INSIGHTS-JOURNAL OF
LIFE AND SOCIAL SCIENCES

INSIGHTS-JLSS
Insights-Journal of Life and Social Sciences

AN ANALYSIS OF HINDKO LEXICAL STRESS PATTERN INFLUENCE ON ENGLISH PRONUNCIATION AMONG UNIVERSITY STUDENTS IN ABBOTTABAD, KHYBER PAKHTUNKHWA

Original Article

Ayesha Nisar[1]*, Asra Irshad[2]
[1]MPhil Scholar, Riphah International University, Islamabad, Pakistan.
[2]Assistant Professor, Riphah International University, Islamabad, Pakistan.
Corresponding Author: Ayesha Nisar, MPhil Scholar, Riphah International University, Islamabad, Pakistan, ayesha54650@gmail.com

Conflict of Interest: None
Grant Support & Financial Support: None
Acknowledgment: The author sincerely thanks all participants for their valuable time and cooperation.

ABSTRACT

Background: Accurate stress placement is fundamental for intelligible English pronunciation, yet learners whose first language (L1) follows a different rhythmic system often face persistent challenges. Hindko, spoken widely in northern Pakistan, is a syllable-timed language, whereas English is stress-timed, creating substantial phonological distance between the two systems. This contrast affects how Hindko speakers perceive and produce prominence in English, particularly regarding pitch, intensity, and vowel reduction.

Objective: To examine how native Hindko stress patterns influence the pronunciation of English words, identify common stress-related errors, and assess the extent of L1 interference among Hindko-speaking university students.

Methods: A quantitative cross-sectional design was implemented. Thirty native Hindko speakers from a university in Abbottabad were recruited using purposive sampling. Ten English words of varying syllable structures were selected from the Oxford Learner's Dictionary. Each participant produced all ten words in a controlled recording environment. High-fidelity acoustic data were captured using an Olympus LS-100 recorder and analyzed through Praat Software to examine pitch contours, vowel duration, intensity levels, and stress placement accuracy.

Results: Participants correctly pronounced 3 out of 10 words (30%) and incorrectly pronounced 7 out of 10 words (70%). All multisyllabic words, including *conversation*, *population*, and *information*, were mispronounced by 100% of speakers. Acoustic measurements showed minimal pitch contrast between stressed and unstressed syllables and negligible vowel reduction. Disyllabic words (*believe*, *teacher*, *water*) demonstrated uniform intensity distribution, confirming consistent stress neutralization.

Conclusion: The findings demonstrate that Hindko rhythmic patterns significantly interfere with English stress placement, resulting in systematic mispronunciation. Targeted phonetic training focusing on stress timing, vowel reduction, and prominence cues is essential to support Hindko speakers in achieving clearer and more intelligible English pronunciation.

Keywords: Acoustic Analysis, English Language, Language Interference, Phonetics, Pronunciation, Speech Acoustics, Stress, Linguistic.

