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Islamic Azad University

Addressing Pronunciation Challenges Arising from Negative Transfer in Vocabulary Teaching: A Mixed-Methods Analysis

Mohammad Javad Hejazi[1]

[1]Department of English Language, Qo.C., Islamic Azad University, Qom, Iran

Abstract

Accurate pronunciation is a critical yet often overlooked component of EFL instruction. Although it plays a central role in communicative competence, pronunciation is frequently subordinated to spelling and meaning in vocabulary teaching. This study employed an explanatory sequential mixed-methods design to investigate how the sequencing of pronunciation and orthographic input affects learners' acquisition of English word pronunciation and stress patterns. In a quasi-experimental setup, 40 Iranian secondary school students were divided into two groups: one received phonology-first instruction, and the other received orthography-first instruction. Quantitative analysis of posttest data revealed that the phonology-first group made significantly fewer pronunciation and stress errors. To enrich and explain these results, semi-structured interviews were conducted with participants from both groups, and classroom observations were used to document behavioral patterns during instruction. Learners in the phonology-first group reported greater confidence, reduced confusion, and clearer awareness of English stress patterns. In contrast, the orthography-first group described frustration and persistent difficulty overcoming initial mispronunciations. The convergence of statistical findings and learner perspectives suggests that introducing pronunciation and stress patterns before spelling and meaning mitigates negative transfer and supports more accurate phonological development. These findings underscore the importance of incorporating pronunciation as a foundational element in lexical instruction.

Keywords: English as a foreign language, EFL, negative transfer, stress pattern, phonology-first approach, pronunciation

1. Introduction

Pronunciation is a fundamental yet often overlooked aspect of second language (L2) acquisition. While vocabulary instruction is essential for language proficiency, its integration with pronunciation teaching remains insufficient in many EFL classrooms. Traditional approaches tend to prioritize spelling and meaning over phonological accuracy, leading to persistent pronunciation difficulties (Sardegna & Jarosz, 2023a). Since pronunciation is a multifaceted process, involving the intricate coordination of cognitive and physiological mechanisms, L2 learners are required to recalibrate their articulatory habits to accommodate L2 phonological system (Levis, 2018a, 2018b). Clear articulation facilitates comprehension and listener engagement,

whereas phonological ambiguity can lead to cognitive dissonance, even in the presence of advanced grammatical and lexical proficiency. Notably, while lexical and grammatical simplification may enhance comprehensibility, phonological simplification is not a viable strategy.

Phonological proficiency carries significant socio-indexical value, influencing perceptions of intelligence, competence, and social status (Lindemann, 2002). Pronunciation can serve as a marker of a speaker's socio-cultural origins, and is often a salient characteristic of non-native speech. Research indicates a correlation between phonological proficiency and socio-economic outcomes, impacting perceptions of credibility and professionalism (Munro & Derwing, 2011).

Despite the widely acknowledged significance of pronunciation, L2 learners frequently encounter challenges in this domain, attributable to linguistic factors. This is particularly problematic for learners whose first language (L1) phonetic and stress patterns significantly differ from English, resulting in negative transfer, a phenomenon where L1 pronunciation habits interfere with L2 speech production. Negative transfer can lead to mispronunciations that hinder intelligibility and communication, making it essential to address pronunciation early in vocabulary instruction. Research suggests that phonological inaccuracies, especially those stemming from incorrect stress placement, are more difficult to correct once they become ingrained (Levis, 2018a, 2018b). Despite this, many language learning environments emphasize written forms of vocabulary before ensuring that learners have mastered accurate pronunciation and stress patterns (Derwing & Munro, 2015). Accordingly, this paper aims to examine the impact of negative transfer on pronunciation among Iranian learners of English as a foreign language (EFL) in English vocabulary teaching.

As the learning of spoken language precedes the development of literacy skills in human development, the mastery of a language necessitates accurate production of its phonological inventory, encompassing individual sounds, utterances, and lexical items. While native-like pronunciation remains a complex and often elusive goal for second language (L2) learners, the attainment of clear and intelligible speech is paramount for effective cross-linguistic communication. In L2 interactions, pronunciation serves as a primary indicator of a speaker's linguistic competence, significantly influencing listeners' initial perceptions. Phonological deficiencies can impede comprehension and engender miscommunication. Furthermore, challenges in pronunciation can negatively impact learners' self-efficacy and perceived credibility (Derwing & Munro, 2015).

