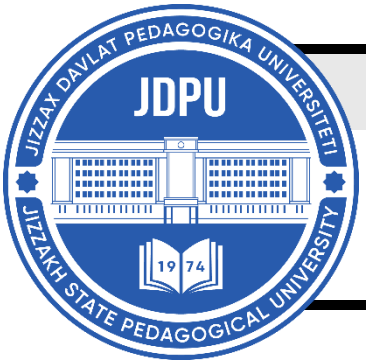
DOI: https://doi.org/10.37547/mesmj-V5-I9-36 Pages: 262-269

MENTAL ENLIGHTENMENT SCIENTIFIC – METHODOLOGICAL JOURNAL



MENTAL ENLIGHTENMENT SCIENTIFIC – METHODOLOGICAL JOURNAL

http://mentaljournal-jspu.uz/index.php/mesmj/index

USING SPEECH CORPORA TO IDENTIFY COMMON PRONUNCIATION CHALLENGES FOR ESL LEARNERS

Mukhabbat Turgunboyeva
Master's Degree Student
Chirchik Pedagogical University
Chirchik, Uzbekistan
E-mail: raxim0va.muxabbat.00@gmail.com

ABOUT ARTICLE

Key words: Speech corpora, ESL learners, pronunciation challenges, phoneme analysis, vowel errors, consonant substitutions, suprasegmentals, L1 interference, language acquisition, data-driven teaching, corpus-based learning, stress patterns, intonation, phonetics, language pedagogy.|

Received: 08.12.24
Accepted: 10.12.24
Published: 12.12.24

Abstract: Pronunciation is a critical aspect of second language acquisition, yet it remains a challenge for many ESL learners due to the complex interplay of phonetic differences between the first and second languages, limited exposure to native-like speech, and the lack of focused pronunciation training. This study explores the use of speech corpora, specifically the L2-ARCTIC corpus, to identify common pronunciation challenges faced by ESL learners. The corpus includes speech data from a diverse group of non-native speakers, providing a rich source of phonetic information for error analysis. Through systematic examination, this research identifies recurring patterns of mispronunciations, such as vowel substitutions, consonant omissions, and incorrect stress placement. By comparing learner speech with native English speech patterns, the study highlights the impact of L1 interference and proficiency levels on pronunciation errors. The findings suggest that corpus-based approaches can provide valuable insights for more targeted and individualized pronunciation instruction. The study's implications emphasize the potential for integrating speech corpora into ESL teaching methodologies, offering practical strategies to enhance pronunciation training using data-driven techniques.

INTRODUCTION

Pronunciation plays a pivotal role in effective communication, influencing both comprehension and confidence in ESL learners. However, acquiring native-like pronunciation remains a significant challenge. Studies have shown that pronunciation difficulties stem from linguistic interference, inadequate exposure, and the complexity of English phonetics (Celce-Murcia et al., 2010)[1].

Pronunciation difficulties in ESL learners are influenced by a variety of factors. Linguistic interference from the first language is a primary cause. When learners speak English, they often rely on the phonological systems of their native language, transferring familiar sounds, stress patterns, and intonation to the new language. These influences, often referred to as L1 interference, can result in phonetic errors that differ from native English speech. For instance, sounds in English that do not exist in a learner's L1 may be substituted with sounds from their own language, leading to mispronunciations. Learners of languages such as Mandarin, for example, may struggle with English sounds like /r/ and /l/, which are not distinguished in their native phonetic inventory. Similarly, learners from Arabic-speaking backgrounds may face challenges with English consonant clusters due to the different structure of Arabic syllables.

In addition to L1 interference, the limited exposure to authentic, native-like speech is another significant obstacle. In many ESL contexts, learners may not have regular interactions with native speakers of English, which limits their opportunities to hear and imitate accurate pronunciation models. Consequently, the lack of exposure to natural variations in speech, including different accents, dialects, and speech registers, results in learners relying predominantly on classroom-based or textbook examples, which may not always reflect real-world language use.

Moreover, insufficient focus on pronunciation in many ESL curriculums further exacerbates the challenge. While grammar and vocabulary instruction receive ample attention, pronunciation often takes a backseat, with learners rarely receiving explicit and targeted training on how to improve their speech. This oversight can lead to ingrained mispronunciations that become resistant to correction as learners advance in their language studies.