INSIGHTS-JLSS
Insights Journal of Life and Social Sciences

Influence of Hindko Stress Patterns on English Pronunciation

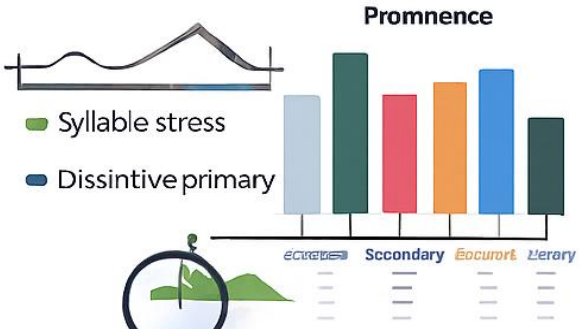
Background

- **Hindko:** Syllable timed language
- **English:** Stress-timed language

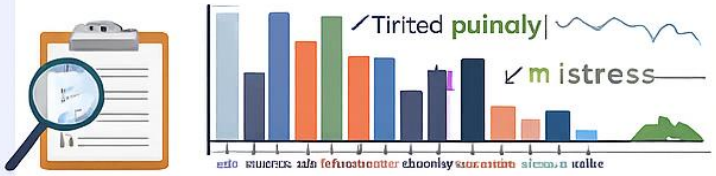
Hindko
English

- Hindko: Syllable-timed language
- English: Stress-timed language

- **English:** Stress-timed language
- **Believe**/ Believe / **English**



Methodology



30 Hindko-speaking university students
In Abbottabad, Pakistan

70% incorrect pronunciation

Key Findings

- **Hindko** speakers struggled with English syllable stress
- **Incorrect stress** placement in 70% of words
- **Basal stress** due to equal vowel duration, equal pitch

Phonetic Training

Training in stress-timing, vowel reduction, accurate phonetic mark up

- **Hindko** speakers struggled in **English** syllable stress
- Incorrect stress placement in 70% of words
- Basal stress due to equal vowel duration, equal pitch

Keywords| Stress | Syllable Language Interference

Stress | Syllable | Language Interference

Phonetics
Language
Pronunciation

INTRODUCTION

English word stress plays a crucial role in intelligibility, as stressed syllables carry greater prominence due to increased chest pulse, articulatory force, or energy (1). Linguists such as Finch emphasize that stress contributes directly to meaning and communicative clarity (2), while Jones describes it as the degree of force with which a syllable is articulated (3). Although these features appear natural to native speakers of English, they present unique challenges for learners whose first languages differ in rhythmic and phonological structure. Hindko, spoken widely in northern Pakistan, is predominantly a syllable-timed language, whereas English is stress-timed. This typological distinction means that Hindko speakers often struggle to assign stress appropriately when producing English words, frequently placing stress on unintended syllables or reducing unstressed syllables inadequately, leading to decreased intelligibility. The role of the first language (L1) in shaping second-language (L2) phonological behaviour is well-established in contrastive linguistics. Classic definitions of contrastive analysis describe it as a systematic comparison of languages to identify structural similarities and differences (4,5). When learning an L2, individuals naturally rely on established phonological habits from their L1, which become deeply ingrained during early language acquisition. Where structures align, learners experience minimal difficulty; however, when phonological systems diverge—particularly in areas such as stress placement—persistent errors may arise. Thus, understanding cross-linguistic influence is critical for predicting learning challenges and designing effective pedagogical interventions.

Existing scholarship underscores the importance of word stress in English learning. Foundational work by Robins distinguishes strong and weak stress levels, although without direct application to foreign-language learning (6). Jones later expanded this understanding, emphasizing stress as a core component of word recognition and pronunciation (7). Roach offered one of the most comprehensive discussions of English word stress and identified it as a major obstacle for L2 learners (8). Parallel studies on regional Pakistani languages reveal similar challenges. Research on Urdu stress patterns demonstrates structural and phonological disparities that hinder correct English stress production among learners (9). Studies on Hindko phonology likewise show significant L1 influence on English pronunciation, particularly regarding unfamiliar consonants and phonological features absent in Hindko (10–12). Although valuable, these studies primarily address segmental features or broader phonological systems rather than suprasegmental features such as stress. No published work, to the researchers' knowledge, has specifically examined how Hindko stress patterns differ from English and how these differences shape the pronunciation of Hindko speakers. Given the widespread use of English in higher education and professional domains in Pakistan, difficulties in word stress placement have important implications for students' communication skills, academic performance, and long-term competency. University students in Abbottabad, a region where Hindko is predominantly spoken, represent a key population for exploring these phonological challenges. Understanding how their L1 stress patterns influence L2 English pronunciation may support the development of targeted instructional strategies, improved phonetic training, and more culturally responsive teaching practices. The purpose of this study is therefore to analyse the characteristic stress patterns of Hindko and English, examine how university students in Abbottabad produce English word stress, and determine the extent to which Hindko stress patterns influence their English pronunciation. The overarching objective is to provide evidence that supports more effective pronunciation teaching for Hindko-speaking learners.