However, in pedagogical contexts, pronunciation is frequently overshadowed by orthographic and semantic instruction. As Sardegna and Jarosz (2023b) note, pronunciation instruction is often sidelined in favor of other language skills, leading to persistent phonological challenges. Teachers are expected to address pronunciation, stress, orthography, and semantics, yet the latter two often receive disproportionate attention. This pedagogical imbalance can result in persistent phonological and suprasegmental challenges.

Empirical research conducted on Iranian learners of English has demonstrated that prioritizing orthography and semantics over phonological and suprasegmental instruction in vocabulary acquisition leads to significant and enduring pronunciation difficulties. These findings underscore the critical role of phonological and suprasegmental accuracy in effective communication, as deficiencies in these areas can impede comprehension and hinder successful intercultural interactions.

Despite growing recognition of pronunciation's importance, existing research on lexical instruction has largely overlooked its phonological dimension. Studies examining negative transfer have primarily focused on segmental phonetics (e.g., consonant and vowel pronunciation) rather than suprasegmental features such as stress patterns and rhythm. Additionally, while research has documented the detrimental effects of orthographic interference on pronunciation, few studies have investigated this issue in Persian-speaking EFL learners.

This study aims to bridge these gaps by examining how pronunciation challenges in Iranian learners of English stem from negative transfer and orthographic interference. Accordingly, this paper examines the impact of negative transfer on pronunciation among Iranian learners of English as a foreign language (EFL) in English vocabulary teaching. By investigating the impact of phonological primacy in lexical instruction, this research contributes to the development of more effective pedagogical strategies that integrate pronunciation as a core component of vocabulary teaching. To that end, the following research question were put forward:

RQ1: To what extent does the type of instructional method—Orthography-First or Phonology-First—influence learners' accuracy in pronouncing English lexical items, as measured by correct, incorrect, and no-answer responses?

RQ2: Does the type of instructional approach—Orthography-First versus Phonology-First—significantly affect students' accuracy in identifying lexical items?

RQ3: How do the participants perceive the effects of phonology-first versus orthography-first instructional sequencing on their pronunciation learning, confidence, and use of learning strategies?

2. Literature Review

2.1. The Role of Pronunciation in Second Language Acquisition

Pronunciation is a critical yet often overlooked component of second language (L2) acquisition. While vocabulary instruction is essential for language proficiency, its integration with phonological accuracy remains insufficient in EFL classrooms. Research indicates that pronunciation is a key factor in intelligibility and communicative success, significantly influencing listeners' perceptions of linguistic competence (Derwing & Munro, 2015). However, traditional instructional approaches frequently prioritize orthography and semantics over phonetic accuracy, leading to persistent pronunciation difficulties (Sardegna & Jarosz, 2023a). The complexity of pronunciation learning stems from multiple linguistic and cognitive factors, including articulatory settings, phonological contrasts, and prosodic features such as stress and intonation (Levis, 2018a, 2018b). Despite the widely recognized importance of pronunciation, explicit phonological instruction remains marginal in language teaching, particularly in lexical-focused curricula (Henderson et al., 2015). Consequently, learners develop entrenched errors that hinder their spoken communication, particularly when pronunciation is introduced as a secondary concern after spelling and meaning.

2.2. Negative Transfer and Pronunciation Challenges

Negative transfer occurs when linguistic features of a learner's L1 interfere with the acquisition of L2 phonological patterns. This is especially evident in pronunciation, where L1 phonetic and prosodic structures influence L2 speech production (Odlin, 2012). Persian learners of English, for instance, often struggle with stress placement due to fundamental differences between Persian and English prosody. Persian is a syllable-timed language with relatively predictable stress patterns, whereas English operates on a stress-timed rhythm with variable stress placement, making L1 transfer a frequent source of mispronunciation (Sadeghi & Hazrati, 2020). Studies have also shown that stress misplacement significantly affects intelligibility and listener comprehension (Field, 2005). Incorrect stress patterns can obscure meaning, disrupt lexical recognition, and contribute to communication breakdown (Trofimovich & Isaacs, 2012). Furthermore, research suggests that learners

who acquire vocabulary primarily through written forms often develop erroneous phonological representations, reinforcing pronunciation errors through repeated exposure to incorrect stress assignments (Cutler, 2015).

