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Phonological Interference of Mother Tongue on English Sound Production: A Contrastive Study Based on A Literature Review

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Abstract

Mastery of English as an international language requires proper sound production skills, but speakers from a variety of linguistic backgrounds often face systematic obstacles due to the influence of their first language sound system. This study aims to map the English sounds that are most susceptible to distortion by first language (L1), analyze these patterns of interference in a contrastive manner, and identify linguistic factors that determine their severity. The method used is library research with a qualitative approach, sourced from journal articles, books, and proceedings published in 2021–2025 which are searched through Google Scholar, ERIC, and DOAJ. Data analysis follows the stages of reduction, display, and verification. The results of the study showed that the dental fricative sounds /θ/ and /ð/, monophthongic vowel pairs, and complex consonant groups were the most susceptible segments to interference. The pattern of sound substitution is systematic and can be predicted through the framework of contrastive analysis. The severity of interference is determined by the typological distance between languages, the level of proficiency of the speaker, nonverbal intelligence, and the complexity of cross-lexical similarities. These findings are expected to be a foundation for teachers in designing more contextual and effective phonetic learning.

Keywords: Phonological Interference; Contrastive Analysis; Sound Production; English; Second Language Acquisition

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INTRODUCTION

Mastery of English as an international language requires the ability to produce sound accurately, yet empirical evidence indicates that this requirement is frequently unmet. In a quantitative study of 112 Saudi EFL learners, mispronunciation of a single English consonant occurred at rates high enough to alter listeners' interpretation of entire words, demonstrating that segmental errors are not merely cosmetic but can directly compromise meaning (Al-khresheh, 2024). Beyond isolated phonemes, intelligibility research using transcription-based scoring has shown that even learners at elementary-to-low-intermediate proficiency can be transcribed with roughly 80 percent word-level accuracy by unfamiliar native-speaker listeners, though the same body of research cautions that any decline below this threshold meaningfully increases listener effort and the risk of miscommunication (Chau et al., 2022). These findings support the view that pronunciation accuracy is not a peripheral skill but a direct determinant of successful oral communication, which motivates renewed attention to the phonological interference that mother tongues impose on English sound production. Against this backdrop, reality on the ground shows that speakers from various linguistic backgrounds often experience systematic barriers due to the influence of their mother tongue. This phenomenon is known as phonological interference (*phonological interference*), which is a condition in which the sound system of the first language (*first language/L1*) unconsciously affects and distorts the production of second language sounds (*second language/L2*).

According to Macías et al. (2025), phonological interference is not just a random error, but a predictable systematic pattern based on the typological distance between the L1 and L2 of the speaker. Typological distance refers to the degree of structural divergence between two languages across multiple linguistic dimensions — phoneme inventories, syllable structure, morphological marking, and prosodic organization — rather than a single, monolithic measure of how "different" two languages appear on the surface (Lee, 2022). This distinction

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matters theoretically because collapsing typological distance into one composite score can obscure cases where two languages are close on one dimension yet distant on another; Korean and Japanese, for instance, share little resemblance in script while retaining considerable phonological and lexical overlap (Lee, 2022). For the purpose of this review, typological distance is understood specifically in its phonological dimension — the extent to which an L1's segmental inventory, syllable templates, and stress or tone system overlap with those of English — since this dimension most directly predicts which English sounds a given L1 group is likely to substitute, omit, or distort. This is emphasized by Astuty (2022) which states that speakers with L1 have a simple syllabic structure (*Simple Syllabic Structure*) tends to have greater difficulty in producing consonant clusters (*consonant clusters*) complex in English.