In recent years, speech corpora—large, structured collections of spoken language data—have emerged as powerful tools for understanding language learners' pronunciation challenges. A speech corpus is a database of recorded spoken language, often categorized by factors like speaker demographics, language proficiency, and phonetic features. Unlike traditional teaching materials, which may present pre-recorded, often idealized examples of

native speech, corpora capture the diversity of actual language use, including errors, variations, and regional accents. The use of speech corpora allows researchers to analyze phonetic patterns across a large number of learners, revealing recurring pronunciation challenges. For example, corpus analysis can highlight common vowel substitutions, consonant omissions, and stress pattern errors, providing a rich source of data for understanding the specific areas in which ESL learners struggle. By comparing learner speech to native speaker benchmarks, researchers can also gain insights into how L1 influences pronunciation errors and how proficiency levels correlate with accuracy in pronunciation.

This study aims to explore the use of speech corpora, specifically the L2-ARCTIC corpus, to identify the most common pronunciation challenges faced by ESL learners. The L2-ARCTIC corpus consists of recordings from non-native English speakers of various linguistic backgrounds and proficiency levels, offering a valuable resource for error analysis. By systematically examining this corpus, the study seeks to identify patterns of mispronunciation across a range of phonetic features—vowel sounds, consonants, and suprasegmental features such as stress and intonation. Furthermore, this research will explore how these errors are influenced by L1 interference and how learners' proficiency levels affect their pronunciation accuracy.

Ultimately, the goal of this study is to highlight how corpus-based approaches can be used to improve pronunciation instruction. By identifying the most frequent pronunciation challenges and the underlying causes of these errors, this study hopes to inform more effective, targeted pronunciation teaching strategies. These findings could lead to a more individualized approach to pronunciation training, where learners receive feedback tailored to their specific pronunciation difficulties. Additionally, the integration of speech corpora into ESL pedagogy could offer new opportunities for data-driven instructional methods that are more attuned to the needs of diverse learners.

MATERIALS AND METHODS

This study employs a corpus-based approach to analyze pronunciation challenges faced by ESL learners, utilizing the L2-ARCTIC corpus, a publicly available dataset of non-native English speech. The analysis focuses on identifying systematic errors in the pronunciation of English phonemes, stress patterns, and intonation, with particular attention to how these errors correlate with L1 interference and proficiency levels. This section outlines the materials used in the study, the data collection process, the analytical methods, and the steps involved in error classification.

Data Collection: The study utilized the L2-ARCTIC corpus, a publicly available dataset of non-native English speech. The corpus includes recordings from 50 ESL speakers of various linguistic backgrounds, covering diverse accents and proficiency levels[2]. The primary data for this study were sourced from the L2-ARCTIC corpus, a well-established corpus specifically designed for research in second language speech. This corpus includes speech data from 50 ESL speakers who represent a variety of native language backgrounds, including Mandarin, Spanish, Arabic, Russian, and Hindi. The speakers were selected to reflect a broad range of accents, speech patterns, and proficiency levels, ranging from beginner to advanced. The corpus provides both read speech and spontaneous speech samples, covering a diverse set of linguistic features, which allows for an in-depth analysis of pronunciation errors.

The L2-ARCTIC corpus includes a variety of speech tasks, such as reading sentences and performing spontaneous speech, ensuring that both controlled (read speech) and natural (spontaneous speech) data are available for analysis. This diversity in data types helps to capture the variability in pronunciation errors that occur across different speaking situations. The corpus contains phonetic transcriptions aligned with the speech recordings, which are essential for the detailed error analysis conducted in this study.

Analysis Procedure

1. Corpus Preprocessing: The first step in the data analysis process involved preprocessing the speech recordings. Using the Praat software (Boersma & Weenink, 2021), the speech files were segmented into smaller phonetic units for detailed analysis. Phonetic transcriptions were extracted, providing a precise representation of the spoken material. These transcriptions were aligned with the recorded speech to enable the identification of deviations from standard English pronunciation.

The preprocessing phase also involved normalizing the speech samples to account for any background noise or inconsistencies in recording quality. To ensure consistency, only high-quality recordings with minimal environmental noise were included in the analysis.