2.3. The Impact of Orthography on Pronunciation

Orthographic interference plays a crucial role in pronunciation learning. English spelling conventions are not consistently phonetic, leading learners to rely on written forms when developing pronunciation patterns. Studies indicate that EFL learners who are first introduced to vocabulary through written text tend to mispronounce words based on their orthographic representations rather than their phonetic realizations (Bassetti, 2017). This issue is particularly pronounced among Persian learners, as Persian orthography is largely phonemic, meaning that words are pronounced as they are written—a stark contrast to the irregularities of English spelling and pronunciation (Ebrahimi & Kormi-Nouri, 2016). Research highlights the importance of phonological primacy in vocabulary acquisition. Learners who are first exposed to correct pronunciation before seeing the written form demonstrate greater accuracy in phonetic production and stress placement (Escudero et al., 2008). Moreover, Sardegna and Jarosz (2023b) argued that pronunciation should be integrated early in lexical instruction to prevent the fossilization of incorrect phonological patterns. Empirical studies suggest that when pronunciation is prioritized in vocabulary teaching, learners exhibit improved intelligibility, higher confidence in oral communication, and reduced phonological transfer errors (Flege & Bohn, 2021).

2.4. Pronunciation in Vocabulary Teaching

Traditional vocabulary pedagogies have primarily focused on meaning and collocational patterns, often neglecting pronunciation (e.g., Lewis, 1993). Recent studies argue that integrating phonological components into lexical instruction enhances both pronunciation accuracy and overall communicative competence (Webb & Nation, 2017). Pronunciation-focused lexical teaching involves explicit instruction in phonetic transcription, stress placement, and suprasegmental features alongside vocabulary learning (Chan & Li, 2020). Experimental studies have shown that learners who receive phonological instruction alongside lexical teaching demonstrate better retention and application of pronunciation rules compared to those who focus solely on written vocabulary (Munro & Derwing, 2015). In particular, explicit training in stress patterns has been found to mitigate the effects of negative transfer, enabling learners to produce more intelligible speech (Levis & Sonsaat, 2020).

3. Method

3.1. Design

This study employed a mixed-methods experimental design (Creswell, 2022), consisting of a quantitative quasi-experimental study followed by qualitative data collection and analysis to provide deeper insight into the instructional effects observed. The rationale for this design was to first measure the impact of instructional sequencing on pronunciation and stress accuracy, then explore learners' experiences and perceptions to interpret and enrich the quantitative findings.

3.2. Participants

A sample of 40 secondary school students was selected via convenience sampling from four distinct secondary schools in Qom, Iran. Participants were homogeneous with respect to sex and age, all being third-year secondary school students. Prior to the study, participants had received English language instruction solely within their secondary school curriculum, thus their English proficiency was confined to the content covered over the preceding two academic years. None had received specialized pronunciation training prior to the study. Participants were randomly assigned to two experimental groups: Orthography-First (Group 1) and Phonology-First (Group 2). For semi-structured interviews, 10 participants were selected via simple random sampling from the two experimental groups, 5 from each group.

3.3. Materials

A set of 20 novel English lexical items was selected for the study. These items were chosen based on their novelty to the student population, ensuring that participants had not received prior instruction in their pronunciation. This limitation of lexical items to 20 was implemented to mitigate participant fatigue and maintain optimal concentration during the testing procedure. The items were selected to include a range of common English stress patterns.

The lexical items and their IPA transcriptions are as follows: giant /ˈdʒaɪənt/, archaic /ɑːrˈkeɪɪk/, feature /ˈfiːtʃər/, peasant /ˈpɛzənt/, poison /ˈpɔɪzən/, honor /ˈɑːnər/, courage /ˈkɜːrɪdʒ/, lagoon /ləˈguːn/, budget /ˈbʌdʒɪt/, violence /ˈvaɪələns/, schedule /ˈskɛdʒuːl/, stingy /ˈstɪndʒi/, patron /ˈpeɪtrən/, preface /ˈprɛfəs/, distant /ˈdɪstənt/, odor /ˈoʊdər/, massage /məˈsɑːʒ/, navy /ˈneɪvi/, pupil /ˈpjuːpəl/, and petrol /ˈpɛtrəl/.

