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Contrastive Analysis of the Kurdish and English Sound Systems – A Review

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Abstract

In this review paper, the English and Kurdish sound systems are contrasted to identify similarities, differences, and potential difficulties in the process of learning English as a second (L2) or foreign (FL) language, to improve the English pronunciation instruction and also to ease the process of learning English sounds by English as a foreign language learners (EFLLs) with Kurdish as their native language. For this, the segmental (consonants & vowels) and suprasegmental (stress & intonation) features of both Standard British English and General American English were analyzed and compared to their Central Kurdish or Sorani Kurdish counterparts. Challenges for Kurdish learners of English are predicted.

Keywords: Consonants, Vowels, Pronunciation, Central Kurdish, BRE, and AME

General Introduction

Pronunciation is a cornerstone of effective communication in a second language, directly impacting intelligibility, speaker confidence, and successful social interaction (Gilakjani & Sabouri, 2016; Sokyrska, 2023). In the global context of English as a Foreign Language (EFL), learners from diverse linguistic backgrounds face significant challenges in acquiring native-like pronunciation, often primarily due to the pervasive influence of their first language (L1) sound system (Flege, 1995; Sales, 2022). This phenomenon of L1 interference is a central concern in second language acquisition research, as it can lead to persistent errors and fossilized pronunciation patterns that hinder communicative competence.

Within the broader landscape of EFL, the situation in Iraq, and specifically the Kurdistan Region, presents a unique and under-researched case. Despite the introduction of modern communicative curricula like the *Sunrise* Series and governmental efforts to enhance English education (Sofi-Karim, 2015; Amin, 2017), EFL learners in this region continue to demonstrate significant pronunciation difficulties. These challenges are compounded by documented issues such as overcrowded classrooms, insufficient teacher training, and a reliance on L1

(Kurdish) in English instruction (Ahmed, 2022; Muhamad & Jasim, 2022; Ghafar et al., 2024). While these pedagogical hurdles are significant, a fundamental and often overlooked factor is the profound phonological differences between the learners' native language, Central Kurdish (Sorani), and English.

This is where the present study situates its research problem. Contrastive Analysis (CA) provides a powerful theoretical framework for understanding and predicting such learning difficulties by systematically comparing the sound systems of the L1 and the target language (Lado, 1957; Wardhaugh, 1970). The core premise of CA is that structural similarities between languages facilitate learning (positive transfer), while differences pose challenges and lead to errors (negative transfer) (Wang, 2007; Huang, 2024). In phonology, this means that Kurdish learners of English are likely to filter English sounds through their existing Kurdish phonological categories, struggling most with English sounds and patterns that are absent or different in their L1 (Brière, 1966; Al-Shalabi, 2021).

However, a critical research gap exists. While contrastive analyses have been conducted for many language pairs (e.g., Arabic-English, Chinese-English), there is a notable scarcity of comprehensive, systematic reviews focusing specifically on the Central Kurdish (Sorani) and English sound systems. Existing studies on Kurdish phonology often present conflicting inventories of phonemes (e.g., McCarus, 1958; Fattah, 1997; Ahmed, 2019) and lack a consolidated, pedagogical focus on predicting learning challenges for EFL students. This lack of a clear, synthesized resource leaves EFL teachers in the Kurdistan Region without a solid linguistic foundation to diagnose and address the specific pronunciation errors of their students.

Therefore, the primary rationale for this review paper is to fill this gap by providing a thorough and authoritative contrastive analysis of the Kurdish (Central/Sorani) and English (BrE and AmE) sound systems. By synthesizing findings from over 220 sources, this study aims to:

i. Establish a clear and reasoned inventory of Sorani Kurdish/Central Kurdish phonemes, addressing longstanding disagreements in the literature.
ii. Systematically compare the segmental (consonants, vowels) and suprasegmental (syllable structure, stress) features of both languages.
iii. Generate explicit, theoretically-grounded predictions about the specific pronunciation difficulties Central Kurdish speakers are likely to encounter when learning English.
iv. Compile these predictions into a comprehensive resource that identifies potential challenges across all levels of phonology, from individual sounds (e.g., the English /θ, ð/, /r/, /ʌ/, /ɜː/, /ə/, vowel length distinctions, and aspiration /p^h, t^h, k^h/) to complex phonological patterns (e.g., consonant clusters and word stress placement).

