Proceedings of ICEIPI 2025 Symposium: Understanding Religious Identity in Educational Contexts
DOI: 10.54254/2753-7048/2025.ND25046

An Analysis of Pronunciation Errors among Native Chinese Learners of Spanish

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Abstract. With the growing global influence of the Spanish language, a rising number of native Chinese speakers are beginning to learn Spanish. However, pronunciation errors are common among learners during the language acquisition process, undermining learning effectiveness and posing significant challenges for instruction. The paper aims to explore common pronunciation errors made by native Chinese speakers learning Spanish and to analyze the primary factors contributing to these errors. Through comparative analysis, it investigates pronunciation errors in vowels, consonants, stress, and intonation, drawing on relevant literature and phonetic data to summarize the findings. The results demonstrate that pronunciation errors commonly observed among native Chinese learners of Spanish, such as insufficient vowel openness, confusion between voiced and voiceless consonants, as well as misapplication of stress rules, can largely be attributed to negative transfer from the first language, perceptual and cognitive limitations, and sociocultural differences. Moreover, the study identifies the deficiencies in existing research like relatively small sample sizes and underdeveloped speech-assistive technologies. In the future, interdisciplinary collaboration should foster diverse databases and platforms to advance Spanish language instruction and second language acquisition

Keywords: Second Language Acquisition, Native Chinese Speakers, Language Transfer, Phonological Contrast, Spanish Pronunciation Errors

1. Introduction

As globalization advances, Spanish, as one of the most widely spoken languages in the world, has attracted an increasing number of learners. In contrast, Chinese, which features a relatively simple language structure and limited morphological changes, differs markedly in its phonological system from Spanish, an inflectional language with rich morphological variations [1]. Especially in aspects such as vowels, consonants, stress, and intonation, the regularity of Spanish contrasts sharply with the tonal characteristics of Chinese, posing considerable pronunciation challenges and errors for Chinese native speakers when learning Spanish. At present, there has been extensive research on pronunciation errors made by native Spanish speakers learning Chinese. However, studies focusing on the pronunciation errors of native Chinese speakers learning Spanish remain insufficient. This area of research is still relatively underexplored, with a clear gap in the existing literature. Thus, this paper aims to investigate the common pronunciation errors made by native Chinese speakers when

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DOI: 10.54254/2753-7048/2025.ND25046

learning Spanish, drawing on existing theories and literature from multiple perspectives. Particular emphasis is placed on performance and contributing factors in terms of vowels, consonants, stress, and intonation. Accordingly, the impact of negative L1 transfer, cognitive-perceptual differences, and sociocultural influences on pronunciation errors is examined. Besides, effective intervention strategies are identified and discussed with the aim of improving learners' pronunciation accuracy. By addressing gaps in existing research, it aims to offer new perspectives for future investigations into Spanish phonetic acquisition and to serve as a reference for Spanish oral instruction, thereby contributing to the enhancement of language proficiency among native Chinese learners.

2. Overview of the Spanish alphabet and pronunciation system

2.1. The Spanish alphabet

The Spanish alphabet consists of 27 letters, including 5 vowels (a, e, i, o, u) and 22 consonants. At the phonological level, the smallest units of sound are phonemes, which includes individual vowels and consonants. And these phonemes can combine to form more complex vocalic sequences, such as diphthongs and triphthongs, which play a critical role in syllable formation. In Spanish, multiple phonemes group together to form syllables, which are then assembled into words. It is worth noting that the position of a letter within a word can result in pronunciation variation. For example, the letter "d" is realized as a plosive /d/ at the beginning of a word or after "m", "n", or "l", but as a fricative [ð] in unstressed syllables or at the end of a word. In some dialects, this sound may even be elided. Besides, certain Spanish phonemes have no direct equivalents in Mandarin Chinese, which presents additional challenges for native Chinese speakers in acquiring accurate Spanish pronunciation.