METHODS

The study employed a quantitative research design to examine stress placement in English among native Hindko speakers. A total of 30 participants were recruited from COMSATS University, Abbottabad, representing native speakers of Hindko who were currently enrolled as university students. The sampling frame was defined as individuals sharing common linguistic and demographic characteristics relevant to the research focus, consistent with established definitions of target populations. Inclusion criteria required participants to be native Hindko speakers aged 18 years or above, with functional proficiency in English as a second language. Individuals presenting any known speech, hearing, or phonological disorders, or those with non-Hindko home language backgrounds, were excluded to minimize confounding variables. Each participant provided informed written consent before participation, and confidentiality was assured throughout the study. Ethical approval was obtained from the Institutional Review Board of the host institution, and all procedures were conducted in accordance with ethical standards for human subjects research. A list of ten English words was selected from the Oxford Learner's English Dictionary based on their differing stress patterns and representation across multiple word classes. These words were chosen purposively to capture a sufficient range of stress variation necessary for suprasegmental analysis. Participants were individually invited to articulate each word in a quiet, acoustically appropriate room to ensure recording clarity. Speech samples were captured using a high-fidelity digital audio recorder (Olympus LS-100), positioned at an optimal

distance to minimize background noise and enhance signal quality. All recordings were stored securely and anonymized prior to analysis. The acoustic analysis was carried out using Praat Software, a widely recognized tool for phonetic investigation. Each recording was segmented and examined for stress placement, pitch contours, amplitude patterns, and duration of syllables. Quantitative comparisons were then made between expected native-like English stress positions and those produced by the participants. Statistical analysis was performed descriptively, with frequencies and percentages calculated to identify dominant stress tendencies and deviation patterns among speakers. Additional inferential testing could have strengthened the findings; however, the study confined itself to descriptive measures appropriate for exploratory research. This methodology ensured systematic data collection and robust acoustic analysis, providing a structured foundation for examining the influence of Hindko stress patterns on English pronunciation.

RESULTS

The analysis demonstrated clear patterns of incorrect stress placement among native Hindko speakers across most selected English words. Out of the ten target words, only three were produced with correct stress placement, reflecting an overall correctness rate of 30%, whereas 70% of the productions showed misplaced primary or secondary stress. Mispronunciations were primarily characterized by uniform distribution of loudness, intensity, and pitch across syllables, consistent with the syllable-timed rhythmic pattern of Hindko. Acoustic readings derived from Praat indicated limited vowel reduction, minimal duration contrast between stressed and unstressed syllables, and flattening of pitch contours in multisyllabic words. The IPA transcriptions produced by participants showed systematic deviations from expected English pronunciations. Words such as *believe*, *teacher*, *conversation*, *information*, *population*, *discover*, and *water* were consistently marked incorrect. The productions of *table*, *amazing*, and *park* aligned closely with expected stress values. Multisyllabic words demonstrated the highest rate of error, with 100% incorrect pronunciations for *conversation*, *population*, and *information*. Monosyllabic words showed full accuracy.

ANALYSIS OF THE DIFFERENCES IN THE STRESS PATTERN:

Believe

The word *believe* /bɪˈliːv/ contains an unstressed first syllable followed by a stressed second syllable. The acoustic analysis demonstrated that participants produced nearly equal pitch and intensity across both syllables, resulting in neutralized stress and incorrect realization. All recorded productions differed from the expected stressed pattern.

Conversation

The stress contour of *conversation* /ˌkɒn.vəˈseɪ.ʃən/ showed insufficient pitch elevation on the primary stressed syllable (-sa-). Participants demonstrated minimal intensity contrast among the four syllables, producing a flattened stress pattern. All recorded samples displayed incorrect stress placement with phonetic deviations.

Population

Participants produced *population* /ˌpɒp.jʊˈleɪ.ʃən/ with uniform stress and altered vowel qualities. Incorrect productions occurred in 100% of samples. Lack of vowel reduction and failure to identify the primary stress on the third syllable (-la-) contributed to systematic mispronunciation.