3.4. Instruments:

The instrument was a posttest presenting lexical items orthographically on a whiteboard. Participants individually pronounced each item and produced correct stress patterns. This tool measured pronunciation accuracy and stress assignment while ensuring controlled, distraction-free assessment conditions. For the purpose of the qualitative data collection, a semi-structured interview protocol was prepared with the following questions:

1. How did the order of hearing the pronunciation before seeing the spelling (or vice versa) affect your ability to remember and pronounce new English words?
2. Did the sequence of instruction influence your confidence when speaking English? Please explain.
3. What challenges did you face when learning the pronunciation and stress patterns of new vocabulary?
4. Can you describe any strategies you used to improve your pronunciation after the lessons?

Moreover, a structured observation protocol was also used to record learner behavior, focusing on pronunciation attempts, hesitation patterns, peer interaction, and engagement.

3.5. Procedure

Initially, the participating students were assigned to two experimental groups, with each group receiving a different methodology to learn 20 novel lexical items for four weeks. In Group 1 (Orthography-First), learners were shown each English lexical item and its Persian equivalent in written form. They were asked to pronounce the word aloud based on its spelling. After initial attempts, the correct pronunciation and stress pattern were modeled auditorily, and learners were instructed how to self-correct. This method aimed to simulate the typical orthographic-first exposure in EFL contexts and elicit errors related to orthographic interference and L1 transfer.

In Group 2 (Phonology-First), learners first heard the pronunciation and stress of each lexical item before seeing the written form or translation. They were guided to repeat the words with attention to sound and stress patterns. After auditory exposure, the orthographic form and Persian equivalent were presented. This sequence was designed to facilitate accurate phonological encoding prior to any orthographic influence.

Both groups practiced the pronunciation and stress patterns of the 20 lexical items during the lesson. One month following the instructional

intervention, a posttest was administered to assess the efficacy of the two instructional methodologies. Participants were individually assessed in a classroom setting. The lexical items were presented orthographically on the whiteboard, and participants were required to pronounce and apply correct stress patterns. Following individual assessment, participants were directed to a separate room to prevent inter-participant communication. Quantitative data were collected through this delayed posttest and analyzed for segmental and suprasegmental accuracy.

Following the posttest, a qualitative phase was conducted to explore learners' subjective experiences with the instructional methods.

Semi-structured interviews were carried out with a purposive subsample of 10 learners (5 from each group). The interviews explored learners' perceptions of pronunciation difficulty, their confidence levels, the influence of instructional sequencing, and any strategies used to improve pronunciation. Interviews were conducted in Persian to ensure clarity and comfort, then transcribed and thematically analyzed. Classroom observations were also conducted throughout the instructional sessions. Observational field notes captured learner behavior, engagement, hesitation, and response to corrective feedback, providing contextual support for interpreting the test results and interview data.

3.6. Data Analysis

The Mann-Whitney U test was run to compare the pronunciation accuracy scores between the Orthography-First and Phonology-First groups The Chi-square test of independence was run to answer the second research questions because of the non-internal nature of the quantitative data. Qualitative data from interviews and observations were analyzed using Braun and Clarke's (2006) six-step thematic analysis procedure to identify recurring perceptions and attitudes related to the instructional sequence. These qualitative insights were used to explain, confirm, or elaborate on the quantitative outcomes. The integration of findings occurred during the interpretation phase, where learner-reported experiences were compared with group-level performance patterns to draw conclusions about the cognitive and affective effects of each instructional sequence.

4. Results

4.1. Results for the First Research Question

To address the first research question (i.e., To what extent does the type of instructional method—Orthography-First or Phonology-First—influence learners' accuracy in pronouncing English lexical items, as measured by

correct, incorrect, and no-answer responses?), the accuracy of 20 lexical items was compared between the Orthography-First and Phonology-First groups. Table 1 provides a detailed breakdown of how learners in each group performed on individual words, highlighting the overall distribution of correct, incorrect, and omitted responses.