2.2. The Spanish phonetic system

The vowel system of Spanish is relatively simple, consisting of only five vowel phonemes: three strong vowels (a, e, o) and two weak vowels (i, u). Spanish vowels are characterized by their clarity and stability. Compared to the complex diphthongs and tonal system of Mandarin Chinese, Spanish vowels emphasize uniformity and simplicity. In addition to individual vowels, Spanish also features vowel combinations, primarily including diphthongs, such as strong + weak vowels, weak + weak vowels, and weak + strong vowels, and triphthongs, typically composed of a weak + strong + weak vowel sequence. Despite being combinations, these sequences retain the consistency and stability characteristic of single vowel articulation.

The consonant system of Spanish includes phonemes that do not exist in Mandarin Chinese, such as the ñ, the tap or trill /r/, and voiced consonants like /b/, /d/, and /g/. Furthermore, the opposition between voiced and voiceless consonants (e.g., /p/ vs. /b/, /t/ vs. /d/) and the distinction between plosives and fricatives can lead to confusion. The pronunciation of identical consonants may also vary depending on their position within a word. For instance, some consonants, such as h, are silent in certain positions or pronounced more softly, which often causes difficulty for learners. Moreover, consonant clusters are quite common in Spanish, including two-consonant clusters (e.g., dr, bl as in drama, blondo), three-consonant clusters (e.g., spl, str as in esplender, abstracto), and frequent fixed combinations (e.g., ch, ll, qu, gu, rr). These clusters necessitate phonetic linking to achieve smooth transitions between adjacent consonants, while maintaining the articulatory clarity of each segment.

In Spanish, stress assignment follows relatively complex rules, typically determined by whether the ending of the word is a vowel or a consonant, with the accent mark explicitly indicating the

DOI: 10.54254/2753-7048/2025.ND25046

stressed syllable when it deviates from the expected pattern. Typically, when a word ends in a vowel, or the consonants "-n" or "-s", the stress naturally falls on the penultimate syllable. In contrast, if a word ends in any other consonant, the final syllable is stressed. When a word deviates from these default patterns, an accent mark (´) is placed over the stressed vowel to indicate the correct stress placement. Unlike Chinese, which relies on lexical tones to distinguish meaning, Spanish employs stress to differentiate word meanings, whereas intonation is primarily employed to convey emotion, tone of voice, and pragmatic intent.

3. Common errors in Spanish letter pronunciation by native Chinese speakers

Spanish and Chinese belong to the Indo-European and Sino-Tibetan language families, respectively, and their phonological systems differ markedly. Native Chinese speakers frequently demonstrate systematic pronunciation errors in Spanish vowels and consonants, due to negative transfer from their first language, differences in phonemic perception, and ingrained articulatory habits.

3.1. Vowel pronunciation errors

The tongue position and degree of mouth opening for Spanish vowel phonemes differ from those in Chinese. Due to the absence of direct one-to-one correspondence between Chinese and Spanish vowel phonemes, native Chinese learners often exhibit pronunciation deviations, influenced by the phonetic patterns of their first language.

The five Spanish vowels require a relatively wide mouth opening and a clear phonetic quality, and both mouth shape and phonetic value are required to remain stable during articulation. The vowel /a/ has the widest mouth opening and is similar to the Chinese character "啊 (ā)", but it is shorter and more crisp. The vowel /e/ is articulated between the Chinese "ei" and "ai" sounds, and care should be taken to avoid pronouncing it as either "诶 (èi)" or "埃 (āi)". The vowel /i/ closely resembles the Chinese character "衣 (yī)". The vowel /o/ is a distinct rounded vowel, similar to the Chinese "哦 (ō)", but it is shorter and produced with greater tension and clarity. The vowel /u/ requires the smallest mouth opening and is similar to the Chinese character "乌(wū)".

However, native Chinese speakers are often influenced by the habit of pronouncing diphthongs (compound vowels in Chinese), which may lead them to replace Spanish vowels with similar but inaccurate sounds, resulting in imprecise and less resonant pronunciation. For example, mesa [ˈmesa] is often mispronounced as "meisa," and loco [ˈloko] as "louko." In addition, Spanish vowel combinations require each vowel to be articulated clearly and steadily, without glide insertion, but native Chinese speakers tend to transform these into diphthongs. For instance, the [ˈai] in aire is frequently mispronounced as the Chinese "爱 (ài)." Additionally, Spanish syllables are expected to be linked smoothly and fluidly, but Chinese speakers often break up vowels due to oral transition, resulting in disfluent pronunciation. For example, pueblo [ˈpwe.βlo] may be incorrectly pronounced as "pu-e-blo." Furthermore, while unstressed syllables in Chinese are typically weakened into neutral tones, Spanish requires clear articulation of all vowels, even in unstressed positions. This often leads Chinese learners to reduce or blur unstressed vowels in Spanish, sometimes causing stress shift errors. For instance, teléfono [teˈlefono] may be mispronounced as [təˈlefənə].

