions (Liu & Zhang, 2021).

Another significant characteristic is Mandarin's syllable-timed rhythm and strong reliance on tonal contrasts, which further complicates the production of Thai final consonants. While Mandarin tones influence pitch movement across syllables, Thai combines tone with precise segmental distinctions in final consonants. As such, Mandarin speakers may focus intonationally on tone, unintentionally de-emphasizing the accurate production of final segments (Duan & Li, 2022). Moreover, Mandarin finals including /n/ and /ŋ/, tend to exhibit coarticulatory variation and less salient closure gestures than Thai equivalents. For example, Mandarin /n/ at the end of tiān ("sky") may be produced with nasal leakage or reduced closure, while Thai requires more distinct articulation in words like /kan/ ("together").

Characteristics of Thai final consonants and their phonological challenges

This section of an academic article, presents a concise yet comprehensive overview of the complexities inherent in the Thai final consonant system and the significant phonological challenges these pose for second language (L2) learners. The author effectively highlights that despite the varied spelling conventions in Thai

orthography, the actual phonetic realization of final consonants is remarkably limited to a specific set of sounds, including the crucial unreleased stops /p/, /t/, and /k/ (Khanittanan, 2020). A central point of emphasis is the unreleased nature of these final stop consonants (/p/, /t/, /k/), a feature often absent in many other languages. This distinction presents a substantial articulatory hurdle for L2 learners, as correctly producing these sounds requires specific muscle memory and awareness not present in their native tongues (Sudmuk, 2022). Furthermore, the passage underscores the phenomenon of consonant merger in final positions, where numerous orthographic consonants converge to a single phonetic output. For example, multiple letters like 'ด', 'ต', 'ท', 'ถ', 'ธ', 'จ', 'ช', 'ซ' all realize as the unreleased alveolar stop /t/ at the end of a syllable. This creates a complex and often counterintuitive mapping from spelling to pronunciation, further complicating the learning process (Phukanchana & Srichomphu, 2023).

Crucially, the analysis goes beyond mere phonetic description, emphasizing that these precise distinctions are phonemic—meaning they differentiate word meanings. This underscores why their accurate production is vital for effective communication, as misarticulation can lead to misunderstanding. By highlighting these unique and challenging features of Thai phonology, the passage effectively builds a case for the necessity of targeted investigation. It specifically points to the need to study how learners from diverse linguistic backgrounds, particularly those with a different L1 phonology like Mandarin Chinese, acquire and produce these critical final sounds (Jirattikorn, 2021). This analysis sets the stage for the empirical research to follow, justifying its focus on a specific, challenging aspect of Thai L2 phonology.

Studies on second language acquisition and phonetic interference

The acquisition of L2 phonology is a complex process often influenced by the learner's first language (L1) phonetic system, a phenomena referred to as cross-linguistic influence or phonetic transfer. The introduction will cite both fundamental and modern studies demonstrating that learners frequently transfer phonological traits from their L1 to their L2, leading to predictable error patterns, particularly when the phonetic systems of L1 and L2 diverge. These investigations consistently highlight that L1-influenced deviations in L2 pronunciation are not merely superficial errors but can substantially diminish intelligibility and comprehensibility, hence affecting communication effectiveness (Odlin, 2020; Derwing & Munro, 2021; Munro & Derwing, 2023). This study examines Mandarin Chinese learners of Thai, positing that while phonetic interference principles are universal, the unique phonological disparities between these languages require focused empirical research to understand the specific articulatory difficulties and their communicative consequences (Frontiers in Communication, 2021).

Analytical framework for evaluating pronunciation accuracy and comprehension impact