Ultimately, this research seeks to bridge the gap between theoretical linguistics and practical pedagogy. By clearly delineating the points of phonological conflict, this review provides an evidence-based resource that can inform the development of targeted pronunciation instruction, curriculum design, and teaching materials, thereby helping to improve English language learning outcomes for millions of Kurdish speakers in Iraq and beyond.

Importance of Pronunciation in English as a Foreign Language

It is obvious that effective communication in English as a foreign language cannot be performed without good pronunciation. Communication with poor pronunciation leads to reduced self-confidence, limited social interactions, and misunderstanding (Gilakjani & Sabouri, 2016; Prashant, 2018). Enhancing communicative competence, listening skills improvement, and increasing learners' confidence in using the language are affected by proper pronunciation (Sokyrska, 2023). It significantly affects how messages are conveyed and received, shaping others' impressions of the speaker (Prodanovska-Poposka, 2017).

Numerous researchers, including prominent scholars like Brown (1994), Crystal (1997), Jenkins (2000), Kelly (2000), Cook (2001), Fraser (2001), Yang (2004), and Roach (2009), have consistently highlighted the importance of pronunciation instruction for effective communication, with EFL teachers playing a crucial role (Gilakjani & Sabouri, 2016) in developing learners' pronunciation skills through targeted techniques and instruction. While language knowledge encompasses more than just pronunciation, incorporating it into EFL instruction is crucial for fostering overall proficiency and enabling learners to communicate effectively (Levis & Grant, 2003; Gilakjani, 2012; Prodanovska-Poposka, 2017; Levis & Echelberger, 2022; Sokyrska, 2023; Alharthi, 2024).

Current Quality of EFL Teaching in Iraq

The introduction of English language teaching in Iraq began in 1873 in selected major cities (Kareem, 2009). Under British rule post-World War I, English education expanded, starting from primary level. The curriculum later adjusted to introduce English in the fifth primary year, changing its status from second language to foreign language instruction (Al-Chalabi, 1976).

EFL textbooks have become essential supplements for English language learning and teaching. They play a crucial role in language acquisition (Al-Akraa, 2007). According to Sheldon (1988), textbooks are the backbone of ELT programs, benefiting both teachers and students. Well-designed textbooks help learners develop linguistic and communicative skills (Sheldon, 1987).

In 2007, the Kurdistan Regional Government's Ministry of Education introduced a new English curriculum, the *Sunrise* Series by Macmillan, for primary, secondary, and preparatory schools. This communicative approach-based series includes teacher's books, activity books, student books, and CDs (Sofi-Karim, 2015). It is a comprehensive 12-volume English course (*Sunrise 1-12*) tailored for Iraqi Kurdistan students. It emphasizes the four key language skills: writing, reading, listening, and speaking. According to the publisher, the series is designed to match students' proficiency levels as they near the end of their school education, preparing them for English-taught studies beyond school. According to Mahmud (2013), the textbook *Sunrise 12* aligns with the B1 level of the Common European Framework of Reference for Languages (CEFR). Subsequently, the Kurdistan Regional Government has made significant efforts to enhance education standards (Amin, 2017). In this study, the terms 'English curriculum' and 'prescribed curriculum' specifically refer to the *Sunrise* Series, the comprehensive teaching and learning package adopted by the Kurdistan Regional Government.

English language teachers in the Kurdistan Region face numerous challenges. According to Ahmed (2022) and Muhamad and Jasim (2022), these include inadequate technology,

overcrowded and multilevel classrooms, insufficient class time, lack of teacher training, inadequate teaching methodology, and the use of Kurdish in English instruction. Ghafar et al. (2024) and Gafar and Amin (2022) and Ahmed (2016) highlight speaking difficulties, citing low confidence, limited vocabulary, and anxiety. Meanwhile, Muhamad (2022) and Valizadeh (2021) note pedagogical and environmental challenges, including overcrowding, lack of parental support, and curriculum pressure. These issues underscore the need for better resources, teacher training, and support in the Kurdistan Region.

Contrastive Analysis

Contrastive linguistics plays a crucial role in developing cross-language awareness by systematically comparing languages to identify structural similarities and differences. According to researchers (Lado, 1957; Mair, 2005; Wardhaugh, 1970, 1974), this field is essential for enhancing language awareness. Contrastive analysis (CA), a key component of contrastive linguistics, involves a thorough comparison of languages to anticipate learning challenges and inform instruction (Nur, 2016; Rustipa, 2011; Tajareh, 2015). CA can be applied in pedagogical contexts or focus on language typology (Nur, 2016), and its process includes data collection, comparison, and rule formulation. While CA predicts that similarities facilitate learning and differences cause difficulties, it has limitations, and critics argue that it cannot fully account for learner errors (Rustipa, 2012). Despite these limitations, CA remains valuable for syllabus design, translation, and interpretation (Tajareh, 2015), and many educators view it as a vital pedagogical tool (Khansir & Pakdel, 2019).