Contrastive studies (Contrastive Analysis) between the phonological systems of the mother tongue and English represent a relevant approach for understanding the root of the interference problem. This approach is anchored in two complementary traditions within second language acquisition theory. The first, generally known as the Contrastive Analysis Hypothesis and first articulated by Lado (1957, as cited in Al-Rickaby, 2023), holds that the structural distance between a learner's native language and the target language is the principal source of predictable learning difficulty. A recent re-examination of this hypothesis traces its original formulation and shows that, despite decades of criticism questioning its strong predictive claims, its core insight into L1-based sound substitution remains defensible when applied specifically to the phonological level rather than to syntax or discourse as a whole (Al-Rickaby, 2023). The second tradition, Interlanguage Theory, introduced by Selinker (1972, as cited in Chidi-Onwuta & Maqbool, 2022), reframes L2 learner speech not merely as a deficient copy of the target system but as an evolving, internally consistent linguistic system shaped by several simultaneous psycholinguistic processes, of which native-language transfer is only one. This view helps explain why phonological errors traceable to the mother tongue often persist as stable, rule-governed patterns rather than disappearing once pointed out — a phenomenon associated with fossilization (Chidi-Onwuta & Maqbool, 2022).

Taken together, these frameworks indicate that contrastive analysis functions best as a tool for generating falsifiable predictions about likely difficulty, not as a deterministic account of every error a learner produces. Critics have long argued that the strong version of the hypothesis overstates its predictive power, since not every structural difference between two languages produces an observable error, and not every error can be traced to a structural difference; the moderate and weak versions, which treat contrastive analysis as a diagnostic aid for interpreting errors after they occur rather than a complete forecasting device, are now more widely accepted in applied linguistics (Al-Rickaby, 2023). The present review adopts this moderate stance, treating contrastive analysis as a heuristic for organizing and explaining interference patterns while acknowledging that proficiency, individual cognitive factors, and exposure also determine whether a predicted difficulty actually surfaces in production.

Studies conducted by Kafryawan & Zulihi (2023) reveal that certain English phonemes, particularly the dental fricatives /θ/ and /ð/, lack a direct equivalent in several major language families spoken across Southeast Asia, prompting speakers to replace them with sounds already available in their native phonological inventories. This pattern is not uniform across the region, however, and should not be read as a claim that every Southeast Asian language lacks these sounds. Malay, for instance, has no dental place of articulation at all, leading its speakers to substitute /θ/ with the voiceless stop /t/ and /ð/ with the voiced stop /d/, a pattern documented among Malaysian secondary school learners regardless of their examination performance in English (Zaidi, 2024). Comparable substitution tendencies, realized through partly different target sounds, have also been reported for Vietnamese and Indonesian speakers, who variably replace these fricatives with /t/, /d/, /f/, or /s/ depending on word position and individual articulatory habit (Zaidi, 2024). The consistency across these typologically distinct Austronesian and Austroasiatic languages lies less in a single shared substitute and more in the underlying mechanism: the absence of a dental or interdental fricative category forces speakers toward the phonologically closest available consonant — consistent with the broader cross-linguistic rarity of dental fricatives generally. The regional pattern Kafryawan & Zulihi (2023) describe is therefore better understood as a consequence of this wider typological rarity than as evidence that Southeast Asian languages form a single, phonologically homogeneous group. Meanwhile, Perkins & Zhang (2024) asserts that the literature-based approach (*Literature-based approach*) in contrastive studies is able to produce more comprehensive interference mapping than a single study, as it integrates findings from a wide range of diverse linguistic contexts.

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The relevance of this study is all the stronger given that a deep understanding of phonological interference patterns has significant practical implications for the world of English teaching (*English Language Teaching/ELT*). By specifically identifying the sounds of English that are most susceptible to interference by a particular native language, teachers can design phonetic learning materials that are more targeted and efficient. Macías et al. (2025) added that pedagogical interventions based on interference analysis have been proven to be able to significantly accelerate the process of acquiring L2 phonological competence, as well as reduce the level of *Fossilization* or freezing of sound errors that often occur in middle to upper level students.