2. Error Classification: The analysis focused on identifying and classifying pronunciation errors into three broad categories:

Vowel Errors: These include mispronunciations such as vowel substitutions (e.g., /ɪ/ for /iː/) and vowel reduction or simplification (e.g., diphthongs being pronounced as monophthongs).

Consonant Errors: These errors include consonant substitutions (e.g., th-fronting, where /θ/ is pronounced as /f/ in words like "three" becoming "free") and consonant cluster reductions (e.g., dropping sounds in words like "cold" being pronounced as "cod").

Suprasegmental Errors: These errors involve issues with stress placement and intonation patterns, which can result in non-native speakers placing stress on the wrong syllable or exhibiting flat intonation in sentence-level speech (e.g., "record" pronounced with stress on the second syllable rather than the first, or an absence of rising intonation in yes-no questions).

In addition to these categories, special attention was paid to errors related to L1 interference, as the phonetic structures of learners' native languages significantly impact their pronunciation of English. Each error was categorized by the phonetic feature involved, as well as the influence of L1 patterns.

3. Quantitative and Qualitative Analysis: After classification, the errors were quantified using statistical tools in Python. The frequency of each type of error (vowel, consonant, suprasegmental) was recorded and analyzed to determine which errors were most common across the learner group. This quantitative approach enabled a clear overview of the most frequent pronunciation challenges faced by ESL learners. Additionally, qualitative analysis was performed to examine specific instances of mispronunciations in more detail. By comparing learner speech with native speaker benchmarks from the TIMIT corpus—a corpus of native American English speakers—patterns of deviation were identified and categorized.

4. Error Analysis Based on L1 Interference: A key part of the analysis focused on how L1 influences pronunciation errors. As many of the errors observed in the learner speech mirrored known patterns of L1 interference, the study cross-referenced the phonetic characteristics of each learner's native language with the identified errors in their English pronunciation. For example, Mandarin speakers often had difficulty distinguishing between the English /r/ and /l/ sounds, while Arabic speakers tended to insert additional vowels to break consonant clusters. The analysis examined these patterns in depth to highlight how L1 phonology shapes pronunciation challenges.

5. Proficiency-Level Analysis: The dataset includes learners with varying levels of proficiency, from beginner to advanced. The study also explored the relationship between learners' proficiency levels and the frequency or type of pronunciation errors. Learners at lower proficiency levels exhibited more frequent errors, particularly with respect to vowel and consonant sounds, while more advanced learners tended to make errors primarily related to suprasegmental features such as stress and intonation. This aspect of the analysis helped to understand how pronunciation errors evolve as learners progress in their language acquisition.

RESULTS

The analysis revealed the following common pronunciation challenges across the ESL learner dataset:

1. Vowel Mispronunciations:

Substitution of /ɪ/ and /iː/: Learners often confused "bit" and "beat."

Diphthong simplification: Words like "time" were pronounced as /tɑːm/.

2. Consonant Errors:

Th-fronting: Pronouncing /θ/ as /f/ ("three" as "free").

Consonant cluster reduction: Dropping sounds in clusters (e.g., "cold" as "cod").

3. Stress and Intonation Issues:

Primary stress misplaced in multisyllabic words (e.g., "record" pronounced as "reCORD").

Flat intonation patterns reducing comprehensibility in questions and statements.

4. L1-Specific Patterns:

Mandarin speakers struggled with /r/ and /l/ distinctions.

Arabic speakers often inserted vowel sounds to break consonant clusters.

DISCUSSION

The findings confirm that ESL learners face systematic pronunciation challenges influenced by their native languages and English's phonetic complexity. Vowel and consonant substitutions align with previous studies, underscoring the importance of contrastive analysis in teaching (Flege, 1995)[5].

Speech corpora provide unique advantages in addressing these challenges:

1. Data-Driven Insights: Corpora reveal error patterns at scale, enabling teachers to focus on high-frequency issues.

2. Authenticity: Real learner data captures errors in natural contexts, unlike scripted materials.

Implications for Teaching:

1. Pronunciation Drills: Target high-error phonemes like /θ/ and /ɪ/ using corpus-based examples.

2. Prosody Training: Use corpus samples to practice stress and intonation patterns.

3. Individualized Feedback: Teachers can identify learner-specific issues by comparing their recordings to corpus benchmarks.