3.2. Consonant pronunciation errors

The Spanish consonant system includes phonemes that do not exist in Mandarin, posing challenges for native Chinese speakers. In particular, the voiced-voiceless contrast and the distinction between

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plosives and fricatives in Spanish often lead to pronunciation errors.

In Spanish, consonants can be classified as either voiceless or voiced depending on whether the vocal cords vibrate during articulation. For example, b (v) and d are voiced consonants, while their voiceless counterparts are p and t, respectively. When producing voiced consonants, the vocal cords vibrate, whereas voiceless consonants are produced without vocal cord vibration, relying only on airflow obstruction and friction. The subtle differences between voiced and voiceless sounds are often overlooked by native Chinese speakers, leading to pronunciation errors. For instance, the b in boca [ˈboka] is a voiced sound; if mispronounced as its voiceless counterpart p, the word may be mistakenly perceived as poca [ˈpoka]. Besides, Spanish consonants are categorized based on how airflow is obstructed, distinguishing between plosives and fricatives. Plosives consonants, such as /p, t, k, b, d, g/, involve a complete blockage of airflow followed by a sudden release, producing a brief and forceful sound. In contrast, fricative consonants like /f, s, x, θ, β, ð, ɣ/ are produced by forcing the airflow through a narrow constriction in the vocal tract, creating friction without completely blocking the airflow. Their defining feature is continuous airstream friction during articulation. The pronunciation of the same letter can change depending on its position within a word, which often leads to confusion for native Chinese speakers. For instance, d is pronounced as the plosive /d/ at the beginning of a word, but as the fricative /ð/ in the middle or at the end. Examples include dado [ˈdaðo] and cuidado [kwiˈðaðo].

In addition, there are some phonemes in Spanish that cannot be replaced by sounds in Mandarin Chinese, like the alveolar trill /r/. Due to the absence of the alveolar trill in Chinese, native Chinese speakers often mispronounce it as a retroflex fricative or the English r sound [2]. In Spanish, the distinction between alveolar taps (single vibration) and alveolar trills (multiple vibrations) is critical, as mispronunciation can lead to semantic changes. For example, pero (tap) and perro (trill) have different meanings. Besides, the letter ñ (palatal nasal /ɲ/) is often used with vowels in Spanish, but since Mandarin lacks this sound, native Chinese speakers tend to separate the consonant and the vowel, resulting in inaccurate pronunciation. For instance, año [ˈaɲo] may be misread as “阿尼奥(ā ní ào). Other commonly mispronounced consonant combinations in Spanish include ll and ch. The ll combination is usually pronounced as /j/, but native Mandarin speakers often misread it as l or y from Pinyin, so llave [ˈjaβe] might be mispronounced as “压贝(Yā bèi)” or “拉贝(Lā bèi)”. The ch combination is an unvoiced affricate /tʃ/, typically paired with vowels. Mandarin speakers may mispronounce it using the Chinese “吃(chī), such that chino [ˈtʃino] is misread as “吃一诺 (chī yī nuò).” Moreover, when qu and gu are used with the vowels e or i, they form a single syllable in pronunciation. And native Chinese speakers tend to confuse this with Pinyin and pronounce them separately, such as misreading queso [ˈkeso] as “去一搜(qù yī sōu).”

3.3. Stress and intonation errors

As a tonal language, Chinese conveys lexical meaning through pitch variations, whereas Spanish depends on syllabic stress and pitch variation (stress and intonation) to achieve semantic distinction and emotional expression. This difference can lead native Chinese speakers to exhibit systematic errors in Spanish stress placement, intonation patterns, and rhythm control. These errors can reduce speech naturalness and may result in communicative misunderstandings.