Based on the background that has been described, this study focuses on three main problem formulations. First, what sounds of English are most often interfered with by the phonological system of the mother tongue based on the existing literature review? Second, how can these phonological interference patterns be explained through the *contrastive analysis* approach between the mother tongue and English sound systems? Third, what linguistic factors determine the severity of mother tongue phonological interference with English sound production in speakers from various first-language backgrounds?

This study aims to identify and map the English sounds that are most susceptible to phonological interference from the mother tongue based on the latest literature synthesis. In addition, this study also aims to analyze these interference patterns in a contrasting manner in order to find systematic regularity that can be explained phonologically. More broadly, this study aims to make a theoretical contribution to the development of a *phonological contrastive analysis framework* that can be applied in the context of teaching English to speakers with diverse mother tongue backgrounds.

Theoretically, the results of this research are expected to enrich the treasures of applied linguistics, especially in the field of contrastive phonology and second *language acquisition*. Practically, the findings of this study can be used as a reference for English teachers in designing a phonetic syllabus based on the specific needs of speakers according to their mother tongue. Furthermore, this research is also expected to be useful for teaching material developers and ELT curriculum designers in creating *pronunciation practice* materials that are more contextual, measurable, and effective in minimizing the negative impact of mother tongue phonological interference on students' English speaking competence.

Tabel 1. Research Objectives

No	Objective	Description
1	To identify English sounds most susceptible to mother tongue interference	A clear mapping of vulnerable English sounds
2	To analyze phonological interference patterns through contrastive analysis	Systematic explanation of interference patterns
3	To investigate factors determining the severity of interference	Identification of major linguistic and cognitive factors
4	To contribute to English language teaching practices	Recommendations for effective pronunciation instruction

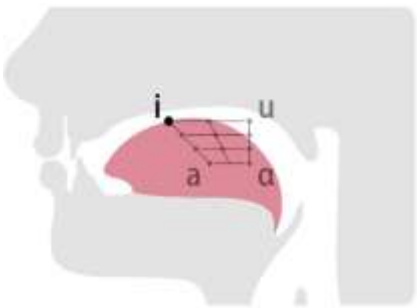

Figure 1. Tongue Positions for the Articulation of the Monophthong Vowels /i/, /u/, /a/, and /ɑ/

Sagittal section of the human vocal tract showing the approximate tongue positions for the high vowels /i/ and /u/ and the low vowels /a/ and /ɑ/, illustrating the articulatory space within which the monophthong contrasts discussed in this review are produced. The shaded area represents the tongue body, and the vowel symbols mark the relative position of the tongue's highest point during articulation of each vowel.

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METHOD

This study uses a qualitative approach with the *Library Research* (literature research), which is a scientific procedure that places written sources as the main data in the analysis process. This approach was chosen because the study of phonological interference requires a deep understanding of linguistic concepts scattered in various academic sources, rather than through field experiments. In this context, the researcher plays the role of the main instrument that reads, examines, and interprets various literature critically and systematically. Zed (2022) explained that literature research has advantages in producing comprehensive conceptual synthesis, especially in theoretical and cross-disciplinary studies.

The data sources in this study consist of scientific journal articles, applied linguistics books, and international seminar proceedings published between 2021 and 2025. Data collection is carried out through browsing academic databases such as Google Scholar, ERIC, and DOAJ using specific keywords such as *phonological interference*, *Contrastive Analysis*, and *L1 transfer*.