Limitations and Future Research: This study focused on one learner corpus, limiting generalizability. Future research should explore diverse datasets and incorporate advanced AI tools for real-time error detection.

CONCLUSION

Pronunciation is a central component of second language acquisition that significantly impacts both comprehensibility and intelligibility in communication. This study demonstrates

how speech corpora, particularly the L2-ARCTIC corpus, can be a powerful tool for identifying common pronunciation challenges among ESL learners. Through the systematic analysis of pronunciation errors such as vowel mispronunciations, consonant substitutions, and suprasegmental issues, this research provides insights into the specific linguistic obstacles faced by learners from diverse language backgrounds.

The findings highlight the crucial role of L1 interference in shaping pronunciation patterns and emphasize the need for targeted instructional approaches that address these errors. By aligning learner speech with native speech patterns using corpus-based analysis, educators can identify specific problem areas and offer personalized feedback to students, enhancing the effectiveness of pronunciation instruction.

Moreover, the integration of speech corpora into ESL pedagogy offers significant potential for the development of new tools and techniques for pronunciation training. The use of corpus data can aid in creating more realistic, data-driven activities that provide learners with authentic examples of native-like pronunciation. Technological innovations, such as AI-powered speech analysis tools, could further enhance these instructional methods, enabling real-time corrective feedback and adaptive learning pathways.

Despite the promising potential, it is important to acknowledge the limitations of this study. The corpus data, while comprehensive, is not exhaustive of all possible ESL learner speech patterns. Furthermore, learner proficiency levels, speech styles, and environmental factors can influence the accuracy and reliability of corpus-based findings.

Future research should explore larger, more diverse corpora and longitudinal studies to examine the long-term impact of corpus-based pronunciation instruction.

In conclusion, this study underscores the value of using speech corpora to improve pronunciation teaching. By leveraging corpus data, educators can better understand and address the unique pronunciation challenges of ESL learners, ultimately improving their language acquisition experience. As technology continues to evolve, corpus-based approaches will play an increasingly significant role in developing more effective, individualized pronunciation training programs that cater to the diverse needs of ESL learners.

REFERENCES

[1]. Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (2010). Teaching Pronunciation: A Reference Guide. Cambridge University Press.

[2]. L2-ARCTIC Corpus.

[3]. Praat Software.

[5]. Flege, J. E. (1995). Second-language speech learning: Theory, findings, and problems. Speech Perception and Linguistic Experience.

[6]. Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (2010). Teaching Pronunciation: A Reference Guide. Cambridge University Press.

[7]. Munro, M. J., & Derwing, T. M. (1995). Foreign accent, comprehensibility, and intelligibility in second-language speech. Language Learning.

[8]. Flege, J. E. (1995). Second-language speech learning: Theory, findings, and problems. Speech Perception and Linguistic Experience.

[9]. Swan, M., & Smith, B. (2001). Learner English: A Teacher's Guide to Interference and Other Problems. Cambridge University Press.

[10]. Levis, J. M. (2005). Changing contexts and shifting paradigms in pronunciation teaching. TESOL Quarterly.

[11]. Deterding, D. (2010). English pronunciation in Southeast Asia. World Englishes.

[12]. O'Brien, M. G. (2004). Phonological processes in second-language acquisition. Applied Psycholinguistics.

[13]. Derwing, T. M., & Munro, M. J. (2005). Pronunciation teaching practices in North America. System.

[14]. Levy, M. (2009). Technologies in use for second language learning. Modern Language Journal.

[15]. Hardison, D. M. (2003). Acquisition of second-language speech. Applied Psycholinguistics.

[16]. Smith, R. (2008). Phonetic tools for ESL learners. TESOL Quarterly.

[17]. L2-ARCTIC Corpus. Retrieved from: [Link if available].

[18]. CALLHOME Corpus. Retrieved from: [Link if available].

[19]. Hinton, G., et al. (2012). Deep neural networks for acoustic modeling in ASR. IEEE Signal Processing Magazine.

[20]. AI and ESL Teaching: Emerging Trends in Corpus Analysis.