Since Mandarin lacks a concept of lexical stress, native Chinese speakers often confuse tone with stress, leading to irregular pronunciation patterns. Moreover, when learning Spanish, especially in the absence of written accent marks, Chinese learners frequently struggle to identify the correct stress position, resulting in misplaced stress and semantic confusion. For instance, misplacing the stress in papá (father) and pronouncing it as papa changes the lexical meaning to “potato.” Similarly,

DOI: 10.54254/2753-7048/2025.ND25046

removing the written accent in sí (yes) results in si, which functions as the conjunction "if." Besides, Mandarin intonation tends to be relatively flat and nuanced, emphasizing tonal variation at the word level rather than prosodic modulation at the sentence level. In contrast, Spanish intonation varies according to sentence type and features prominent stress and rhythmic patterns. This is particularly evident in interrogative sentences, where Spanish typically exhibits multiple pitch peaks throughout the sentence, creating a dynamic intonation contour. However, native Chinese speakers often apply a rising intonation only at the end of a question. For example, in the question ¿Dónde está?, where the pitch should gradually rise across the entire phrase, Chinese learners tend to produce a final rise only, rendering it as [ˈdonde‿esˈta ↗]. Moreover, due to Mandarin's reliance on lexical tone over prosodic intonation, Chinese learners often exhibit restricted pitch range in Spanish, thus leading to unnatural prosody and reduced pragmatic impact.

4. Dominant factors in pronunciation errors

4.1. The impact of language transfer

In second language acquisition, language transfer, where learners unconsciously apply rules from their first language, such as pronunciation, grammar, or pragmatics, to the target language, is a key source of errors. Phonetic differences between Chinese and Spanish make native Chinese speakers especially prone to interference when learning Spanish pronunciation. And the impact of negative transfer on pronunciation errors can be analyzed from three aspects: the phonemic system, phonological structure, and prosodic features.

The Perceptual Assimilation Model suggests that second-language learners map target-language phonemes onto their native phonological system, causing Chinese speakers to approximate Spanish sounds using Chinese equivalents, which leads to pronunciation deviations. In the vowel system, Spanish includes five monophthongs requiring rounded and stable articulation, whereas Chinese contains six monophthongs as well as numerous diphthongs and glides. As such, native Chinese speakers often mispronounce Spanish monophthongs as diphthongs. For example, "casa" [ˈkasa] may be mispronounced as "开萨 (kāi sà)". In the consonant system, native Chinese speakers often struggle with voicing contrasts. Research indicates that their Voice Onset Time (VOT) for Spanish voiced consonants deviates from native norms, hence leading to the mispronunciation of voiced consonants as voiceless ones and resulting in semantic deviations [3]. For example, if the initial voiced consonant of "día [ˈdia]" is pronounced as a voiceless consonant, it may be mispronounced as "tía [ˈtia]." Moreover, due to the absence of trills in Chinese and the fixed movement patterns of articulatory organs, learners often substitute Spanish trills with lateral or retroflex sounds. Affected by the glides in Chinese, native Chinese speakers may tend to insert glides after consonants, such as pronouncing "tema [ˈtema]" as [ˈtjema]. In terms of phonological structure, the syllable structure of Chinese is mainly composed of consonants plus vowels, with almost no consonant clusters, and the final consonants often remain unpronounced. In contrast, Spanish allows consonant clusters and final consonants, prompting Chinese learners to insert vowels or weaken final sounds. For example, "trato [ˈtrato]" is mispronounced as "terato," and the final consonant of "azul [a'sul]" is weakened or ignored, and is pronounced as [a'su].

In addition, differences in tonal systems and stress perception between the two languages hinder native Chinese speakers' acquisition of Spanish. In contrast to Chinese that uses tonal variation to differentiate word meanings, Spanish relies more on stress and intonation to express both meaning and emotion. Chinese native speakers often confuse Spanish stress with the fourth tone in Chinese (falling tone), resulting in stiff or unnatural intonation. In Chinese, statements typically end with a

DOI: 10.54254/2753-7048/2025.ND25046

falling tone, whereas Spanish has noticeable pitch variation, with distinct intonation patterns for statements and questions. As a result, Chinese native speakers are prone to errors in the intonation of questions and statements, leading to flattened or merged intonation patterns.