After the initial pool of sources was assembled, analysis proceeded through three interrelated stages following the qualitative data analysis model of Miles (2023). During the *reduction* stage, sources were screened against three inclusion criteria: (a) explicit focus on phonological or pronunciation-related L1 interference in English as a second or foreign language; (b) publication in a peer-reviewed journal, book chapter, or conference proceeding between 2021 and 2025; and (c) availability of full text for verification. Sources addressing only morphosyntactic or lexical transfer without a phonological component were excluded at this stage. The *display* stage involved organizing retained sources into a coding matrix structured around three recurring dimensions identified across the literature — the specific English sound segment discussed, the speaker's first-language background, and the linguistic or cognitive factor proposed to explain interference severity — allowing more systematic cross-study comparison than a purely narrative summary would permit. The *verification* stage cross-checked emerging patterns against at least two independent sources wherever possible, following the source triangulation procedure described by Creswell & Creswell (2023), so that conclusions reported in the Results and Discussion reflect convergent rather than isolated findings. Data validity is maintained through techniques *Source triangulation*, namely by comparing the findings of several references to ensure the consistency and validity of the resulting interpretations (Creswell & Creswell, 2023). This approach has been shown to yield more theoretically rich conclusions than a single study (Moleong, 2021).

RESULT AND DISCUSSION

English Sounds That Most Often Experience Phonological Interference from Mother Tongues

Literature reviews consistently show that not all English sounds have the same level of susceptibility to phonological interference. Sounds that have no equivalent in the phonological system of the speaker's mother tongue tend to be the main point of difficulty that most often arises in various linguistic contexts. The English vowel system, particularly the subtly different monophthongs of vowels, has proven to be a significant source of interference for speakers from a variety of first-language backgrounds. This is evidenced by the findings Georgiou & Giannakou (2024) which reveals that Greek speakers (*Greek speakers*) consistently exhibits below-average discriminating capabilities (*Below chance discrimination*) for most of the English monophthong's vocal contrast, even after going through a fairly intensive learning process. This proves that the phonological distance between the L1 and L2 vocal systems plays a major role in determining the difficulty of sound production.

In addition to vowels, English consonants are also fertile ground for phonological interference. Phonemes */d/* in English, for example, is a clear example of how the position of sounds in words also determines the severity of interference that occurs. Chiluisa et al. (2024) found that Spanish-speaking students experienced three different interference patterns for the same phoneme, depending on their position in the word: in the initial position (*Initial position*), speakers tend to transfer tongue positions and aspiration tendencies from Spanish; in the middle position (*middle position*), a pattern appears *Flapping* and a typical Spanish elixir that produces sound *Tap* alveolar [ɾ]; while in the final position (*Final Position*), speakers tend to make loud noises (*voiced*) even though English requires a silent. These findings confirm that interference analysis cannot be performed partially on a single phoneme without considering its positional context in the speech chain.

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Phonological interference also occurs at a more complex level, namely in the process of lexical segmentation (*lexical segmentation*) and visual word recognition. Research on bilingual English-Spanish speakers shows that sensitivity to syllable structure (*syllable structure*) in the target language is significantly influenced by the phonological system of the mother tongue, especially in terms of consonant sonority (*consonant sonority*) that differ between languages (Garrido-Pozú, 2024). Thus, interference not only occurs at the level of sound production in isolation, but also permeates deeper cognitive processes such as word recognition and segmentation in the actual flow of speech.

Read together, the three strands of evidence reviewed in this section point to a single underlying mechanism operating at different linguistic levels: vowel contrasts are lost through perceptual assimilation (Georgiou & Giannakou, 2024), consonant articulation shifts according to positional context within the word (Chiluisa et al., 2024), and syllable-level segmentation is reorganized according to L1 sonority preferences (Garrido-Pozú, 2024). What distinguishes these studies is not whether L1 interferes with L2 sound processing — all three converge on that point — but the level of representation at which the interference is detected, ranging from articulatory output to online word recognition. This distinction carries a direct pedagogical implication: an instructor relying solely on production-based correction, such as repeating a mispronounced word aloud, addresses only the articulatory level, leaving the deeper segmentation and perceptual biases identified by Garrido-Pozú (2024) and Georgiou & Giannakou (2024) unaddressed. A more comprehensive intervention would therefore combine explicit articulatory training with listening-based discrimination practice targeting the specific contrasts a learner's L1 fails to distinguish, rather than treating pronunciation correction as a single, undifferentiated skill.