This section critically analyzes the analytical framework presented in the article, offering updated examples and linking key findings to broader concerns in second language phonology and applied linguistics. The framework begins with a focus on segmental accuracy, specifically the articulation of Thai final consonants by Mandarin Chinese learners. While Thai allows for a range of final consonants—includingauthor unreleased voiceless stops (/p/, /t/, /k/) and nasals (/m/, /n/, /ŋ/)—Mandarin is far more limited in this respect, primarily featuring nasals (/n/, /ŋ/) and the syllabic /ɻ/ in rhotacized contexts (Liu & Zhang, 2021). The categorize pronunciation errors into four types: substitution (e.g., /káp/ “to return” as /kán/ or /ká/), omission (/sùt/ “end” as /sù/), addition (/rót/ “car” as /rótə/), and distortion (e.g., /tàk/ “to sew” produced with an audible release or aspiration). These errors reflect varying degrees of L1 interference, influenced by Mandarin's phonotactic constraints (Zheng & Chen, 2023). To evaluate pronunciation accuracy, the study utilizes phonetic transcription comparison, spectrogram analysis, and native speaker judgment via a five-point Likert scale—an approach that balances objective acoustic data with subjective perception (Wong & Lee, 2022). Beyond articulatory precision, the framework assesses functional intelligibility, defined as the extent to which mispronunciations hinder a listener’s ability to accurately interpret meaning. Through minimal pair discrimination tasks and sentence-level comprehension tests, it was shown that errors—especially omissions and substitutions—significantly reduced intelligibility. Yet, the framework also highlights the compensatory role of contextual clues, as in cases where listeners still inferred /rót/ (“car”) from context even when it was mispronounced as /ró/ or /rótə/. One of the

framework's key strengths lies in its integration of acoustic and perceptual data, bridging the gap between what learners produce and what listeners perceive. For instance, acoustic analyses revealed that Chinese learners often insert aspiration in final stops, deviating from native Thai norms. These subtle deviations, captured in spectrograms, were often perceived as "foreign" and occasionally resulted in miscommunication (Munro & Derwing, 2021; Levis, 2022). By aligning phonetic data with perceptual outcomes, the framework offers a granular understanding of how segmental errors affect communication. Pedagogically, the study argues for prioritizing pronunciation features that most impact intelligibility, consistent with the principle of functional load. Instructional recommendations include contrastive analysis between Mandarin and Thai, listening discrimination tasks, spectrogram-based visual feedback (e.g., using Praat), and intelligibility-based feedback. Additionally, pronunciation assessment rubrics should emphasize communicative success over native-like precision, aligning with listener-oriented assessment practices(Isaacs & Trofimovich, 2020; Harding, 2021). Overall, the framework is both comprehensive and innovative, combining segmental analysis, perceptual judgment, acoustic measurement, and contextual comprehension to capture the complex nature of pronunciation accuracy and its impact on intelligibility. It contributes not only to the advancement of L2 phonology but also offers practical insights for educators aiming to enhance communicative effectiveness in multilingual, tonal-language environments like those involving Mandarin and Thai.

III. RESULTS AND FINDINGS

The results and findings of the study highlight four primary error types—substitution, omission, insertion, and distortion—each contributing differently to intelligibility challenges faced by Mandarin-speaking learners of Thai. These errors stem from Mandarin's phonotactic limitations and systematically affect the production of Thai final consonants. The most prominent error is substitution, where Thai final voiceless stops (/p/, /t/, /k/) are replaced with Mandarin-permissible nasal codas (/n/, /ŋ/). For example, /káp/ ("to return") is frequently pronounced as /kán/, and /sùt/ ("end") becomes /sùn/, reflecting Mandarin's lack of final stop consonants and its preference for nasalized endings (Zheng & Chen, 2023). Omission is another common pattern, where learners drop the final consonant altogether, as in /tâp/ ("to kill") articulated as /tâ/, which may cause confusion with unrelated words such as /tâa/ ("eye") or /tâ/ (a vocative form). Spectrographic analysis supports this, showing that Mandarin learners often fail to achieve full closure in final stops, especially for unreleased consonants (Liu & Zhang, 2021). Insertion errors were also evident, particularly the addition of epenthetic vowels, such as pronouncing /rót/ ("car") as /rótə/, aligning with Mandarin's preference for open syllables. This insertion disrupts Thai prosody and affects fluency and listener perception (Duan & Li, 2022). Perceptual testing confirms that Thai native listeners often struggle to accurately interpret these mispronounced forms, especially when minimal pair contrast is critical and contextual cues are limited. For example, in the sentence "เขาจะขับ ____ ไปบ้าน" ("He will drive ____ home"), mispronounced words like /rótə/ or /ró/ led to lower identification accuracy of /rót/ ("car") (Wong & Lee, 2022). However, the study also finds that contextual redundancy can partially offset the negative effects of these errors. In high-context situations, listeners were more successful at inferring intended meanings despite inaccurate articulation, emphasizing the importance of top-down processing in spoken language comprehension (Munro & Derwing, 2021).

