



African Journal of Biological Sciences



Research Paper

Open Access

Investigating Vowel Errors of Persian Students in Learning the English Language: A Cognitive Phonology Approach

Nahid Khosravi¹, Maryam Irajil*, Bahram Modarresi¹¹Department of linguistics, Central Tehran branch, Islamic Azad University, Tehran, Iran.

*Corresponding Author

Article History

Volume 6, Issue 6, 2024

Received: 03 Feb 2024

Accepted: 06 Apr 2024

doi:

10.48047/AFJBS.6.6

.2024.7868-7883

Abstract

Fraser's 2010 cognitive phonology theory believes that pronunciation is a form of behavior and, like other behaviors, stems from concepts. Concepts are abstract motivators of behavior. Words also influence concepts. Each word has a specific meaning, form, and pronunciation, and it is important for the learner to understand its meaning. Therefore, based on this cognitive framework, the formation of concepts arises from the phonological structure in the substrate.. The application of concepts in learning a native language occurs subconsciously at the level of phonemes, allophones, and in the sequence of meaningful elements. In this study, based on data obtained from a field questionnaire and sample study through audio recording, we studied the analysis of vowel errors of Persian-speaking students in the translation field. The statistical population of the study consisted of 80 Persian-speaking learners in the English translation field from the Applied Science University of Tehran province, which was conducted using a descriptive-analytical method. Based on the findings and the above cognitive phonology theory, it can be concluded that an important cause of vowel errors is unfamiliarity with the phonological-phonetic structure and conceptualization of speech as a continuous stream of words and phrases.

Keywords: Cognitive phonology, phonological concepts, language learning, phonological awareness, vowel errors

Introduction

The ability of humans to learn language is a prominent reflection of the remarkable capability with which the human mind adapts itself. Language learning is a two-sided coin - first language acquisition and second language learning. The former requires no conscious effort from the child, as they naturally learn their mother tongue, while the latter is a complex process where the child needs to make a conscious effort in a domain beyond their first language in order to step into a world with a new culture and way of thinking. Based on the critical period hypothesis, language learning can be related to age, facilitating the learning process and enabling the child to perform better in areas like pronunciation, grammar, and acquisition (Azib Samia 1, 2021, p.2; Yen, V. T., et al. 2024).

Awareness of the science of linguistics and linguistic units, including phonetics and phonology, is necessary to explain skillful knowledge in the field of psycholinguistics in order to create a favorable learning environment. One of the important areas in teaching is paying attention to the language system, linguistic structure, and filling existing gaps to address vowel and pronunciation errors through an interactive approach, where the main goal of second language learning is the principle of communication. Furthermore, attention to the cognitive framework is necessary to remove obstacles in this area, which can have a profound impact on second language learning. By considering linguistic knowledge, it can help language learners develop critical thinking and better understanding, as learning a new language is associated with new thinking, familiarity with the content culture, and a new world of communication, viewed as a bridge to progress. Efforts to remove obstacles fall under the purview of linguistics, cognitive sciences, and related fields.

Problem Statement

Awareness of the science of phonology, phonetics, and cognitive patterns during the learning stages is essential and can play a significant role in reducing interlingual errors that occur due to a lack of awareness of the phonological structure of the second language and because of linguistic habits from the first language.

For a child, mastering phonological skills, which arise from listening, is a prerequisite for language skills such as reading, writing, and spelling words during school years and beyond. During this period, phonological awareness needs to be further strengthened, as there is a close relationship between speech, phonological awareness, reading and writing skills, and the processing system (Dastjerdi, Soleimani 2006 pp. 932-954).

In recent years, cognitive sciences have embraced the presence of the phonetic and phonological system, which is an approach to the science of phonology. The neuroscience system, with new tools, facts, and hypotheses related to motor-perceptual development, has made progress in the interaction between factors in societal development. It has guided us towards presenting a mechanism for the emergence of phonology in cognitive development and cultural evolution. It helps conduct further studies on units, syllables, prosodic elements, normalization of growth, and the perception of phonological production (Jean Luc et al., 2017, pp. 2-3).

Most neural communication models of language in processing single and monosyllabic words are instrumental models of discovering a set of computational principles closely linked to neuropsychology and conceptual meaning for cognition. This approach is a bridge between the brain and thought, separate from its natural connection to neural computation; it plays the same processing mechanism in the language structure, including phonological, morphological, and syntactic processes that adopt an interactive cognitive form in neural processing units. This model provides human performance in cognitive discovery (Plaut, 2000, pp. 1-14).

Studying the cognitive approach of the mind in cultivating phonological words and the phonetic system of two languages during the critical period of language learning, as well as the interactive role and linguistic environment after this period, leads us to deeper study. Familiarity with the practical mechanism, syllabic system, cultural literacy phenomenon, phonological relations, phonological schemas, cognitive and global processing, and natural phonology, which creates a distinction between global processes in production and auditory context and syllabic awareness, is highly important (Hulst, 2008, pp. 1-15).