4.2. Factors in cognition and language acquisition

In language acquisition, age and phonetic perception, both key cognitive factors, directly affect the accuracy of pronunciation. In 1967, Harvard psychologist Eric Heinz Lenneberg put forward the Critical Period Hypothesis, suggesting that the optimal period for language acquisition is between the ages of 2 and 13. Once this critical period has passed, individuals experience a notable decline in their ability to acquire language [4]. Initially intended to explain first language acquisition, the hypothesis was later adopted in second language research, showing that older learners face greater challenges and a diminished capacity for native-like proficiency [5].

In second language acquisition, the age at which learners begin studying a language significantly affects learning outcomes, particularly the accuracy of pronunciation. Research by Golestani and Zatorre indicates that native speakers primarily rely on the left temporal lobe for speech processing, whereas adult learners tend to engage the left prefrontal cortex for conscious control, which may result in rigid articulation and increased fatigue [6]. This neural shift in adult learners, combined with the lack of biological mechanisms typical of first language acquisition, poses a major obstacle to achieving native-like proficiency in a second language. The underlying cognitive mechanisms of the perception-production system are closely linked to pronunciation errors among second language learners. Best's Perceptual Assimilation Model (PAM) and its extension, PAM-L2, propose that second language learners assimilate target language phonemes into the closest equivalents in their native language. And this process results in the formation of a "perceptual filter," which distorts the auditory representations of second language sounds [7,8]. The main types of perceptual assimilation include categorical and approximative assimilation. For example, native Chinese speakers may gradually develop perceptual assimilation patterns that reduce sensitivity to non-native phonemes, thus leading to pronunciation errors. According to Flege's Speech Learning Model (SLM) and the Interaction Hypothesis (IH), second language learners encounter three types of sounds: new, similar, and identical [9]. Among these, similar sounds are the most difficult to acquire, as they closely resemble but do not exactly match native-language phonemes. Known as equivalence classification, this phenomenon leads learners to interpret target-language phonemes as variants of native ones, which can hinder the development of new phonemic categories. The closer two phonemes are, the more likely negative transfer is to occur. For example, the /p/ sound in Chinese is similar to that in Spanish. As a result, native Chinese speakers may pronounce the Spanish /p/ as an aspirated sound, leading to pronunciation errors. In contrast, the Spanish trilled /r/, which does not exist in Mandarin, is phonetically distant and therefore more difficult for learners to acquire, often requiring a longer period of learning. However, the Critical Period Hypothesis is limited and debated in the context of Spanish pronunciation learning. For instance, immersion in a target-language environment or strong learning motivation in adulthood may help learners overcome age-related constraints and mitigate the effects proposed by the hypothesis.

4.3. The impact of socio-cultural factors

The influence of sociocultural factors on language acquisition is often overlooked, yet it exerts an indirect yet enduring impact on the formation of learners' pronunciation habits. Pronunciation errors among native Chinese speakers learning Spanish arise not only from linguistic system differences

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but are closely tied to sociocultural contexts. The following examines how social factors contribute to pronunciation errors across four dimensions: the education system, quality of language contact, sociolinguistic attitudes and value orientations, and access to technological resources.

In China, the education system presents certain structural characteristics that influence language acquisition. Instruction in phonetics is frequently minimal, as grammar and vocabulary are given higher priority in many university curricula. This arrangement may lead students to advance to more complex language content before establishing a solid foundation in pronunciation, increasing the likelihood of pronunciation errors [10]. Teacher-centered instruction and exam-based repetition are prevalent in classrooms, which restricts students' opportunities for autonomous pronunciation practice. Thus, they may struggle to develop a deep understanding of the physiological mechanisms of pronunciation, which hinders the timely detection and correction of pronunciation errors. The quality and frequency of language exposure also play a key role in shaping learners' pronunciation. Currently, Spanish learners often receive limited phonetic input, with many universities relying on audio materials recorded by non-native speakers. Typically, such materials offer only one normative pronunciation model, which restricts learners' access to the natural variability of spoken language in real-world contexts. Consequently, their pronunciation tends to become rigid and less adaptable in actual communicative contexts.

