Bridging Psycholinguistic Research and L2 Pedagogy: Implications for Teaching Orthographic and Phonological Awareness in English Learners

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ABSTRACT

Recent psycholinguistic research has highlighted the influence of orthography on phonological perception and lexical access in second language (L2) learners. This study examines the impact of orthographic representations on English word recognition among Spanish- and Korean-speaking learners, focusing on how their native language (L1) phonological and orthographic systems shape their ability to distinguish between /b/ and /v/. The findings reveal that Spanish learners exhibit greater difficulty distinguishing between these sounds in orthographically mismatched conditions, while Korean learners rely on alternative phonemic substitutions. Based on these results, this paper explores pedagogical implications for pronunciation instruction, phoneme-grapheme mapping, and multimodal teaching strategies that minimize orthographic interference. Practical recommendations for curriculum design and classroom applications are provided to enhance L2 phonological development.

Keywords: Orthographic interference, Phonological perception, Second language word recognition, Phoneme-grapheme mapping

1. Introduction

Languages across the world employ diverse writing systems, ranging from alphabetic (e.g., English, Spanish) to syllabic (e.g., Japanese Kana) and logographic (e.g., Chinese). These orthographic systems are not merely visual representations of language; they significantly influence phonological perception and production (Bassetti, 2017; Bassetti et al., 2015, 2018, 2020). In second language (L2) acquisition, learners often transfer familiar orthographic conventions from their native language (L1) to the target language, affecting their ability to accurately perceive and produce new phonemes (Erdener & Burnham, 2005; Hayes-Harb et al., 2010; Escudero & Wanrooij, 2010). The relationship between orthography and speech perception is particularly relevant in contexts where L1 and L2 employ different scripts or phonemic inventories, influencing cross-linguistic phonological adaptation (Mok et al., 2018; Cutler, 2015; Mathieu, 2016).

Recent research has increasingly focused on how orthographic forms shape L2 speech processing, particularly in languages sharing the same script (Bassetti & Sokolovic-Perovic, 2018; Escudero & Wanrooij, 2010). However, studies on non-Latin scripts, such as Chinese logographic writing or

Japanese Kana, reveal that script differences profoundly impact L2 phoneme perception and categorization (Mok et al., 2018; Cutler, 2015). For instance, learners from syllabic backgrounds may impose syllable-based segmentation onto alphabetic languages, leading to difficulties in distinguishing phonemic contrasts (Cutler, 2015). Similarly, learners whose L1 lacks particular phonemes may rely on orthographic representations when acquiring L2 sounds, which can either facilitate or hinder phoneme learning, depending on the congruence between L1 and L2 scripts.

This study examines Spanish- and Korean-speaking learners of English, focusing on how their native orthographic conventions affect the perception of the English /b/-/v/ contrast. In Spanish, the graphemes and exist but are phonemically interchangeable, typically realized as [b] or [β] (Hualde, 2014). In contrast, English maintains a clear distinction: /b/ is a bilabial plosive, while /v/ is a labiodental fricative (Hualde, 2014; Jogman, Wayland, & Wong, 2000). Korean presents an even greater challenge, as its phonemic inventory lacks labiodental fricatives entirely, assimilating them to the lenis stop /p/ (Shin et al., 2012). This phonemic adaptation is evident in loanword pronunciation, where English "video" is borrowed as [pitio] and "coffee" as [kʰopi] (Tranter, 2000).

Given these differences, it is important to understand how phonemic and orthographic influences interact in L2 speech perception. This study explores whether difficulties in distinguishing /b/ and /v/ affect word recognition and how written representations may either facilitate or interfere with auditory processing. Understanding these interactions is essential for developing more effective pedagogical approaches to pronunciation instruction, particularly for learners whose L1 orthographic conventions differ from those of English.

2. The Role of Orthography in the <b> and <v> Phonemic Distinction

This study explored how L2 learners process the English /b/-/v/ contrast and whether their perceptual difficulties influence word recognition, particularly in relation to orthographic effects (following Martínez-García, in press design). Spanish- and Korean-speaking learners, along with native English speakers, completed two experiments assessing phoneme discrimination and lexical access.