Table 1

Pronunciation Accuracy of Lexical Items by Instructional Group: Frequency and Percentage of Responses

Item	Group 1: Orthography-First			Group 2: Phonology-First		
	Incorrect (%)	Correct (%)	No Answer (%)	Incorrect (%)	Correct (%)	No Answer (%)
giant	8 (40)	1 (5)	11 (55)	6 (30)	9 (45)	5 (25)
archaic	11 (55)	3 (15)	6 (30)	4 (20)	13 (65)	3 (15)
feature	8 (40)	5 (25)	7 (35)	4 (20)	14 (70)	2 (10)
peasant	6 (30)	2 (10)	12 (60)	5 (25)	11 (55)	4 (20)
poison	5 (25)	1 (5)	14 (70)	8 (40)	10 (50)	2 (10)
honor	10 (50)	4 (20)	6 (30)	10 (50)	9 (45)	1 (5)
courage	13 (65)	3 (15)	4 (20)	2 (10)	13 (65)	5 (25)
lagoon	7 (35)	7 (35)	6 (30)	1 (5)	16 (80)	3 (15)
budget	11 (55)	6 (30)	3 (15)	3 (15)	14 (70)	3 (15)
violence	7 (35)	2 (10)	11 (55)	3 (15)	11 (55)	4 (20)
schedule	6 (30)	3 (15)	11 (55)	5 (25)	13 (65)	2 (10)
stingy	8 (40)	8 (40)	4 (20)	2 (10)	17 (85)	1 (5)
patron	6 (30)	2 (10)	12 (60)	7 (35)	9 (45)	4 (20)
preface	15 (75)	0 (0)	5 (25)	6 (30)	10 (50)	4 (20)
distant	12 (60)	1 (5)	7 (35)	4 (20)	10 (50)	6 (30)
odor	16 (80)	2 (10)	2 (10)	9 (45)	11 (55)	0 (0)
massage	11 (55)	4 (20)	5 (25)	6 (30)	8 (40)	6 (30)
navy	9 (45)	6 (30)	5 (25)	2 (10)	16 (80)	2 (10)
pupil	12 (60)	3 (15)	5 (25)	4 (20)	14 (70)	2 (10)
Petrol	13 (65)	2 (10)	5 (25)	6 (30)	14 (70)	0 (0)
Total (%)	184 (46)	65 (16.25)	141 (35.25)	97 (24.25)	242 (60.5)	59 (14.75)

According to Table 1, the Phonology-First group demonstrated markedly stronger pronunciation accuracy than the Orthography-First group across all 20 lexical items. Group 1 produced 46% incorrect, 16.25% correct, and 35.25% no-answer responses overall. In contrast, Group 2 produced 24.25% incorrect, 60.5% correct, and only 14.75% no-answer responses. This reflects a substantial difference in performance favoring the Phonology-First instructional approach. The descriptive results in Table 3 reveal a clear

performance gap between instructional groups. Students in the Phonology-First group consistently produced higher correct pronunciation rates across the majority of lexical items and demonstrated fewer omissions and errors. Conversely, the Orthography-First group showed lower accuracy and substantially higher no-answer rates, suggesting greater uncertainty or difficulty with pronunciation.

These results indicate that instruction emphasizing phonological processing leads to more accurate and confident pronunciation of lexical items than instruction focused primarily on orthographic forms. The pattern is consistent across nearly all items, supporting the conclusion that the phonology-based instructional method is more effective for developing pronunciation accuracy. A Mann-Whitney U test was conducted to compare pronunciation accuracy scores between the Orthography-First and Phonology-First groups (Table 2).

Table 2
Using Mann-Whitney U Test Results of Pronunciation Accuracy Between Groups

Group (n)	Median Score	U	p
Orthography-First (n = 20 items)	20	45,250.5	< .001
Phonology-First (n = 20 items)	35		

Note. Scores were coded as 0 = Incorrect, 1 = No Answer, 2 = Correct. Higher scores indicate better pronunciation accuracy.

As presented in Table 2, results indicated a significant difference, $U =$ 45,250.5, $p < .001$, with the Phonology-First group demonstrating higher accuracy scores. This confirms that instruction emphasizing phonology leads to superior pronunciation performance.