Research Questions:

1. What is the cause of vowel errors in Persian-speaking learners of the English language from the perspective of Fraser's cognitive phonology?
2. What practical method exists for improving vowel errors in the post-critical period and adulthood?

Research Hypotheses:

1. According to Fraser's 2010 cognitive phonology theory, the cause of vowel errors is the lack of conceptualization of speech as a sequence of words through the native language, and learners have little metalinguistic description for the sounds of words in relation to their meaning.
2. The most important practical methods for improving vowel errors at this stage focus on linguistic, interactive, environmental, and cognitive motivators.

Theoretical Framework:

The cognitive theory is used to determine speech concepts, and phonological theory is used to determine speech units; the former is a method of understanding the speaker's behavior, and the latter is a method of describing speech. Emphasis on communicative language teaching can lead to performance similar to the cognitive approach (Tyler, 2016, p.7).

The phonological system is a module of grammar, and despite being related to sounds, it has a structure that operates in parallel with the grammatical and syntactic components. The relationship between phonological and phonetic representations is part of this cognitive system. Kaye in 1989 emphasizes the understanding of phonology as a grammatical

underlying structure rather than just a description of acoustic-productive and perceptual features (Tyler 2016, pp. 1-12).

The reality beyond phonological descriptions is something that needs conceptualization. The conceptualization of speech as a sequence of words through the native language is quite evident. One method for phonologists in conceptualizing speech is as a series of phonemic constructs. Another way is a sequence of allophones, and the conceptualization of speech for them is self-evident and certain. For each individual, it is necessary to conceptualize at the level of phoneme, allophone, and the sequence of meaningful words (Fraser 2006, p. 64).

The term "concept" in Fraser's cognitive theory is the same as the concept in everyday language, and having a concept means having an idea and a way of thinking about it. Concepts are important cognitive aspects (Murphy, 2002), and our concepts make us focus on relevant realities, and having a concept result in experiential learning in the mind. Pronunciation, like all behaviors, stems from concepts; words often encompass concepts beyond themselves, and phonemes shape speech concepts. Like all phonological concepts, each speech concept contains a sound category. Phonological concepts refer to different categories of sounds that are learned through experience. Phonemes are related to concepts, and the study of auditory errors shows that the concepts of syllable, stress, rhythm and intonation, and suprasegmental features point to the importance of phonemes in pronunciation, and like phonemes, they are abstract and unobservable.

A change in pronunciation entails a change in concepts. Pronunciation is not only a mental activity but also a physical skill that requires practice, and for effective practice, according to the cognitive approach, the conceptual aspect is important. Teacher training in helping to learn new concepts in a new language must be done skillfully. Learning concepts must be conceptualized; conceptualization at the level of phoneme, word, and sentence structure and speech sequence - learning new concepts at the subconscious level and in a real environment is possible and can provide useful feedback in reducing learners' errors (Fraser 2006, pp. 82-83).

Fraser's cognitive framework is based on meaning, communication, and learner-centered teaching between teacher and language learner in the classroom. Fraser points to the role of phonological awareness in teacher education and language learning for identifying meaningful units in content and context for second language learning in children and adults.

In terms of psycholinguistics, creating motivation and time for effective practice and active use of the classroom and discussions about ideas are very important because creating positive and motivating conditions provides the necessary driving force for effort and an active role in improving methods. Emphasis on transferring literacy of second language learners also leads to an increase in teachers' understanding.

Attention to the prosodic system, including stress, intonation, and the tone system of sounds, as well as creating conceptualization and perception, is also important, and learners should be encouraged to think about the sounds of the new language in better ways (Fraser 1999).

The teacher's job is to consciously adopt a new way of thinking about the concepts of words and sentences in the new language, such as productive knowledge, abstract phonological rules, applying pronunciation in communicative content, creating connections in real-life contexts, and focusing on listening to native speakers. This helps learners realize that hearing native and non-native accents is very interesting and audible, and reaching sufficient belief in producing speech units and perceiving mastery and order in speech and rhymes for intonation in speech is considered very important (ibid).

According to research, English language teaching should be explicit, meaningful, and interactive, and spending time understanding the prosodic system with regard to the meaning of the message can provide the learner with an opportunity for improvement and progress.

It is very important for teachers to adopt a learner-centered approach using naturalistic and real exercises. The basis of classroom exercises should be the sequence of phrases and sentences. Attention to conceptual schemas in most connected phrases and sentences instead of correcting and fault-finding errors should be the basis of teaching and learning (Fraser 1999, pp. 5-7).

Paying attention to the impact of our speech and utterance on phonological concepts causes us to also focus on learning the phonological concepts associated with it when we learn a new language.