The first experiment, an AXB discrimination task, tested participants' ability to distinguish between /b/ and /v/ in nonce words. Both L2 groups showed lower accuracy than native speakers, with no significant differences between Spanish and Korean learners. The labiodental /v/ was more accurately perceived than the bilabial /b/, suggesting that perceptual salience and phonemic constraints influence L2 phoneme discrimination. The findings support the idea that learners map non-native contrasts onto familiar phonemic categories from their L1, making it harder to develop distinct representations for unfamiliar sounds (Best, 1995; Flege, 1995). Despite the differences in their native phonemic inventories, both L2 groups exhibited similar difficulties, reinforcing the notion that the absence of a phonemic contrast in the L1 can hinder perception in the L2. These results align with prior research indicating that L2 learners often assimilate novel phonemes to the closest available category in their L1, which can lead to persistent difficulties in distinguishing certain phonemic contrasts (Werker & Tees, 1984; Polka & Werker, 1994).

The second experiment investigated whether these perceptual challenges affected word recognition. A word monitoring task required participants to identify target words in spoken

sentences, with conditions designed to test the influence of orthographic cues. Both L2 groups struggled more in mismatch conditions, indicating that phoneme misperception increased lexical competition (Weber & Cutler, 2004; Broersma & Cutler, 2011). The tendency for Spanish learners to rely on orthographic representations suggests that written forms may play a compensatory role in speech processing when auditory cues alone are insufficient (Stevens, 2000; Takawaki, 2012). In contrast, Korean learners showed no significant reliance on orthographic cues, possibly due to their limited exposure to Romanized English spellings or differences in how phonological information is encoded in their L1 (Shin et al., 2012). These findings suggest that word recognition in L2 learners is shaped by both perceptual and orthographic factors, with differences emerging based on the learners' linguistic backgrounds and literacy experiences.

The results highlight the role of phoneme perception difficulties in L2 word recognition and emphasize the need for targeted instructional strategies. Spanish learners may require explicit training to distinguish /b/ and /v/, while Korean learners benefit from focused practice on labiodental fricatives. Integrating orthographic awareness into phoneme training may further support perception, particularly for learners whose native languages employ similar graphemes (Cartagena, 2002). These findings reinforce the importance of multimodal instruction, combining auditory, visual, and articulatory training to enhance L2 phonological processing (Bernstein & Liebenthal, 2014). Addressing both phonetic discrimination and orthographic influences in L2 instruction can help learners develop more robust phonemic distinctions and improve their overall language comprehension and production.

3. Pedagogical Implications

The study's findings highlight several instructional strategies that can enhance L2 phoneme recognition, reduce orthographic interference, and improve word recognition skills. Cross-linguistic orthographic interference emerges as a critical issue, particularly as Spanish and Korean learners demonstrate distinct phonemic processing patterns influenced by their respective L1 systems. While this study focuses on these two language groups, the interplay of phonological and orthographic factors is relevant across a wide range of language combinations.

To address these challenges, instructors should incorporate explicit phoneme-grapheme mapping activities, particularly using minimal pairs (e.g., *bat* vs. *vat*) to reinforce contrasts in both auditory and written forms. Additionally, direct instruction in phoneme production—supported by phonetic transcription and articulatory explanations—can help learners form more accurate and robust mental representations of target contrasts.

Beyond explicit instruction, developing learners' phonological awareness through multimodal input is equally crucial. Listening discrimination tasks, combined with audiovisual techniques, can boost perceptual accuracy. Research suggests that visual cues—such as watching articulatory movements—can enhance phoneme perception (Hardison, 2021), especially when combined with shadowing exercises that promote active engagement with spoken input.

The role of spelling in pronunciation instruction should also be reconsidered. Rather than introducing new vocabulary solely through written form, educators are encouraged to prioritize auditory exposure before presenting orthographic representations. Phonetic spelling exercises,

where students transcribe words based on sound rather than conventional spelling, can reinforce phonemic awareness and reduce reliance on misleading orthographic cues.

Encouraging learners to reflect on orthographic influence can further support L2 development. Activities that prompt learners to analyze their own misperceptions, paired with metalinguistic discussions about the relationship between spelling and pronunciation, can foster greater cognitive flexibility. Self-monitoring exercises—such as recording and analyzing one's own speech—offer learners opportunities to identify and correct L1-based pronunciation errors.