Native Language Interference

Learners' native language (L1) often influences their production of a second language (L2), a phenomenon known as native language interference (Markov et al., 2020). This interference affects various aspects of language, including grammar, pronunciation, sentence structure, and meaning (Iskandar & Ari Saputra, 2020). Research highlights factors like learning approaches, limited L2 knowledge, and learner attitudes as contributors to L1 interference (Rattanadilok Na Phuket & Bidin, 2016). The extent of interference depends on the learner's L2 proficiency and the linguistic differences between their L1 and L2 (Alisoy, 2024).

Learners' native language significantly affects their acquisition of English as a foreign language, particularly in pronunciation, a phenomenon known as native language interference in phonology. This occurs because learners filter L2 sounds through their existing L1 phonemic categories, making it challenging to master new or similar sounds (Brière, 1966). Research shows that L1 interference affects both individual sounds and broader features like stress, intonation, and vowel pronunciation (Sales, 2022), such as insertions and substitutions (Al-Shalabi, 2021). interference also occurs when English sounds are absent in the learner's L1 causing difficulties with vowels and consonants (Suadiyatno, 2020). The similarity between L1 and L2 phonologies plays a crucial role in acquisition, with completely new sounds sometimes being easier to learn than those that are partially similar (Brière, 1966; Flege, 1986; Sypiańska & Constantin, 2021).

L1 influence extends beyond phonology, impacting grammar, syntax, and vocabulary, with varying patterns across language families (Alisoy, 2024). Recognizing these patterns is essential for creating effective teaching strategies tailored to learners' diverse linguistic backgrounds (Alisoy, 2024; Al-Shalabi, 2021).

Positive and Negative Transfer

The influence of a learner's native language on their second language pronunciation is known as positive or negative transfer. Kurdish learners of English as a foreign language (EFL) often experience conceptual transfer in both spoken and written communication. This occurs when Kurdish concepts don't have direct English equivalents or have nuanced differences, influencing their language production (Ahmed & Ali, 2024; Omar, 2018). Positive transfer facilitates learning when languages share similarities, while negative transfer hinders it due to differences (Wang, 2007; Huang, 2024). This is particularly notable for speakers of tonal languages like Chinese learning English (Wang, 2009; Ning, 2024). Negative transfer can impact both individual sounds and broader pronunciation features, affecting fluency and accuracy (Yang & Fu, 2022). To minimize negative transfer and maximize positive transfer, bilingual contrastive teaching and language comparisons can be effective (Yan, 2020). Raising learners' awareness of pronunciation differences and encouraging practice can also help achieve more native-like pronunciation (Yang & Fu, 2022). Understanding transfer effects is key to developing effective pronunciation learning strategies.

Why a Review Paper?

This review paper on the contrastive analysis of the Sorani Kurdish and English sound systems was written to provide a comprehensive background of the Kurdish language, shedding light on its historical context and linguistic features. Specifically, this study focuses on the Sorani Kurdish dialect, with particular attention to the Erbil and Sulaymaniah dialects especially in the predictions of errors. Additionally, it aims to contribute to the ongoing debate among researchers regarding the phonemes of Central Kurdish, offering a detailed examination of the existing literature.

Furthermore, this paper seeks to predict potential errors that Kurdish learners of English as a foreign language may encounter, including the impact of L1 interference and positive and negative transfer, and to present these predictions in a detailed and nuanced manner. A thorough examination of various pronunciation features is also conducted, covering aspects such as phonemes, consonants, vowels, syllable structure, and stress patterns, although intonation is excluded due to the limited availability of sources on Sorani Kurdish intonation.

This review paper is based on an extensive analysis of over 220 sources, providing a comprehensive and authoritative examination of the subject matter. By drawing on such a large body of literature, this study aims to offer a detailed and insightful comparison of the Sorani Kurdish and English sound systems.

Organization of Rest of Paper

The rest of this paper covers the historical background of the Kurdish language, an in-depth analysis of Central Kurdish and English phonology, a comparison of their sound systems, and predictions of potential challenges for Central Kurdish speakers learning English, followed by a conclusion.