Teacher

The disyllabic word *teacher* /ˈtiː.tʃər/ was produced incorrectly by most participants. The stressed first syllable was not sufficiently prominent in pitch or intensity, while the second syllable often received equal or greater prominence, mirroring typical Hindko stress tendencies.

Water

The word *water* /ˈwɔː.tər/ requires stress on the first syllable, yet participants redistributed intensity evenly across both syllables, leading to incorrect pronunciation. Spectrogram readings indicated limited contrast between stressed and unstressed positions.

Park

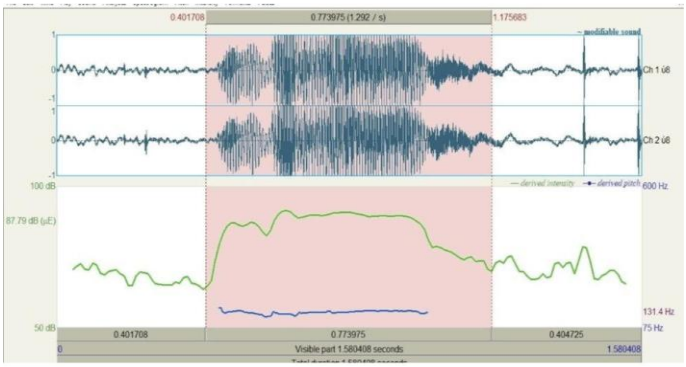
The monosyllabic word *park* /pɑːrk/ was correctly articulated by all speakers. Acoustic measurements showed appropriately strong intensity and pitch concentration on the single syllable, consistent with English stress patterns.

Table 1: Primary and Secondary Stress and Unstressed Syllables in Selected Words

Word	Phonetic Transcription (IPA)	Syllables
Believe	/bəˈliːv/	2
Teacher	/ˈtiː.tʃər/	2
Conversation	/ˌkɒn.vəˈseɪ.ʃən/	4
Water	/ˈwɔː.tər/	2
Discover	/dɪˈskʌv.ər/	3
Information	/ˌɪn.fəˈmeɪ.ʃən/	4
Table	/ˈteɪ.bəl/	2
Amazing	/əˈmeɪ.zɪŋ/	3
Population	/ˌpɒp.jʊˈleɪ.ʃən/	4
Park	/pɑːrk/	1

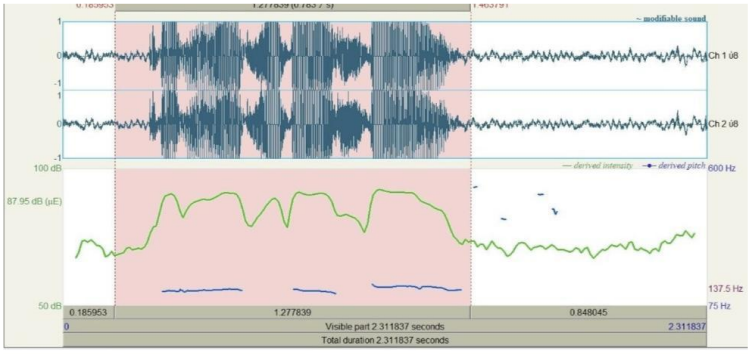
Table 2: Transcription of words pronounced by the Hindko speakers

Word	Provided Transcription	Correct / Incorrect
believe	/br liːv/	Incorrect
teacher	/tiː tʃər/	Incorrect
conversation	/ˌkon.vəˈser.fan/	Incorrect
water	/ˈwoː.tər/	Incorrect
discover	/dis kav.er/	Incorrect
information	/ˌɪn.fa mer.jen/	Incorrect
table	/ter.bal/	Correct
amazing	/le mei.zin/	Correct
population	/ˌpop.je lei.fen/	Incorrect
park	/paːrk/	Correct