Considered alongside the proficiency-based moderation reported by Liu et al. (2026) and the priming asymmetry between advanced and lower-intermediate speakers documented by Gu & Zhang (2025), the developmental trajectory described by Hevia-Tuero et al. (2022) suggests that phonological interference is not a fixed trait of a given L1–L2 pairing but a moving target that recedes, unevenly, as input and proficiency accumulate. Critically, none of these three studies experimentally isolated which type of input — explicit phonics instruction, naturalistic exposure, or some combination — drives this reduction most efficiently; their designs are correlational with respect to proficiency level rather than manipulating instructional input directly. This leaves an open question directly relevant to classroom practice: if interference recedes with proficiency regardless of how that proficiency was gained, then early, explicit phonological instruction may simply accelerate a process that exposure alone would eventually produce, rather than raising a learner's eventual pronunciation ceiling. Pedagogically, this argues for front-loading explicit contrastive phonological awareness — such as guided minimal-pair discrimination — at the lower-intermediate stage that Gu & Zhang (2025) identify as the point where interference is most resistant to suppression, rather than postponing pronunciation instruction until learners reach an advanced level.

Comparing the four factors discussed in this section — typological distance (Norrman, 2024), proficiency-linked cognitive control (Prystauka et al., 2024), nonverbal intelligence (Georgiou & Giannakou, 2024), and cross-lexical similarity (Liu et al., 2026) — a clear asymmetry emerges. Typological distance and nonverbal intelligence describe relatively stable learner-external and learner-internal traits that classroom instruction cannot easily alter, whereas proficiency-linked cognitive control and cross-lexical similarity management are, at least partly, trainable through sustained practice and targeted vocabulary instruction. This asymmetry carries a pedagogical consequence: teachers should calibrate expectations accordingly, since a learner whose L1 is typologically distant from English may require more instructional time to reach the same intelligibility threshold as a learner whose L1 is typologically closer — not from any deficit in effort or aptitude, but because of a factor outside the classroom's direct control. At the same time, the same teacher can still intervene meaningfully on the trainable factors, for instance by explicitly teaching learners to recognize when an orthographically similar English–L1 word pair is phonologically misleading, a strategy directly suggested by the orthographic-interference findings of Liu et al. (2026).

Phonological Interference Patterns in the Framework of Contrastive Analysis

Contrastive analysis (*Contrastive Analysis*) between the phonological systems of mother tongues and English allows researchers to find patterns of interference that are systematic and predictable. One of the most consistent patterns found in the literature is the tendency of speakers to substitute unfamiliar L2 sounds for L1 sounds that

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are most articulalogically approaching. This pattern of substitution is not a random action, but rather a reflection of a cognitive mechanism that actively seeks the closest equivalent in the phonological representation that the speaker already has. Wayland (2024) In its comprehensive review of various models of second language sound acquisition, it asserts that *Speech Learning Model* (SLM) explains this phenomenon as a result of perceptual categorization (*perceptual categorization*) where L2 sounds similar to L1 are more difficult to learn because speakers tend to assimilate them into existing L1 categories.

The next interference pattern relates to how the orthographic and phonological systems interact with each other in the process of second language production. Studies of bilingual Chinese-English speakers show that phonological and orthographic processing in second-language production is significantly moderated by proficiency levels (*proficiency*) speakers in their L2 (Liu et al., 2026). Speakers with low skills exhibit impairment (*interference*) that is greater between its L1 and L2 phonological representations, while advanced speakers are able to separate the two systems more efficiently. This indicates that the phonological interference pattern is dynamic and can change as the speaker's linguistic competence in the target language increases.

Another pattern that is no less interesting is the interference that takes place in the early stages of morphological and phonological processing simultaneously. Gu & Zhang (2025) reveals that advanced Chinese-English bilingual speakers (*Advanced*) exhibited strong and significant priming effects in all tested conditions, including those involving phonological suitability (*phonological congruence*). In contrast, lower-middle-level speakers (*lower-intermediate*) only shows priming effects on conditions related to the word form visually. These findings unequivocally suggest that phonological effects in second language processing are not merely surface phenomena, but rather reflections of a complex distributed phonological representation encompassing simultaneous spelling, sound, and meaning.