In learning pronunciation as a cognitive skill, practice will be very effective if it is accompanied by shaping concepts compatible with the new language. The formation of concepts from something results in experiential learning in the mind and better processing in network sciences. Our experience in different concepts can be reflected, and understanding the concepts that effectively motivate pronunciation behavior in learners is important (Fraser 2010, p. 357).

Domestic Background:

In reviewing an article on the pronunciation of the English language, what is considered an important issue is the inadequacy of its spelling system, such that the mismatch between the spellings of the phonemes of a word affects the correct pronunciation of language learners (Kasegari et al., 2014-2023).

Proving the hypothesis of a significant relationship between pronunciation and spelling errors leads to the conclusion that spelling and pronunciation are two sides of the same coin. We recommend adopting a communicative approach in teaching and writing Persian language textbooks for non-Persian speakers, with simultaneous teaching of pronunciation and spelling, and considering this area as a mirror of each other (Abolhasani, Chimeh, pp. 1-30).

In an article about pronunciation errors of male high school students in the city of Sirvan in the English language course, it was found that their language errors included phonetic errors arising from interlingual transfer, errors related to syllable structure, and errors related to letter pronunciation and pronunciation of unreadable letters. Among these,

interlingual transfer errors accounted for the highest percentage, emphasizing the role of the mother tongue structure in phonetic errors (Palizan 2016, pp. 1-11).

Based on the findings of a study using the storytelling method, steps can be taken to improve the creativity and phonological awareness of students with reading difficulties, and the storytelling method is effective in verbal creativity and phonological awareness (Shahbazi et al., 2019, pp. 36-57).

In an article studying the increase in language learners' awareness of prosodic features in word pronunciation and its effect on Iranian learners' listening skills, with an emphasis on Schmidt's 1995 theory, it is concluded that increasing awareness of prosodic features in pronunciation has a significant effect on improving listening performance (Ahangari et al., Saeedi 2020, pp. 260-271).

Another study on verb errors of Persian speakers at the beginner, intermediate, and advanced levels shows that errors at the beginner level have an external source, at the intermediate level are related to learning strategies, and at the advanced level are related to the learning context (Jahromi Ebrahimi, Niri et al.2021, pp. 123-150).

Foreign Background:

Another study emphasizes planning for phonological awareness in the pre-school period and early school years. Explicit instruction, learning style, familiarity with sound differences and similarities, word awareness, letter-sound connections, blending and segmenting syllables and phonemes in words, using listening skills, providing opportunities for writing experiences, storytelling, answering questions, and presenting a way to make abstract concepts more concrete are recommended. Hearing sounds, feeling sounds, seeing sounds in words, and using picture cards to introduce initial sounds are suggested (Chercil et al. 1998, pp. 1-73).

Another article discusses the nature and outcome of developing phonological skills in children and presents a document on the development of refinement in phonological processes, arguing that progress in this area affects other skills. The relationship between the development of speech skills, verbal short-term memory, and the evolution of children's phonological awareness is discussed (Margaret Snowling et al., 1999, pp. 21-27).

We can attend to the available evidence from lexical distribution, a process by which changes spread across the vocabulary, as lexical distribution provides evidence for the way in which phonology and morphophonology are related in the lexicon. Here we see differences between phonological and non-phonological processes. Phonological changes gradually spread through the lexicon and tend to progress to more advanced forms in more common and dominant words. Non-phonological changes tend towards obscurity and this absence occurs in less frequent items, with more dominant and frequent items being more conservative and resistant to non-phonological changes, but more innovative in phonological changes (Hopper, 1976). Phonological and lexical changes are gradual, but usually without exceptions. Gradually all words undergo phonological evolution and change. Non-

phonological changes not only can have exceptions, but are the exception (Bybee, 1994, pp. 289-305).

Cognitive phonology, the study of the sound system of a language, can be referred to as the cognitive approach in this domain, and it is explicitly stated that phonology is nothing but a cognitive phenomenon, and the explanation in this regard is essentially based on our understanding of how language is produced and perceived. From the researcher's perspective, some basic features of the sound system are not understandable in this way. Rather, they are obtained from theories about the cognitive representations that underlie the sound system. Therefore, "cognitive phonology", as we shall see, is a cognitive category and has not been fully embodied, just as the system for externalizing phonological representations should be. Human languages include forms of sound events that are conventionally connected to meanings, and these meanings constitute the structural blocks of what our thoughts are made of. By the continuous chain of these speech events, we construct words and complex sentences that manifest our thoughts. If the listener knows the conventional relationship between the sound events and their meanings, much like the grammatical rules for parsing the complex terms that encode the speaker's complex thoughts, then the conversation and communication proceed successfully. What does it mean for a language user to know and recognize the sound events that are connected to meaning! Clearly, events like acoustic and physical events do not constitute part of cognition; there is no part of the brain that is literally full of the forms of acoustic events that are released through grammatical and prescribed means, but rather, when humans speak sounds, they produce them. Sounds are produced by specific actions or specific movements of the body. How this is studied in detail is the subject of articulatory phonetics. Speakers clearly know these specific movements (as they are adjusted to achieve specific acoustic goals), and therefore, this (unconscious) knowledge can be said to be part of human cognition, apart from the sounds themselves. But this is not enough, language users do not know the sounds by visually and objectively identifying the movements that produce them (although when this visual and objective information is available, it is used in speech perception). If speech perception was completely based on the visual understanding of the articulator movements, spoken languages would be sign languages! In other words, language users have mental, perceptual (acoustic-psychological) schemas of the sounds, which allow them to decompose and distinguish the acoustic speech signals into units that correspond to words or meaningful parts of complex words. Thus, it seems that the knowledge of sound events has two aspects, a productive schema, and a perceptual or psycho-acoustic schema.