4.2. Results for the Second Research Question

To answer the second research question (i.e., Does the type of instructional approach—Orthography-First versus Phonology-First—significantly affect students' accuracy in identifying lexical items?), a chi-square test of independence was run. Table 3 presents the performance of two instructional groups (Orthography-First and Phonology-First Groups) on 20 lexical items. The results are reported as the frequency and percentage of correct and incorrect responses for each item.

Table 3

Stress Pattern Accuracy of Orthography-First and Phonology-First Groups

Lexical Item (POS)	Group 1		Group 2	
	Orthography-First Incorrect n (%)	Correct n (%)	Phonology-First Incorrect n (%)	Correct n (%)
giant (n)	5 (25%)	4 (20%)	5 (25%)	10 (50%)
archaic (adj)	11 (55%)	3 (15%)	2 (10%)	15 (75%)
feature (n)	8 (40%)	5 (25%)	4 (20%)	14 (70%)
peasant (n)	7 (35%)	1 (5%)	5 (25%)	11 (55%)
poison (n)	2 (10%)	4 (20%)	5 (25%)	13 (65%)
honor (n)	8 (40%)	6 (30%)	9 (45%)	10 (50%)
courage (n)	12 (60%)	4 (20%)	6 (30%)	9 (45%)
lagoon (n)	0 (0%)	7 (35%)	0 (0%)	17 (85%)
budget (n)	11 (55%)	6 (30%)	6 (30%)	11 (55%)
violence (n)	5 (25%)	4 (20%)	5 (25%)	9 (45%)
schedule (n)	6 (30%)	3 (15%)	8 (40%)	10 (50%)
stingy (adj)	10 (50%)	6 (30%)	6 (30%)	13 (65%)
patron (n)	7 (35%)	1 (5%)	7 (35%)	9 (45%)
preface (n)	15 (75%)	0 (0%)	8 (40%)	8 (40%)
distant (n)	10 (50%)	3 (15%)	6 (30%)	8 (40%)
odor (n)	17 (85%)	1 (5%)	11 (55%)	9 (45%)
massage (n)	11 (55%)	4 (20%)	7 (35%)	7 (35%)
navy (n)	12 (60%)	3 (15%)	6 (30%)	12 (60%)
pupil (n)	12 (60%)	3 (15%)	8 (40%)	10 (50%)
petrol (n)	11 (55%)	4 (20%)	8 (40%)	12 (60%)
Total (%)	180 (45%)	72 (18%)	122 (35.75%)	217 (54.25%)

As shown in Table 3, Group 2 outperformed Group 1 across nearly all lexical items. Group 1 produced 180 incorrect responses (45%) and 72 correct responses (18%), while Group 2 produced 122 incorrect responses (≈35.75%) and 217 correct responses (≈54.25%). This indicates a large performance gap between the two instructional approaches. A comparison of individual items reveals that Group 2 consistently achieved higher correct response rates. For example, on archaic, Group 1 showed only 15% correct, whereas Group 2 achieved 75% correct. Similarly, on items such as feature, poison, lagoon, and schedule, Group 2 demonstrated notably higher accuracy. In contrast, Group 1 showed comparatively higher error rates, particularly on items such as preface, odor, pupil, and massage, where incorrect responses ranged from 55% to 85%.

A chi-square test of independence was run to examine the relationship between instructional approach (Orthography-First vs. Phonology-First) and response accuracy (Table 4).

Table 4
Chi-Square Test of Independence for Group and Accuracy

Test	χ^2	p
Pearson Chi-Square	71.25	$< .001$

As displayed in Table 4, the association between group and accuracy was statistically significant ($p < .001$). Students in the Phonology-First group demonstrated significantly higher accuracy than those in the Orthography-First group. This finding indicates that accuracy was strongly associated with instructional method, with the phonology-based instruction leading to substantially better performance.

4.3. Results for the Third Research Question

To gain deeper insight into learners' experiences with the instructional sequencing of pronunciation and orthography, semi-structured interviews were conducted with 10 participants. These learners were selected via simple random sampling from the two experimental groups, 5 from each group. Thematic analysis was used to examine the transcribed interview data. The coding process yielded four dominant themes: phonological clarity, orthographic confusion, confidence and anxiety, and pronunciation strategies.