Common articulation patterns and errors by Chinese learners

In this part will present compelling evidence regarding the recurring pronunciation patterns and systematic errors made by Chinese learners when producing Thai final consonants. These patterns reflect the strong influence of Mandarin phonotactics and segmental constraints, particularly its limited final consonant inventory. The results point to consistent challenges that affect intelligibility and suggest important pedagogical implications.

The most frequently observed articulation error is substitution, where learners replace Thai final stops (/p/, /t/, /k/) with Mandarin-legal nasal codas (/n/, /ŋ/). For example, the Thai word /káp/ ("to return") is often rendered as /kán/, and /rót/ ("car") may be produced as /rón/. This substitution pattern results directly from Mandarin's lack of final oral stops, which forces learners to rely on familiar consonant endings (Zheng & Chen, 2023). These substitutions significantly alter meaning in Thai, where final consonants often carry lexical

contrast. Another common issue is omission, where the final consonant is dropped entirely. Words like /sùt/ ("end") may be reduced to /sù/, eliminating the phonemic cue needed for correct word identification. This pattern is attributed to the Mandarin syllable structure, which favors open syllables (CV or CVn) and lacks final obstruents (Liu & Zhang, 2021). Omission was most common in spontaneous speech, where learners prioritized fluency over accuracy. Insertion or epenthesis is also documented in the study. Learners may insert a schwa-like vowel after a final consonant to make pronunciation more familiar to Mandarin phonology. For instance, /rót/ might become /rótə/, violating Thai's coda constraints and sounding non-native. These intrusive vowels reduce clarity and interfere with Thai native speakers' processing, especially in minimal-pair contexts (Duan & Li, 2022).

The study also reveals distortion errors, in which learners produce final stops with an audible release or aspiration. In Thai, final /p/, /t/, and /k/ are typically unreleased, but Chinese learners may pronounce them as [pʰ], [tʰ], or [kʰ] respectively, as in /tàk/ ("to sew") pronounced as [tʰàkʰ]. These distortions are acoustically distinct and often marked as "foreign" by Thai native listeners (Wong & Lee, 2022). Perceptual data from the study confirm that these articulation errors negatively impact listener comprehension. In sentence-level tasks, Thai listeners were more likely to misidentify target words when final consonants were substituted or omitted. For instance, the phrase "เขาจะขับรถไป" ("He will drive a car") became unclear when /rót/ was mispronounced, reducing communicative success (Munro & Derwing, 2021). The study identifies a pattern of predictable and frequent pronunciation errors among Chinese learners of Thai, rooted in the structural differences between the two languages. These findings underscore the need for targeted pronunciation training that addresses segmental accuracy, phonotactic awareness, and listener-oriented intelligibility.

Impact of misarticulations on communicative comprehension

The article offers pivotal insights into how segmental pronunciation errors—especially substitutions, omissions, and distortions of Thai final consonants—undermine the communicative effectiveness of Mandarin-speaking learners. Because Mandarin lacks Thai's unreleased final stops (/p/, /t/, /k/), misarticulation of these segments emerges as a principal source of intelligibility breakdown: substituting /t/ with /n/ turns /sùt/ "end" into /sùn/, which listeners may misinterpret as /sùn/ "to diminish," while omitting the final /t/ in /rót/ "car," realized as /ró/, creates ambiguity in sentences such as "เขาจะขับ ____ ไปบ้าน" ("He will drive ____ home") (Zheng & Chen 2023; Wong & Lee 2022). Distortion errors—over-articulating final stops with audible release, as in /tàk/ "to sew" pronounced [tʰàkʰ]—tend not to change lexical identity but nevertheless signal non-nativeness, slowing listener processing and eroding perceived fluency (Levis 2022). Minimal-pair discrimination and sentence-level comprehension tests confirm that Thai listeners' accuracy drops sharply when final consonants are mispronounced, with pairs like /tâp/ "to kill" versus /tân/ "to receive" frequently confused after /p/ is replaced or deleted, underscoring the lexical load carried by these codas (Duan & Li 2022). Even so, contextual information can mitigate some comprehension loss: in highly predictable sentences, listeners often infer intended meanings despite erroneous articulation, a finding consistent with the intelligibility principle that prioritizes listener understanding over native-like accuracy (Munro & Derwing 2021).