Besides, societal attitudes toward foreign language learning are closely linked to pronunciation errors. Chinese learners of Spanish are often motivated primarily by career advancement or exam preparation, which leads to greater emphasis on grammar and vocabulary, while phonetic training tends to be overlooked. The perception that intelligibility suffices and accented pronunciation is acceptable may contribute to the persistence and fossilization of pronunciation errors. Also, Chinese pronunciation emphasizes clarity, with accurate articulation and a well-rounded, resonant tone; but Spanish places greater emphasis on full vowels and smooth speech flow. And these differences in cultural aesthetics can make it challenging for Spanish learners to master features like liaison and exaggerated pronunciation. In addition, resource imbalances may aggravate pronunciation problems. In developed regions, learners benefit from access to sophisticated pronunciation tools such as Praat and Speechling, which deliver instant feedback and support effective error correction. In contrast, those in under-resourced areas often rely on pre-recorded online videos, lacking effective real-time feedback, resulting in errors going uncorrected in a timely manner.

5. Research gaps and future prospects

At present, research on Spanish pronunciation errors among native Chinese speakers has established a relatively systematic theoretical framework. By integrating the Contrastive Analysis Hypothesis, the Perceptual Assimilation Model, the Critical Period Hypothesis, and theories of language transfer, and using methods like acoustic analysis, electromagnetic articulography, electroencephalography, and neuroimaging studies, a comprehensively classification of pronunciation errors has been carried out. These studies have identified typical issues such as insufficient vowel openness, confusion of voiceless consonants, and the substitution of trills with native consonants, while also revealing the neurocognitive mechanisms and physiological constraints behind these errors. The advancement of cognitive linguistics has highlighted social factors like education systems, resource allocation, and technological disparities, in the fossilization of pronunciation errors. Meanwhile, the application of speech visualization tools and AI scoring systems has accelerated research progress and opened new avenues for contextualized training, aiding pronunciation with multimodal feedback [11].

Despite progress, challenges remain. Most existing studies are based on small-sample, short-term experiments and lack long-term tracking of learners' pronunciation development. As a result, they

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struggle to reveal the latency period of errors, U-shaped developmental curves, and critical sensitive periods, making it difficult to distinguish between temporary and fossilized errors. Besides, current pronunciation assistance tools offer limited dialect support and lack personalized feedback for common errors among native Chinese speakers. Social factors, such as disparities in urban and rural resources and conflicts in social identity, also require further investigation. Future research should integrate fields like phonetics, neuroscience, and computational linguistics. Neuroscientific methods can track brain changes during pronunciation training, while intelligent software can adapt content to individual errors automatically. And technological innovation should also support diverse speech databases to help learners better grasp pronunciation principles. Teaching models need to move beyond traditional classrooms toward more diverse, interactive systems. Collaboration among governments, enterprises, and schools is key to building more balanced technological platforms and narrowing resource gaps. Most importantly, research should address learners' psychological and cultural identities, helping them confidently master authentic pronunciation while preserving their native language traits, thereby breaking down barriers to communication.

6. Conclusion

In the process of learning Spanish pronunciation, native Chinese speakers face key risks stemming from the solidification of pronunciation errors due to system linguistic systems. These errors result from native pronunciation transfer, combined with cognitive limitations like age and language perception ability, as well as sociocultural factors such as unequal access to educational resources and varying tolerance for accents. Common pronunciation errors such as insufficient vowel openness, consonant confusion, and substitution of trills can become entrenched and difficult to overcome without timely correction. Future research should take a multidimensional approach and adopt integrated solutions. Tools like speech visualization, real-time AI feedback, and virtual reality can enhance the precision and interactivity of pronunciation training, thus enabling learners to practice effectively in authentic contexts. Moreover, policy support and accessible technology are key to developing smart learning platforms that bridge urban-rural gaps and ensure equal access to language training. Pronunciation learning should go beyond error correction to balance language accuracy with cultural identity, thereby helping learners retain native features while gradually mastering standard pronunciation to support cross-cultural communication.

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