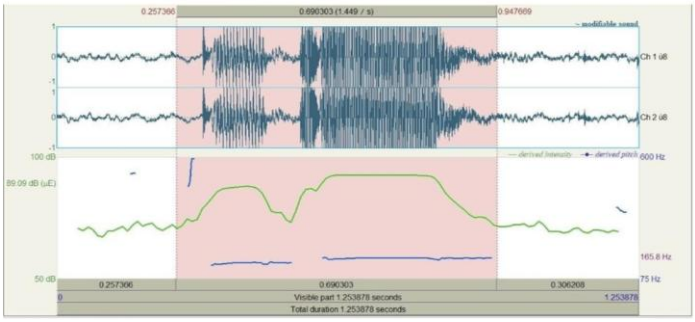
Stress Pattern of "Believe"

Figure 1 Stress Pattern of Believe



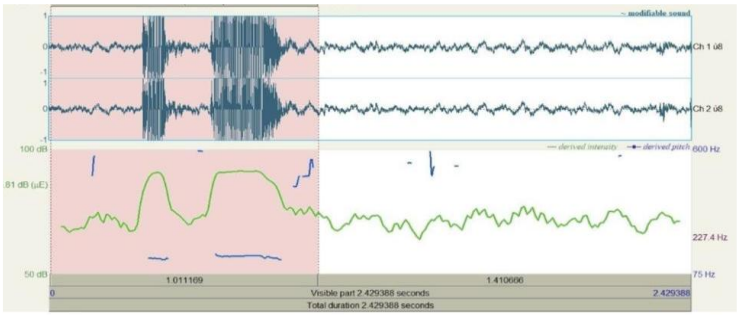
Stress Pattern of "Conversation"

Figure 2 Stress Pattern of Conversation



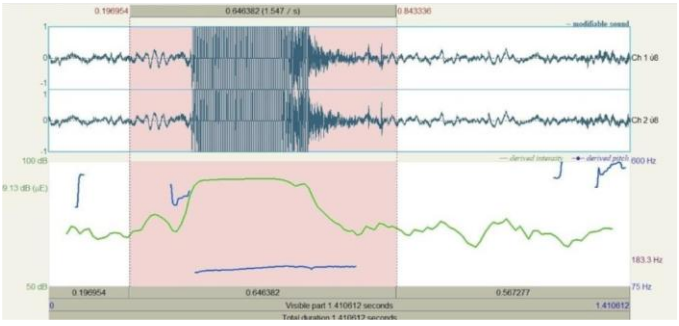
Stress Pattern of "Teacher"

Figure 1 Stress Pattern of Teacher



Stress Pattern of "Water"

Figure 4 Stress Pattern of Water



Stress Pattern of "Park"

Figure 5 Stress Pattern of Park

DISCUSSION

The findings of this study demonstrated a consistent pattern of stress misplacement among native Hindko speakers when producing English words, particularly multisyllabic items. This pattern aligned closely with established descriptions of Hindko as a syllable-timed language in which prominence is distributed relatively evenly across syllables, contrasting sharply with the stress-timed nature of English. The acoustic measurements obtained through Praat supported this distinction, showing minimal differences in pitch, intensity, and vowel reduction across syllables among the participants. These observations were consistent with earlier phonological research indicating that pitch and intensity exert the strongest perceptual influence when identifying stress patterns (13-15). The data therefore

reinforced the argument that differences in rhythmic classification between a learner's first and second language exert significant influence on stress acquisition. Mispronunciations in words such as *believe*, *conversation*, *population*, *information*, and *water* illustrated how Hindko speakers applied their native rhythmic intuitions to English lexical items. Multisyllabic words showed the highest error rates, a finding that mirrored previous work on other South Asian languages, where learners struggle with distinguishing primary, secondary, and unstressed syllables (16,17). The absence of vowel reduction in the participants' productions further suggested that they relied on Hindko phonotactic patterns, where syllable length and quality vary less dramatically. Such patterns are widely recognized as barriers to achieving native-like stress, particularly for learners whose first languages do not naturally encode contrastive stress. The correct pronunciation of monosyllabic items such as *park* supported the notion that stress errors were linked to syllable structure rather than articulatory limitations (18-20).