It is widely accepted that the knowledge of sound events that correspond to morphemes and words is highly specific. This knowledge adopts a form of mental representation that is compositional (rather than holistic and gestalt-like). This means that the cognitive representation is made up of smaller parts that are themselves meaningless. At one time, it was thought that these corresponded to complete chunks of the acoustic signal, and these were called phonemes. Subsequent studies have shown, however, that the phonemes

themselves are composed of even smaller parts, and these have been called features (Halle 2003, pp. 1-24).

The cognitive commitment implies that phonological concepts, categories, and structures require phonological grounding and are derived from empirical domains such as experimental investigations, sociolinguistics, language acquisition, psycholinguistics, evolutionary phonology, and so on. The generalized commitment, which refers to different domains of language study, such as semantics, phonology, and syntax, cognitive linguistics examines how various linguistic aspects derive from the full range of human cognitive capabilities, rather than being believed to be produced by innate mental modules (Evans et al.). Furthermore, cognitive phonologists also hold the view that phonological categories and structures are shaped not only by cognitive factors, but also by phonetic factors such as articulatory, acoustic, and perceptual phonetics, linguistic factors such as historical, distributional, structural, gradient, sociolinguistic factors such as gender, social class, cultural factors, and so on. Studies of the segmental and suprasegmental aspects of language (English as the reference language), and particularly its written form and the related work on phonology within the cognitive linguistics domain, are central (Mompean 2006, pp. 357-388).

In another study, the focus is on the teaching of the target language's native phonology and the development of perceptual pronunciation, and in the approach to second language learning, the phonology of the second language is explained. The results show that explicit instruction has an important effect on the perception and comprehensibility of learners (Salto Kazia 2011, pp. 45-59).

Phonological units are abstract concepts, and learning pronunciation involves facilitating the conceptual formation, and the concept of a phoneme is derived from our prior understanding of words and other larger phonological units (Fraser 2010, p. 2).

In this process, the application of concepts in speech plays an important cognitive role. Changing concepts to fit the new language and representing new concepts in pronunciation allows us to learn in a real and conceptual way and reach the stage of perceiving it.

Based on the research presented in an article in the field of teaching and learning pronunciation, and according to the tests performed, the two key factors that can play a fundamental and important role in this regard are socially constructed metalanguage (SCM) and critical listening (CL) (Gream Couper 2011, pp. 159-182).

In another study, the role of access to phonological awareness understanding and justification at the University of Zaakho is emphasized through practice and skill training. Four levels of phonological awareness are presented, including word awareness, syllable awareness, initial syllable awareness, and sound awareness. Phonological awareness is an approach towards the ability to think about the sounds in a word, rather than just about meaning (i.e., thinking in the domain of sound and meaning). Access to phonological awareness at the pre-school stage leads to success in reading, spelling, and writing. Phonological knowledge leads to better understanding in the later stages of the structure of

spoken language, including sounds, rhymes, syllables, and words (Fakir Omar Mohammad 2014, pp. 101-116).

In another article, a study on the non-native pronunciation of English speakers and an analysis of the problems faced by learners in Jordan, the factors that lead to pronunciation problems are examined, and this research highlights the role of language interference, learner age, attitude, and insufficient knowledge of the English phonological and phonetic system as a second language (N. Alzayed 2017, pp. 86-90).

Research Methodology

In the research methodology section, we described and analyzed the data extracted from the field questionnaire and the data obtained from the sample study on the vowel errors of students majoring in English translation. We also analyzed the causes of the errors. In this research, data analysis was performed using the SPSS software and the Cronbach's alpha coefficient method, and it was carried out in two descriptive and inferential sections. In the descriptive section, the descriptive statistics were explained, and in the inferential section, the Kolmogorov-Smirnov test was used to determine the normality of the data distribution.

The statistical population of this research is limited to 80 students majoring in English translation at the associate's and bachelor's levels from the University of Applied Sciences in Tehran province. The data was collected from the students through a field questionnaire and a sample study over a period of 12 months in the academic year 2022-2023.