IV. CONCLUSION

This study offers valuable knowledge in the fields of second language phonology, cross-linguistic influence, and pronunciation-based communication, contributing to a deeper understanding of how first language (L1) phonological systems—particularly Mandarin Chinese—affect second language (L2) pronunciation accuracy in Thai, a language with a more complex inventory of final consonants. One of the most significant insights is the identification of systematic misarticulation patterns among Chinese learners when pronouncing Thai final consonants, including substitution (e.g., /káp/ "to return" pronounced as /kán/), omission (e.g., /sùt/ "end" pronounced as /sù/), insertion of epenthetic vowels (e.g., /rót/ "car" as /rótə/), and distortion through incorrect aspiration or release (e.g., /tàk/ "to sew" produced with an audible final burst). These errors are primarily attributed to Mandarin's restricted final consonant inventory—mainly nasal codas (/n/, /ŋ/) and a syllabic /ɻ/—and its tendency toward open syllables, limiting learners' ability to produce Thai's unreleased final

stops (/p/, /t/, /k/). Crucially, the study provides new understanding of how these segmental errors affect communicative comprehension. While previous research has largely focused on articulatory accuracy, this study links mispronunciations directly to listener interpretation. Perception tasks with native Thai listeners show that errors in final consonant production significantly reduce intelligibility, especially when substitutions or omissions obscure lexical contrasts in minimal pairs (e.g., /tâp/ "to kick" vs. /tân/ "to receive"), highlighting the vital role of final consonants in conveying meaning. A key contribution of the study is its integration of acoustic analysis and perceptual data, allowing researchers to compare learners' production with native speaker perception. Spectrographic analysis reveals that Mandarin speakers often produce final stops with unintended aspiration or voicing, which—despite acoustic similarity—still disrupts listener processing and comprehension. This production-perception mismatch underscores the need for pronunciation instruction that emphasizes intelligibility rather than native-like articulation. Additionally, the study reveals the mitigating role of context in comprehension; in high-context sentences, listeners are sometimes able to infer intended meanings despite misarticulations. However, this compensatory effect is inconsistent and insufficient to fully resolve comprehension issues arising from frequent or severe segmental errors. Overall, the article provides novel insights into the interaction between L1 phonotactics and L2 communicative effectiveness, advocating for pronunciation instruction that prioritizes intelligibility and targets high-impact errors. It advances both theoretical understanding and offers practical implications for pedagogy, assessment, and curriculum design in multilingual language learning environments.

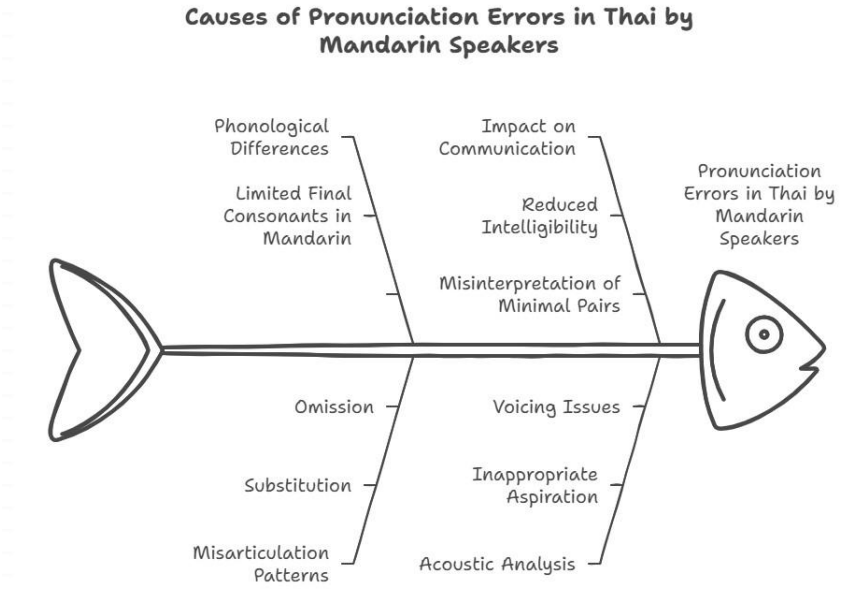

Figure 1: causes of pronunication errors in Thai by Mandarin speakers

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