Participants from the phonology-first group consistently described how hearing the word first improved their memory and reduced confusion as follows. Participant 2 said, "When I listened first, it was easier to repeat. I didn't get distracted by the spelling." Participant 4 stated, "The sound helped me know where the stress goes. If I see the word first, I usually guess wrong." These learners also reported feeling more confident and relaxed during speaking tasks.

In contrast, learners in the orthography-first group noted frustration and persistent difficulty. Participant 3 mentioned, "I thought the word was pronounced like it looks. Later I found I was completely wrong." Moreover, Participant 1 maintained that "It's harder to fix the wrong way after saying it many times. I wish we had heard it first."

Some Group 1 learners mentioned using spelling-based guessing strategies that led to errors, while Group 2 students relied more on audio repetition, mimicking, and teacher feedback. Overall, the interviews offered

insights into how instructional sequencing affected both cognition and learner affect.

Moreover, classroom observations were carried out during instructional sessions for both experimental groups. A structured observation protocol was used to record learner behavior, focusing on pronunciation attempts, hesitation patterns, peer interaction, and engagement. In the phonology-first group, students showed: a) Quicker and more confident repetition of lexical items, b) Fewer hesitations or glances at peers before responding, and c) Greater responsiveness to auditory modeling. In contrast, the orthography-first group displayed: a) More frequent hesitations before pronouncing words, b) Dependency on peer correction or confirmation, and c) Visible signs of uncertainty (e.g., verbalized self-doubt, repeated guessing).

These patterns aligned with the learners' own reflections and the group-level test performance, reinforcing the interpretation that phonological input prior to orthographic exposure supports more fluent and accurate pronunciation practice.

5.4. Integration of Quantitative and Qualitative Findings

The triangulation of data sources revealed consistent alignment between quantitative results and qualitative feedback. Learners in the phonology-first group, who statistically outperformed the orthography-first group in both pronunciation and stress accuracy, also expressed greater confidence and reported fewer difficulties with English stress patterns. Their comments highlighted how auditory-first input facilitated stronger phonological representations. Conversely, participants in the orthography-first group, who had higher error rates, reported greater confusion, reliance on Persian stress rules, and difficulty unlearning incorrect patterns. These reflections clarified the cognitive load and processing disadvantages observed in their posttest performance.

Classroom observations supported these findings, showing that the phonology-first group displayed more fluid, accurate responses and fewer signs of hesitation or reliance on peers. By integrating statistical trends, learner perceptions, and observed behavior, this study offers robust evidence that instructional sequencing—particularly phonology-first delivery—has both cognitive and affective benefits in vocabulary instruction.

5. Discussion

The observed differences in pronunciation and stress acquisition between the Orthography-First and Phonology-First groups can be understood through the lens of human memory processes. Lexical item acquisition involves an initial encoding stage in short-term memory, followed by consolidation into long-term memory (Grains & Redman, 1986). When learners are presented with the orthographic form of an English lexical item alongside its L1 transcription prior to auditory presentation, they may engage in unconscious phonological hypothesizing. Due to discrepancies between English orthography and phonology (Steinberg & Sciarini, 2006), and L1 phonological transfer, these hypotheses often result in inaccurate pronunciations and inappropriate stress placements, which are initially encoded in short-term memory. Subsequently, exposure to the correct auditory representation is also encoded in short-term memory.

Consistent with the interference theory of memory retrieval (Kellogg, 2007), prior learning can impede subsequent learning. The initial encoding of incorrect pronunciations may interfere with the retrieval of correct pronunciations. When learners encounter the lexical item in written form, both pronunciations are activated, and the incorrect pronunciation, which aligns with the orthographic representation, may be preferentially retrieved.

Lexical items must be encountered in multiple and diverse contexts to facilitate robust encoding in long-term memory (Stahl, 2005). When both correct and incorrect pronunciations or stress patterns are encoded, repeated retrieval may consolidate both forms into long-term memory. This co-encoding can lead to persistent pronunciation and stress-related challenges that require extensive pedagogical intervention. Corrective feedback techniques can reinforce accurate forms and attenuate the encoding of errors; however, the present study revealed that some learners continued to exhibit pronunciation errors despite remedial interventions, suggesting that previously encoded errors create persistent cognitive imprints that impede acquisition or retrieval of correct forms.