Data Analysis

Based on the results obtained from the field study of students majoring in English translation at the associate's and bachelor's levels, the majority of them, with 92.2%, were Persian speakers with an average age of 20-30 years, and the largest number were in the associate's degree program.

Among the respondents, the level of interest in the field of study with an average of 23.4% had the highest percentage.

According to the statistical findings, the level of phonological awareness of instructors and teachers is moderate at 41%. Also, according to the findings, the level of the educational system during the course of study in the transfer of sounds, pronunciation, and practical speaking skills is 60.3% weak. Attention to creating an appropriate educational system and providing the groundwork for a real-life environment is crucial, as neglecting this can reduce the effectiveness of pronunciation teaching and the necessary motivation for instructors and learners, which can itself justify the causes of vowel and pronunciation errors.

Furthermore, based on the data findings, the level of motivational support from the family and instructors in learning the second language and the native accent of English is moderate with an average of 33.3%, meaning that strengthening and focusing on the level of phonological and phonetic motivation is more felt.

According to the findings, the use of a real and natural environment for conceptualizing linguistic elements among the respondents is 51.3% moderate, meaning that

according to the hypothesis of cognitive phonology by Fraser (2006), the process of phonological conceptualization by creating real conditions is the main element in cognitive development in this process. This indicates that the lack of creating real conditions for conceptualization and the lack of establishing phonological-phonetic structural foundations can be an important reason for vowel errors.

Attention to phonological and structural conceptualization among adults, regardless of the critical language learning period, is also a necessary matter that needs to be addressed, as the adult period is important in terms of attention to language skills in the direction of processing conceptual schemas. By explaining that adults can also be properly trained to achieve perception and understanding in the distinction between phonemes, the issue is that they do not conceptualize phonemes as phonemes (Fraser 2011, pp. 11-14; Osadchuk, M. A., et al. 2023).

Through a coherent planning for phonological awareness in the manner of children, adults can also be properly trained, and this is an approach that is integrated and consistent with the communicative and meaning-oriented teaching style, and its results will be achievable and successful.

Based on the questionnaire data of the dissertation, the level of time commitment and sufficient time through the communicative approach shows an average of 46.2%, and the frequency distribution of the relationship between the field of study and the job shows a low average of 53.8%, meaning that the majority of respondents do not have a connection between their job and their field of study. It can be stated that the relationship between these two factors plays a role in motivation. Furthermore, according to the frequency distribution, 92.2% of the respondents were Persian speakers.

The results show that the level of grammatical skill knowledge is 50% with the same frequency distribution as the level of reading and writing skill knowledge, which is at a moderate level, and this indicates a direct relationship between these three skills. Also, the level of mastery in phonological awareness, phoneme combination, initial and final phonological units is 48.7%, the knowledge of syllabic combination and syllable division is 55.1%, and the recognition of the intra-syllabic unit, consonance, and rhyme is 56.4%, which are at a weak level.

Table 1: Frequency distribution of the respondents' level of mastery in skills such as phonological awareness, phoneme combination, and assessment of initial and final phonemes

Variable	Options	Frequency	Percentage
Level of mastery in skills such as phonological awareness, phoneme combination, assessment of initial and final phonemes	weak	38	48.7
	moderate	29	37.2
	Good	9	11.5
	very good	2	2.6
Total		78	100

Among the respondents, 82.3% agree that phonetic and phonological knowledge has an impact on learning a second language and progress in language skills (reading, writing,

and speaking), meaning that there is a direct relationship between phonetic/phonological knowledge and language skills.

Moreover, based on the findings, 57.7% of the respondents faced equal weaknesses in consonants, vowels, and diphthongs.

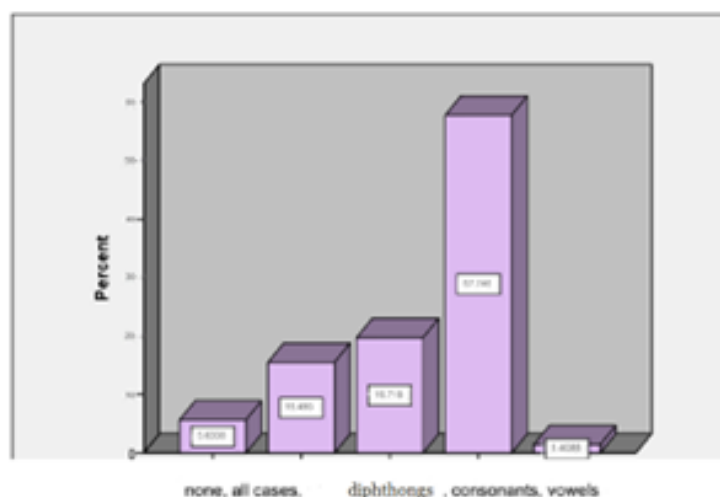


Figure 1 - Frequency distribution of the most common phonetic/phonological errors according to the respondents