Historical Background of the Kurdish Language

> *As to the Kurdish language, so little is known of it that it has been described as a corrupt dialect of Persian and Arabic, "a kind of dog-Persian," and "a degraded old Persian dialect." It is none of these.* (Soane, 1910: 387)

The Kurdish language belongs to the Iranian language group (Khalid, 2020: 133) within the Indo-European language family (Rahimpour & Dovaise, 2011: 74). The main Kurdish dialect groups are Northern or Kurmanji, Central or Sorani, Southern, Gorani, and Zazaki (Fattah 2000; Tavadze, 2019: 170; Hassani & Medjedovic, 2016: 64; Haig & Öpengin, 2014: 101). In terms of number of speakers, Kurdish takes fourth place in the Middle East following Arabic, Persian and Turkish, and fortieth in the world (Hassanpour, Sheyholislami, & Skutnabb-Kangas 2012). Speakers of Kurmanji are located in different countries, i.e., Iraq, Turkey, Syria, Iran, Lebanon, and Armenia, while Sorani is mainly spoken among Kurds in Iraq and Iran. Gorani is primarily spoken in Iraq and Iran. Zazaki is spoken in Turkey (Hassani & Medjedovic, 2016: 64). Kurmanji dialect in the northern Iraq, especially the city of Duhok, is referred to as Badhini or Bahdini, which is one of the major dialect groups of Kurmanji, simply because the area is known as Bahdinan (Sheyholislami, 2015: 32; Mosa, 2016: 1).

There is no consensus among linguists on the number of phonemes in the Kurdish language. The Kurdish language exhibits a phonemic orthography, where each proposed phoneme is represented by a unique letter, and each letter corresponds to a single sound, resulting in a consistent one-to-one relationship between sounds and symbols. There are two main alphabets for Kurdish; the Latin alphabet introduced by Celadet Badirkhan in 1932, and the Persian/Arabic alphabet, which is also called the central/Sorani Kurdish alphabet started by Wahby (1929). Both major dialects of Kurdish, i.e., Northern Kurdish (Kurmanji) and Central Kurdish (Sorani), can be written in Latin (Roman) script while the Central Kurdish dialect is mostly written in a customized version of the Perso-Arabic script. Although Northern Kurdish has a greater number of speakers than Central Kurdish, the latter has more written resources (Sheyholislami, 2015; Veisi et al., 2021: 4).

The focus of our study is on the sound structure of Central Kurdish (Sorani), and to a lesser extent of Northern Kurdish (Kurmanji), compared with English (both British and American).

Figure 1. *Kurdish dialect map, color-coded based on different regional dialects (copied from Mosa, 2016: 19)*

Central Kurdish (CK)

Central Kurdish is also known as Sorani Kurdish (Rasool, 2022: 270). It is also referred to as Pehlewani, Kirmashani or Kermanshahi (Sheyholislami, 2015: 34). It is the second largest dialect and spoken among people of Iraqi Kurdistan (north of Iraq) and the Northwestern part of Iran by about 9 million speakers (Thackston, 2001). It is mostly written in a customized version of the Arabic script (Veisi et al., 2021). This writing system was first established in the 1920s (Nebez, 1993). After ending Saddam Houssain's regime in 2003, it has been identified as an official language of Iraq alongside Arabic (constitute.org 2005).

Central Kurdish (CK) Phonemes

Kurdish has a phonetic spelling system, i.e., it is written as it is pronounced (Rahimpour & Dovaise, 2011: 74). As mentioned above, there is no consensus among Kurdish linguists on the number of phonemes in Kurdish (McCarus, 1958; MacKenzie, 1961; Wais, 1984, 1997; Ahmad, 1986; Fattah, 1997; Mahwi, 2009; Hamid, 2016; Gharib, 2018). For lack of available authentic documents, linguists generally agree that the alphabet developed for Kurdish was a modified version of the Arabic alphabet at the beginning of the 20th century (Hama Saeed & Hamid, 2020: 34), with some additional graphemes for sounds that do not exist in Arabic, while some Arabic symbols were omitted as they do not correspond to any phoneme in Kurdish (Salih, 2014: 5). Scholars disagree on both the number of vowels and of consonants; some of them consider particular consonants an allophone, while the same consonant is considered phonemic by others (Farhadi, 2011; Hamid, 2016). Table 1 summarizes the proposed phoneme count listed in 15 publications. The accounts are listed from old to most recent.