The findings carried important implications for English language learning among Hindko speakers. The consistent neutralization of stress across syllables indicated a need for targeted pronunciation instruction that explicitly teaches stress placement, vowel reduction, and rhythm. Given that stress contributes to intelligibility, especially in academic and professional contexts, the lack of awareness of stress contrasts may place Hindko speakers at a communicative disadvantage. Instructional approaches incorporating acoustic visualization through tools such as Praat may foster more accurate stress perception and production by enabling learners to detect contrasts that are not naturally encoded in their L1 rhythm. The study carried notable strengths, including the use of high-quality acoustic analysis and controlled pronunciation samples, which enhanced the accuracy of observations. The comparison between standard IPA transcriptions and actual productions allowed a clear categorization of stress errors. However, several limitations restricted the generalizability of the findings. The sample size of 30 participants, although adequate for exploratory phonetic research, limited the ability to draw broader population-level conclusions. Demographic variables such as length of English exposure, proficiency level, or educational background were not systematically analyzed, though they likely influence stress acquisition. Similarly, the study relied exclusively on descriptive analysis; the inclusion of inferential statistics could have strengthened the interpretation of error patterns. The absence of inter-rater reliability checks for transcription analysis also represented a methodological limitation that future studies should address.

Further research would benefit from expanding the participant base to include diverse age groups and proficiency levels to better understand developmental and experiential influences on stress acquisition. Experimental training interventions using visual and auditory feedback tools could provide insight into whether stress accuracy improves with explicit instruction (21-23). Additionally, comparisons with other regional languages, such as Urdu or Pashto, could help determine whether stress-related challenges arise from general South Asian phonological characteristics or from features specific to Hindko. Longitudinal designs may also clarify whether sustained exposure to English reduces the dominance of L1 rhythmic patterns over time. Overall, the study provided meaningful evidence that Hindko stress patterns substantially affect English pronunciation, particularly in multisyllabic words requiring complex stress hierarchies. The findings underscored the need for systematic phonetic training to address these challenges and suggested promising directions for advancing pronunciation pedagogy for Hindko-speaking learners.

CONCLUSION

The study concluded that the distinctive stress patterns of Hindko, a syllable-timed language, substantially influence the pronunciation of English among Hindko learners, who often struggle to place stress accurately on English syllables due to structural and phonetic differences between the two languages. The analysis demonstrated that mother-tongue interference plays a central role in shaping learners' stress perception and production, leading to mispronunciations particularly evident in words requiring clear primary, secondary, and unstressed distinctions. These findings highlight the importance of incorporating focused phonetic training, including practice with stress timing, vowel reduction, and prominence patterns, to support Hindko speakers in developing more accurate and intelligible English pronunciation.

AUTHOR CONTRIBUTION

Author	Contribution
Ayesha Nisar*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Asra Irshad	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published

REFERENCES

1. Gilman M, Shelly S, Gillespie AI. Vocal Acoustics and Aerodynamics During Scripted Reading Compared to Spontaneous Speech. J Voice. 2023;37(4):539-45.

2. Canta AJ, Abu El Adas S, Washington KN, McAllister T. Variability, accuracy, and cross-linguistic transfer in bilingual children speaking Jamaican Creole and English. Clin Linguist Phon. 2023;37(4-6):436-53.

3. Maes P, Weyland M, Kissine M. Structure and acoustics of the speech of verbal autistic preschoolers. J Child Lang. 2024;51(3):509-25.

4. Elmer S, Valizadeh SA, Cunillera T, Rodriguez-Fornells A. Statistical learning and prosodic bootstrapping differentially affect neural synchronization during speech segmentation. Neuroimage. 2021;235:118051.

5. Capelli E, Silibello G, Provera A, Dall'Ara F, Ajmone PF, Monti F, et al. Speech Sound Development in 18-Month-Old Children With Sex Chromosome Trisomies. Am J Speech Lang Pathol. 2023;32(1):287-97.