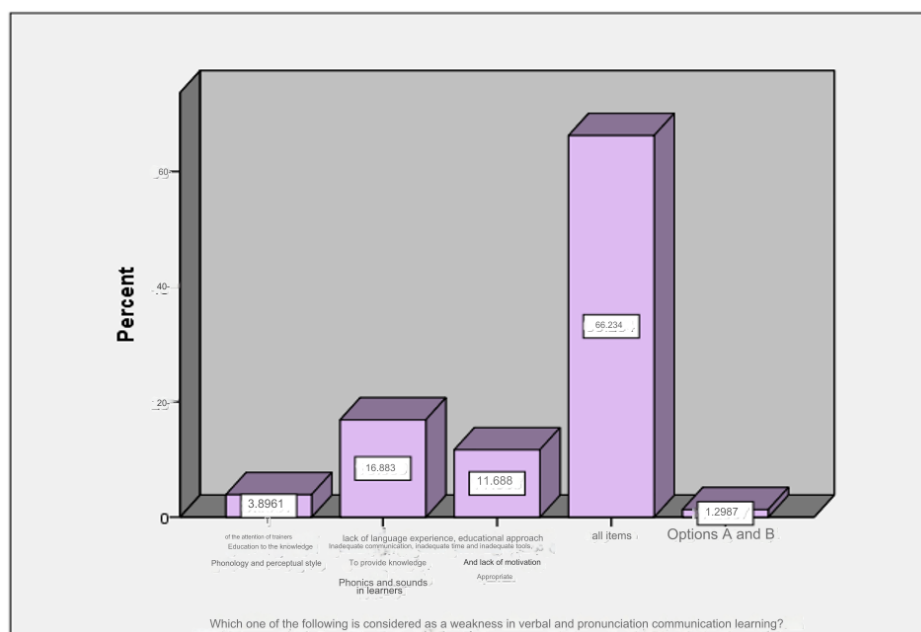


Figure 2 - Frequency distribution of the most important factors of weakness in the communicative, verbal, and pronunciation learning of English

Based on the frequency distribution, 54.65% of the respondents cited factors such as instructors' lack of attention to phonological knowledge, perceptual style, insufficient educational approach, inadequate tools for phonological knowledge, lack of language experience, and insufficient time and motivation as the most important factors of weakness in communicative learning.

In a sample study conducted as part of this research, two oral tests were performed to identify the extent of vowel and pronunciation errors. This test was conducted among students majoring in English translation at the University of Applied Sciences in Tehran, whose first language was Persian and most of whom were born in Tehran. First, a test was conducted on 10 students in the class, their speech was recorded and analyzed. In this study, we asked them to read a text, and then the vowel errors were examined. In this test, after examining the errors, we encountered simple, mid, and diphthong vowel errors in order of frequency. The majority of errors were related to sounds that did not exist in the phonological structure of the Persian language and were observed in most students, such as the dental sound /θ/ pronounced as t, d, or s. Simple vowels like /a/, /æ/, /e/, /i:/, and the addition of the extra vowels /i/ and /e/ had the highest error frequency. After that, the most errors were related to mid vowels, including schwa, and diphthongs.

In the first test, by examining the errors, it was observed that students who were at a lower level in terms of language knowledge and reading and writing skills faced the most vowel errors, consonant insertions, and diphthong vowel errors, while students with higher reading, writing, and speaking skills had fewer errors. In this test, the majority of students made errors with the sounds that did not exist in the structure of their first language.

In this study, the elongation of the additional vowel /i/ in the word "give" as /gi:v/, the voiceless dental consonant /θ/ in the word "three" as /ti:ri/, the voiced dental consonant /ð/ in the word "there" as /der/, the vowel /æ/ as /a:/ in the word "balance", the addition of the extra vowel /e/ in the word "stress" as /esteres/, the mid vowel /ʌ/ or /D/ in the word "none", the mid vowel /ɜ:/ as /a:/ in the word "hurt", and other diphthong vowel errors in words like "go" as /O/, "out" as \[Dt\]t, "good" as \[gu:d\], "most" as \[mDst\] or \[mʌst\], "said" as /seld/, "key" as /.keI/, and "with" as /vi:t/ were observed. The initial schwa vowel /ə/ was replaced with the vowel /e/ or /æ/ in the word "attention".

In the second test, we selected some of the words with errors from the first test and recorded the vowel errors of 10 other students in a different class. We encountered similar results in terms of the type and frequency of errors. In this analysis, we identified the words with the most errors in a table.

In this study, the most errors were related to the elongation of the vowel /i/, the insertion of the vowels /i/ and /e/ in words like "stress" as /esteres/ and "fit" as /fi:t/, the initial schwa vowel in words like "about" pronounced as /e/, the diphthong /ow/ in "grow" pronounced as /O/, and the /o/ vowel in "old" pronounced as /O/.