To translate the study's findings into effective pedagogical practices, this section proposes three key instructional strategies: (1) incorporating L1-specific pronunciation training, (2) prioritizing auditory input before introducing orthographic forms, and (3) using minimal pairs strategically within a multimodal instructional framework. These approaches, while illustrated through Spanish and Korean learners, are broadly applicable to diverse language learning contexts. Together, they aim to enhance learners' phonological awareness, reduce orthographic interference, and improve overall intelligibility by addressing the interplay between auditory perception, phoneme-grapheme mapping, and articulatory control.

3.1 Incorporate L1-Specific Pronunciation Training

Tailoring pronunciation instruction to learners' first language (L1) offers substantial cognitive and linguistic benefits. L1-specific pronunciation training enhances phonetic awareness, speech intelligibility, and overall language proficiency by directly addressing challenges posed by phonemes that are absent, conflated, or differently realized in the learner's native language.

By targeting problematic L1–L2 contrasts, instructors can help prevent negative transfer and foster more accurate and confident communication. For instance, learners from language backgrounds that lack certain phonemic distinctions (e.g., labiodental fricatives or interdental fricatives) benefit from explicit training that highlights the articulatory and acoustic features of these unfamiliar sounds.

Spanish-speaking learners, for example, often struggle to distinguish between English /b/ and /v/ due to overlapping realizations in their L1. Instruction that includes articulatory descriptions, phonetic transcription, and auditory discrimination through minimal pairs can help them develop clearer phonological representations. In contrast, Korean-speaking learners—whose L1 phonology does not include labiodental fricatives like /v/—benefit from targeted perceptual and production training. Shadowing, audiovisual modeling, and the use of high-variability input across different speakers and contexts can support the formation of new phonemic categories.

These cases illustrate a broader principle: L1-informed pronunciation instruction should be adapted to each learner group's specific phonological background. Research supports this targeted approach, showing that learners become more proficient in recognizing and producing unfamiliar phonemes when instruction is aligned with their linguistic needs (Aryanika, 2024; Naidoo & Im, 2014). It also improves comprehensibility and boosts learner motivation—especially when integrated with tools such as Computer-Assisted Pronunciation Training (CAPT), which provide

personalized feedback and interactive practice opportunities (Derwing et al., 2014; Khaustova et al., 2023).

To avoid reinforcing L1-based perceptual biases, it is important to balance L1-specific instruction with exposure to the broader phonetic range of the target language. This ensures that learners develop both precise articulatory control and flexible listening strategies suitable for real-world communication. Ultimately, whether working with learners from Spanish, Korean, Indonesian, Arabic, or other L1 backgrounds, pronunciation instruction that accounts for L1-specific phonological influences is a powerful tool for developing intelligible, confident L2 speakers.

3.2 Prioritize Auditory Input Before Orthographic Forms

A well-calibrated balance between auditory and orthographic instruction is essential in L2 acquisition, but evidence suggests that auditory input should be prioritized in the early stages—especially for phonologically challenging contrasts. Introducing new vocabulary through listening and speaking activities before exposing learners to written forms supports phonological awareness, reduces orthographic interference, and fosters more naturalistic language processing.

Auditory instruction plays a foundational role in developing phonological awareness, enabling learners to decode and mentally segment spoken language (Reid, 2016). This is particularly important for L2 learners who must acquire novel phonemic distinctions that may not exist in their L1. Auditory input—especially when combined with visual articulatory cues—also enhances speech perception and supports the accurate production of unfamiliar sounds (Erdener & Burnham, 2002).

In contrast, early exposure to orthographic forms can sometimes lead learners to misinterpret or overgeneralize sound-letter correspondences based on L1 conventions, especially in languages with differing orthographic depths. For example, learners from alphabetic L1s (e.g., Spanish) may rely heavily on written cues and overapply transparent L1 phoneme-grapheme mappings to L2 contexts, while learners from non-alphabetic backgrounds (e.g., Korean) may initially lack orthographic associations altogether.