Besides negative transfer, the findings of this study can also be understood using Cognitive Load Theory (Sweller et al., 2011). Pronunciation tasks, especially with unfamiliar sounds, place a heavy mental demand on learners as they process new sounds while relying on L1 knowledge. This mental effort can lead to common errors, particularly when learners must focus simultaneously on meaning, grammar, and pronunciation. The present study demonstrates that a Phonology-First approach reduces such errors by

facilitating accurate encoding of pronunciation and stress patterns, supporting subsequent retrieval and long-term consolidation.

Adhering to the principle that prevention is preferable to remediation, proactive strategies are essential. The posttest results for Group 2 demonstrate that pronunciation and stress errors can be significantly reduced by manipulating the sequence of information presentation. Auditory presentation of lexical items with accurate pronunciation and stress patterns should precede orthographic forms and L1 translations. This approach minimizes the opportunity for learners to form inaccurate phonological hypotheses and promotes encoding of the target pronunciation as the primary representation. Explicit instruction on L2 stress rules should be integrated into lessons to mitigate L1 transfer.

Formal instruction represents only one avenue for lexical item acquisition. Learners also acquire vocabulary incidentally through exposure to rich language input in various contexts (Nation, 2020). When encountering new lexical items in auditory contexts, learners should prioritize attentive listening to accurate pronunciation and stress patterns before consulting orthographic representations. Similarly, when encountering novel words in written texts, learners should consult reliable dictionaries for accurate pronunciation and stress information rather than attempting to deduce these features independently. Practical strategies for implementing a Phonology-First approach include beginning lessons with focused listening tasks, using minimal pair exercises (e.g., "ship" vs. "sheep"), visual aids such as mouth diagrams or pronunciation videos, and short daily pronunciation drills. Controlled practice followed by communicative activities using target words in context reinforces accurate production and consolidates phonological knowledge.

6. Conclusions

This study has illuminated the significant impact of instructional sequencing on the acquisition of English pronunciation and stress patterns among Iranian EFL learners. Specifically, it addressed challenges arising from negative transfer and orthographic interference within a lexical approach framework. The findings provide compelling evidence that prioritizing phonological and suprasegmental information over orthographic and semantic input enhances learners' accuracy in both pronunciation and stress placement.

The observed discrepancies between the two experimental groups underscore the critical role of memory encoding and retrieval in language learning. The Orthography-First approach, by introducing inaccurate phonological hypotheses, created persistent cognitive imprints that hindered acquisition of correct pronunciation. In contrast, the Phonology-First methodology facilitated accurate phonological representations in short-term memory, which subsequently consolidated into long-term memory.

The study also highlighted the pervasive influence of L1 phonological transfer, particularly in L2 stress acquisition. Learners frequently applied Persian stress rules to English lexical items, resulting in systematic errors. This emphasizes the necessity of explicit instruction on L2 stress rules prior to L1 equivalents to mitigate negative transfer.

The pedagogical implications are clear: educators are encouraged to adopt a Phonology-First approach, ensuring learners are exposed to accurate pronunciation and stress patterns before encountering orthographic representations. Explicit instruction on L2 stress rules, coupled with strategies to counteract L1 transfer, should be integrated into pronunciation lessons.

While this study provides valuable insights into pronunciation acquisition challenges and solutions, further research is warranted. Future investigations could explore long-term effects of instructional methodologies, the impact of individual differences in phonological aptitude, and the efficacy of corrective feedback techniques. Additionally, studies incorporating technology-mediated instruction, classroom discourse analysis, longitudinal tracking, and learner perspectives could further advance pedagogical practices.

One limitation of the study is that all participants were Iranian secondary school students, which may limit generalizability. Future studies could include a wider range of participants with different ages, backgrounds, and levels of English. Another limitation is the absence of follow-up data to see if learners retained pronunciation improvements over time. Future research could investigate retention weeks or months later to evaluate the sustainability of gains. Future investigations could also explore the long-term effects of instructional methodologies, the impact of individual differences in phonological aptitude, and the efficacy of various corrective feedback techniques. Additionally, studies examining the integration of technology-mediated pronunciation instruction, classroom discourse analysis, longitudinal tracking, and teacher perspectives could further inform pedagogical practice.

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