The findings of this research show that the vowels that do not exist in the phonological and phonetic structure of the second language, i.e. Persian, due to interference, language habits, and the influence of the first language, and due to lack of awareness, phonological

knowledge, prosodic system, and inability to think in the second language, had the most errors. Interference and negative transfer is due to differences in the structural rules and principles of the first and second languages, and these are considered interlingual errors.

The first and second tests from the sample study are related to the 28th question, the answer to which is about the highest frequency of pronunciation errors in relation to vowels and diphthongs, which shows 17.9% for diphthongs and 14.1% for vowels in the statistical data analysis. The sample study also showed that the majority of vowel errors were related to diphthongs and vowels, and the two studies, i.e. the statistical and sample studies, had roughly the same results.

Table 2 (Most common vowel errors)

Insertion of the mid vowel	/e/	Stress
Elongation of the mid vowel	/I/ → /i:/	Give
Interference with dental consonants	/ ð / /d/	There
	/ θ/ → /t //s/	Think
Simplification of diphthongs to monophthongs	/əu / → / ɔ/	old
	/ OU / → / D	Ground
	/ əu/ → / ɔ /	Know
	/ʌ/ → / au/	Around

Conclusion

The teaching of pronunciation requires specialized knowledge of the formation of sound rules and combinations, and in the cognitive approach, the role of phonological concepts and elements, phonological and phonetic literacy, is crucial in the teaching of pronunciation. From the perspective of cognitive phonology, the most important method in learning a second language is not only at the phoneme and allophone level, but in the sequence and continuous flow of meaningful language elements, so that cognitive schemas are formed and conceptualization occurs. Thinking in the new language and conceptual processing, along with effective practice, will be productive. Through contextual changes in real interaction with the target language, one can gain a broader understanding of the conceptual and pronunciation aspects of the language in order to think about its sounds. Perception and conceptualization based on phonological awareness and knowledge is only possible in context and content.

According to the theory of cognitive phonology by Fraser (2010), phonemes and other phonological units are abstract and unreal categories that, as a result of proper and explicit pronunciation instruction, can facilitate the process of conceptual formation. In advancing this, a simultaneous and balanced approach between phonemes, words, grammar, and vocabulary can be achieved. Pronunciation learning must be accompanied by concepts in order to play an effective and necessary role in the neural networks of the mind. Attention to psycholinguistics in this domain and the enhancement of it in the development of vowel and

pronunciation skills, in line with the communicative and meaningful process and appropriate groundwork, is of great importance and effective steps should be taken to address the communication barriers and vowel errors.

In the present research, based on the data obtained from the field study and referring to the theory of cognitive phonology by Fraser (2010) and other previous research in this field, including foreign researchers such as Salto-Kazia (2011) who addresses explicit teaching and perceptual understanding, Suyvoun (2012) who refers to the lack of attention to phonological components and the issue of language interference in creating errors, Fakir Omar Mohammad (2014) on the level of phonological-syllabic awareness, Nawaf Alzayed (2017) who refers to the type of attitude and insufficient knowledge of phonology and phonetics in creating pronunciation and vowel errors, and Anastasia Nakrockova and Bastion Richard (2019) who emphasize the level of phonological awareness and explicit interactive and phonetic teaching in reducing errors, as well as other domestic researchers such as Lee, J. H. (2022) et al also Shahbazi, Dastjerdi, Soleimani (2006) who discuss the important role of phonological awareness in reducing errors, Kasegari, Abolhasani Chimeh (2014) who establish the relationship between pronunciation and writing, as well as Ahangari, Rahbar, Saeedi (2020) who present the effect of increased awareness in the prosodic system in the listening domain, one can confirm the answer to the first hypothesis regarding the causes of vowel errors, considering the above findings, and present the issue of awareness in the phonological and phonetic system in the communicative and interactive domain and the lack of attention to it as the main cause of the errors. Also, in response to the second hypothesis, considering the above data, one can suggest a practical and communicative approach at the adult level towards the conceptual perception of linguistic elements in a real environment, content, and context, which can itself confirm and validate the second hypothesis.

References

- A review of cognitive nature of speech sound system Jean – Luc, Schwartz, Clement, moulin, Frier Pierre-yue, 2017
- Abolhasani Chimeh, Zahra (2014). The interaction of pronunciation and spelling: The relationship between pronunciation difficulties and spelling errors of non-native Persian speakers. *Scientific Research Journal of Linguistic Explorations*, Volume 5, Number 2, pp. 1-30.
- Ahangari, Saeideh; Rahbar, Samira; Saeedi, Mahnaz (2020). Increasing language learners' awareness of prosodic features in word pronunciation and its impact on Iranian language learners' listening skill with a focus on Schmidt's 1995 theory. *Foreign Language Linguistic Research*, Volume 10, Number 2, pp. 260-271.
- Asghari Kasegari, Zahra; Bashirjam; Rahimi Dumakani, Mas'ud (2014). An intralingual investigation of the problems of Iranian language learners arising from the lack of correspondence between the spelling and pronunciation of English words. Thesis, University of Shahrekord, Faculty of Literature.
- Bybee Joan, 1994, New of phonology from cognitive and functional perspective, *Cognitive linguistics*, Pp.285_305