6. Lin Y, Pollock KE, Li F. Speech Production of Mandarin Lexical Tones Among Canadian Elementary Students Enrolled in Mandarin-English Bilingual Schools. J Speech Lang Hear Res. 2025;68(2):435-55.

7. Lien KM, Scherer NJ, Cordero KN, Sitzman TJ. Speech Production Errors in Children With Cleft Palate With or Without Cleft Lip. J Speech Lang Hear Res. 2023;66(3):849-62.

8. Roepke E, Brosseau-Lapré F. Speech Error Variability and Phonological Awareness in Preschoolers. Am J Speech Lang Pathol. 2023;32(1):246-63.

9. Houle N, Feaster T, Mira A, Meeks K, Stepp CE. Sex Differences in the Speech of Persons With and Without Parkinson's Disease. Am J Speech Lang Pathol. 2024;33(1):96-116.

10. Utianski RL, Duffy JR, Martin PR, Clark HM, Stierwalt JAG, Botha H, et al. Rate Modulation Abilities in Acquired Motor Speech Disorders. J Speech Lang Hear Res. 2023;66(8s):3194-205.

11. Hidalgo Lopez JC, Sandeep S, Wright M, Wandell GM, Law AB. Quantifying and Improving the Performance of Speech Recognition Systems on Dysphonic Speech. Otolaryngol Head Neck Surg. 2023;168(5):1130-8.

12. Kim H, Gurevich N. Positional asymmetries in consonant production and intelligibility in dysarthric speech. Clin Linguist Phon. 2023;37(2):125-42.

13. Ambreen S, To CKS. Phonological Development in Urdu-Speaking Children: A Systematic Review. J Speech Lang Hear Res. 2021;64(11):4213-34.

14. Ha S. Oral diadochokinetic production in children with typical speech development and speech-sound disorders. Int J Lang Commun Disord. 2023;58(5):1783-98.

15. McLeod S, Verdon S, Margetson K, Tran VH, Wang C, Phạm B, et al. Multilingual Speech Acquisition by Vietnamese-English-Speaking Children and Adult Family Members. J Speech Lang Hear Res. 2023;66(7):2184-229.

16. Holm A, Sanchez K, Crosbie S, Morgan A, Dodd B. Is children's speech development changing? Preliminary evidence from Australian English-speaking 3-year-olds. Int J Speech Lang Pathol. 2022;24(4):375-84.

17. Pommée T, Balaguer M, Mauclair J, Pinquier J, Woisard V. Intelligibility and comprehensibility: A Delphi consensus study. Int J Lang Commun Disord. 2022;57(1):21-41.

18. McAlister H, McLeod S, Hopf SC. Fijian school students' Fiji English speech sound acquisition. Int J Speech Lang Pathol. 2022;24(3):260-70.

19. Mayr W, Triantafyllopoulos A, Batliner A, Schuller BW, Berghaus TM. Assessing the Clinical and Functional Status of COPD Patients Using Speech Analysis During and After Exacerbation. Int J Chron Obstruct Pulmon Dis. 2025;20:137-47.

20. Maryn Y, Wuyts FL, Zarowski A. Are Acoustic Markers of Voice and Speech Signals Affected by Nose-and-Mouth-Covering Respiratory Protective Masks? J Voice. 2023;37(3):468.e1-.e12.

21. Hussain, M. S. (2022). Forming derivatives in Hindko language: A morpho-syntactic analysis. Annals of Human and Social Sciences, 3(3), 269-282.

22. Javed, M. A., Mahroof, M., Fayyaz, M. A., & Rashid, K. U. (2024). Exploring Hindko Indexicals: A Pragmatic Analysis with Implications for Language Teaching. Journal of Classroom Action Research, 3(1), 27-36.

23. Muneeb, N. (2020). Deviant pronunciation of English consonants by Hindko speakers of Peshawar. Contemporary University Research Journal of Language & Literature (CURJLL).