Although orthographic instruction is essential for literacy development, it is most effective when introduced after learners have formed a preliminary auditory representation of the L2 sound system. Studies show that in multilingual settings, orthographic learning helps connect spoken and written language (Espinas et al., 2020), but this integration works best when the phonemic-orthographic nexus is clearly understood by learners (Munro, 1999).

To implement this principle:

- Present spoken input before showing the written word.
- Use listening discrimination tasks, shadowing, and repetition drills in initial stages.
- Gradually introduce spelling and written forms, emphasizing phoneme-grapheme mapping as a cognitive strategy.
- Incorporate phonetic transcription and phonemic-based spelling tasks to guide learners in distinguishing between auditory and orthographic representations.

A balanced, sequential approach—one that prioritizes auditory instruction early on and then integrates orthographic support—offers the best of both worlds: naturalistic language development grounded in real-time speech perception, and long-term literacy growth supported by stable orthographic knowledge. However, caution should be taken to avoid an overemphasis on written forms too early, as this can impair learners' ability to internalize the rhythm, prosody, and fluidity of authentic speech (Vitez, 2012).

By prioritizing auditory input, educators can help learners form more accurate sound categories, reducing fossilized pronunciation errors and improving both comprehension and production across diverse learner populations.

3.3 Use Minimal Pairs Strategically Within Multimodal Instruction

Minimal pairs—pairs of words that differ by only one phoneme, such as *bat* vs. *vat* or *pat* vs. *fat*—are a time-tested and empirically supported technique for improving learners' ability to differentiate, recognize, and produce phonological contrasts in a second language. When implemented as part of a multimodal instructional framework, minimal pair training becomes even more effective by engaging learners through auditory, visual, and kinesthetic channels.

The linguistic benefits of minimal pairs are well-documented. They are especially effective in promoting phonological awareness and pronunciation accuracy (Husna et al., 2023; Sulistyaningsih et al., 2014). For instance, learners who engaged in minimal pair practice with sounds like /p/ and /f/ or /b/ and /v/ demonstrated significant improvement in both perception and production. These exercises are particularly useful for teaching the distinction between voiced and voiceless sounds, which are commonly challenging for learners from diverse L1 backgrounds (Fatmawati, 2014).

To maximize their impact:

- Use frequent, communicatively relevant minimal pairs, ensuring learners practice contrasts found in everyday discourse (Levis & Cortes, 2008).
- Incorporate minimal pairs into interactive, contextualized activities, such as role plays, pronunciation games, and listening discrimination tasks, to make the learning process dynamic and engaging (Tuan, 2010).

Multimodal instruction—defined by its integration of auditory, visual, and articulatory modes—amplifies the effectiveness of such tasks. When learners can see the differences in sound production (e.g., via spectrograms or mouth movements), hear native models, and feel articulatory patterns through guided movement or kinesthetic cues, their retention and accuracy increase. According to Tuan (2010), combining minimal pair activities with technology (e.g., spectrogram analyses and audio feedback tools) not only aids in perception but also fosters metalinguistic reflection and learner autonomy.

Moreover, multimodal strategies support contextual learning, allowing students to grasp the real-life communicative stakes of pronunciation accuracy. When learners see how pronunciation errors can change meaning (e.g., *bin* vs. *vin*), they are more motivated to refine their speech patterns (Levis & Cortes, 2008).

That said, careful selection and frequency of minimal pair usage is crucial. Some pairs may be phonetically useful but rare in natural conversation, which may limit their transferability. Thus, instruction should balance phonetic clarity with communicative relevance, using minimal pairs as a scaffold toward fluent, intelligible speech in real-world contexts.

4. Conclusion and Future Directions

The results of this study underscore the complex relationship between orthographic input and phonological perception in L2 learners. While both Spanish and Korean learners faced difficulties with the /b/-/v/ contrast, their errors were shaped by distinct L1 influences. These findings suggest that effective L2 instruction must integrate phonetic, orthographic, and perceptual training to support more accurate word recognition. Future research should explore the effectiveness of multimodal teaching approaches and investigate how orthographic interference can be mitigated in classroom settings. Additional research should also examine whether proficiency levels mediate the impact of orthographic influence on L2 phoneme perception and whether long-term training can facilitate more robust phonological representations.

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