- Churchill, Kathy, Durden, Julie, Kenney, Mary, 1998, Improving Early Reading through multisensory phonemic awareness approach, Saint Xavier university, Research project ,pp 1_73
- Couper Graeme ,2014, Teaching concepts of pronunciation: syllables, stress, and drunks, IATEFL publication ,p.159- 182
- Dastjerdi, Kazem Mahdi; Soleimani, Zahra (2006). What is phonological awareness?
- Quarterly Journal of Exceptional Children, Volume 6, Number 4, Serial 22, pp. 931-954.
- Ebrahimi Jahromi, Zainab; Niri Fallah, Sayyede Narges (2021). The source of verb errors in beginner, intermediate, and advanced level students. Literary Research Journal, Number 17, ISC ranked, pp. 123-150.
- Fakir Omar Mohammad ,(2014), The use of phonological Awareness Skills in teaching phonetics and phonology for university students, JOSR journal of humanity and social science, vol 19, pp101_116
- Fraser Helen, 1999, Pronunciation Teaching, Could it be more effective? New England, Armidale, NSW, ALAA Conference, Pp.1_8
- Fraser Helen 2011, Teaching teachers to teach r/l to Japanese learners of English, An Integrated approach, Teaching and learning center, New England, Pp.11_14
- Fraser Helen, 2006, Helping teachers help students with pronunciation, Cognitive Approach, New England, Vol 21, No.1, Pp.75_94
- Fraser Helen, 2006, phonological concepts and concept Formation, New England, Servicio de publicaciones, IJES, Vol 6(2), Pp.55_75
- Fraser Helen, 2010, Cognitive theory as a tool for teaching pronunciation ,Linguistic LAUDM, Theoretical papers, New England, Australia, P.357- 379
- Hulst, 2008,
- Lee, J. H. (2022). Factors affecting the academic performance of low-and high-performing dental students: evidence from Japan. *Journal of Advanced Pharmacy Education and Research*, 12(3), 82-86. <https://doi.org/10.51847/Ow4oR7HGFg>
- Mompean Jose, 2006, Cognitive Phonology in Cognitive Linguistics, International journal, Journal of English studies, Pp.357_381
- Nawaf AL_Zayed, 2017, Non-native pronunciation of English: problems and solutions, American international Journal of Contemporary research 7(3), P.86_90
- Osadchuk, M. A., Osadchuk, A. M., Vasilieva, I. N., & Trushin, M. V. (2023). The State Biology Museum Named after Kliment Arkadyevich Timiryazev as a Scientific and Educational Center. *Journal of Biochemical Technology*, 14(1), 7-12. <https://doi.org/10.51847/OLKERwxo55>
- Palizian, Karamatullah (2016). An investigation of the pronunciation errors of male secondary school students in Siravan County in their English language class. International Congress on Language and Literature, PhD student in General Linguistics, Payame Noor University of Tehran, pp. 1-11.
- Plaut David, 2000, Connections Modeling of language, Examples and Implications, The center for neural Basis of Cognition, Pp.1_14
- Plaut David, 2008, Connections approaches to reading, Pp.24_34

- Salto Kazuya ,2011,Examining the role of explicit phonetic instruction in native-like and comprehensible pronunciation development, an instructed SLA approach to L2 phonology, LANGUAGE AWARENESS 20(1),P.45_59
- SamiaAziab_Mohammad/seddik_BenYahya 2021,the critical period Hypothesis in second language acquisition, A Review of literature, International of research journal, pp.20_26
- Schwarz, Jean_Luc,Clement, Moulin _Frier ,Pierre _yes Oudeyer,2015,Cognitive nature of speech sounds systems,Journal of phonetics 53,Pp.1_175
- Shahbazi, Sanaz; Keramati, Hadi; Hashemi, Hadi; Kave, Manijeh (2019). The effectiveness of storytelling on verbal creativity and phonological awareness of dyslexic students. Journal of Learning Disabilities, Volume 9, Number 2, pp. 36-57.
- Tailor John, 2016,Where do phonemes come from?International journal of English study _UNE. Research, Otago,News land,Pp.1_12
- Van Der Hulst Harry, 2008, On the linguistic universals P.1_34.
- Yen, V. T., Toan, D. V., & Tai, T. A. (2024). Impact of Job-Related Factors on Lecturer's Performance: A Case Study in Vietnam. *Journal of Organizational Behavior Research*,9(1), 64-78. <https://doi.org/10.51847/mf7qzOpahl>