In the context of bilingual reading learning, phonological interference patterns are also evident in how children activate their first-language phonological systems when processing second-language texts. Hevia-Tuero et al. (2022) found that Spanish children learning English showed a marked effect of Spanish phonological interference on English visual word recognition tasks, although the effect gradually weakened as grade levels and the intensity of exposure to English increased. These findings reinforce the argument that phonological interference patterns are gradual and responsive to the linguistic input that the speaker receives on an ongoing basis.

Linguistic Factors Determining the Severity of Phonological Interference

Various literature reviews have identified a number of linguistic factors that directly or indirectly determine how severe the phonological interference of the mother tongue is with the production of English sounds. The first and most dominant factor is typological distance (*Typological distance*) between the L1 and L2 phonological systems. The greater the difference between the sound inventory, syllable structure, and prosodic patterns of the two languages, the higher the potential for serious interference. Norrman (2024) provides very interesting evidence from studies of individuals who were adopted from China to Sweden from the age of toddlers and lost their first language: although they became monolingual speakers of Swedish, the influence of early phonological specialization from Chinese remains detected in their sound production. This proves that early phonological exposure leaves a persistent imprint and goes beyond the bounds of a person's bilingual status.

The second factor that is very influential is the level of proficiency (*proficiency level*) English speakers as L2. Higher proficiency is consistently associated with a better ability to manage phonological interference and separate the sound systems of the two languages. Prystauka et al. (2024) in his study of speakers *Heritage Language* found that individual lexical knowledge and cognitive control (*Cognitive Control*) domain-general plays a crucial role in how lexical and phonological interference manifests in language processing. Speakers with stronger cognitive control are able to suppress the interference activation of L1 more effectively, resulting in more accurate L2 sound production and closer to the native speaker.

The third factor is nonverbal intelligence (*Nonverbal Intelligence*) and phonological working memory (*phonological short-term memory/PSTM*) owned by the speaker. Surprisingly, findings from the literature suggest that PSTM is not always a strong predictor of L2 sound perception and production, while nonverbal intelligence instead shows a more significant correlation. Georgiou & Giannakou (2024) report that speakers with higher nonverbal intelligence exhibit better L2 sound discrimination accuracy, most likely because higher intelligence

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correlates with superior attention capacity, information processing ability, and learning skills—all of these factors collectively support more accurate sound perception and in turn minimize the impact of phonological interference from mother tongue.

A fourth factor that should not be ignored is the dimension of cross-lexical similarity (*Interlexical similarity*) which includes semantic, orthographic, and phonological aspects at the same time. Semantic similarities (*Semantic similarity*) has been shown to be a major facilitator in L2 vocabulary retention, while orthographic similarity (*Orthographic Similarity*) can actually cause interference when standing alone without adequate semantic similarity support (Liu et al., 2026). These findings have important implications: phonological interference cannot be analyzed in isolation from other linguistic dimensions, but must rather be understood as part of a complex network of interactions between sounds, forms, and meanings that work synergistically in the cognitive systems of bilingual speakers.

CONCLUSION

This literature review reveals that phonological interference is a systematic phenomenon whose roots can be traced from the typological distance between the mother tongue and English. The most vulnerable sounds include dental fricatives /θ/ and /ð/, monophthongic vowel pairs, and complex consonant clusters. Through the framework of contrastive analysis, the pattern of sound substitution is proven not to be random, but can be predicted based on the speaker's first language (L1) phonological system. Determinants of interference severity include typological distance between languages, proficiency, nonverbal intelligence, and complexity of cross-lexical similarities involving the dimensions of sound, form, and meaning simultaneously in the cognitive networks of bilingual speakers.

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