Table 1
Number of CK phonemes in previous publications

Author(s)	Year	Variety	Vowels	Consonants
Wahby	1929	CK	10	30
Wahby	1933	CK	9	28
Mackenzie	1961	CK, Sulaymaniah	9	29
Mackenzie	1961	CK, Erbil	8	27
McCarus	1958, 1997	CK	11	31
Amin	1979	CK	8	29
Blau	1980	CK	8	27
Wais	1984	CK	8	29
Fattah	1997, 2010	CK	9	25
Thackston	2001	CK	8	29
Zahedy & Mehrazmay	2011	CK	7	27
Salih	2014	CK	7	28
Hamid	2016	CK	6	28
Ahmed	2019	CK	8	28

Part of the disagreement among the linguists is over the controversial consonants of CK like /ʔ ʕ ɣ v ŋ/ (Ahmed, 2019). Some linguists do not consider these sounds authentic segments in CK, as they occur only in loanwords, either from other Kurdish dialects, or from Arabic and Persian. For another part, there is disagreement on the vowels. Some authors argue that there are diphthongs and long vowels in CK, while others exclude them from the set of CK vowels. The issues about the controversial phonemes are discussed in more detail in the following sections.

Consonants
As mentioned, there is no consensus over the number of the phonemes in CK. Both Kurdish and foreign linguists have argued for different numbers of consonants.

Upper part of cells in table 2 specifies the IPA symbol, the lower part contains the orthographic symbol for the sound in Kurdish orthography. Alveolar stops are phonetically realized as denti-alveolars. The table contains 29 phonemes, but 6 of these (indicated in red) can be analyzed as allophones of some other phoneme.

Table 2

Articulatory features (manner and place) of CK consonants. Arabic script typically associated with the sound on bottom row. When the top row in a cell contains two IPA symbols, the one to the left is voiceless, the one to the right is voiced. Symbols in red print have marginal status in the CK system.

		Place of articulation							
		Labial	Alveolar	Post-Alveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Manner of articulation	Stop	p b پ ب	t d ت د			k g ك گ	q ق		ʔ ئ
	Fricative	f v ف ڤ	s z س ز	ʃ ʒ ش ژ			χ ɣ خ غ	ħ ʕ ح ع	
	Affricate			ʧ ʤ چ ج					
	Nasal	m م	n ن			ŋ نگ ,نك			
	Lateral		l ل			ɬ ڵ			
	Trill			r ڕ					
	Flap		ɾ ر						
	Glide	w و			j ی				h ھ

Stops

For this study, we have identified 29 consonants, 7 of which are stops /p, b, t, d, k, g, q/ while excluding /ʔ/ as there is no minimal pair. The voiceless stops are /p, t, k, q/; /b, d, g/ are voiced. The voiceless stops are aspirated and stronger so in /p/ when it is initial; aspiration is less evident in /q/. Unlike English, /t/ and /d/ are denti-alveolar while they are alveolar in English. /ʔ/ is a controversial consonant; it is considered a loan phoneme from Arabic, so that some linguists reject it as a Kurdish phoneme (Marif, 1986: 82; Digayy, 2000: 39; Rasool, 2005: 59; Ahmed, 2007: 228). We have also excluded /ʔ/ as a Kurdish phoneme in this study as there is no minimal pair which contrasts /V…/ vs /ʔV…/. Instead, we analyze it as abrupt onset of the vowel. It occurs only and always before initial vowels It occurs finally, especially in Erbil CK accent, but only in the word /naʔ/ (Mahwi 2008b: 168), which means 'no', and it is easily analyzed as a paralinguistic phenomenon. This is seen only in Perso-Arabic orthography but not in Latin script and English transcription where /ʔ/ is written before initial vowel as in ئارام [ɑrɑm] 'proper name or quiet', ئێوارە /ewɑra/ 'evening', and ئەندام /andɑm/ 'member'.

Fricatives

The fricative consonants include voiceless /f, s, ʃ, χ, ħ/ and voiced /v, z, ʒ, ɣ, ʕ/. Apart from disagreement among linguists over the number of the phonemes, there is controversy over the phoneme /ʕ/ regarding its manner of articulation. It is considered a pharyngeal stop by

some Kurdish scholars (e.g., Nabaz, 1976: 59; Rahimpour & Dovaise, 2011: 75; Rasool, 2015: 270; Hamid, 2016: 14; Gharib, 2018). At the same time, it is considered a loan phoneme from Arabic where it is analyzed as a fricative (see Farran, 2022: 13). For /ħ/ and /ʕ/, Rasool (2015) states that they are allophones of /h/, simply because there are no minimal pairs. The consonants /ħ/ and /ʕ/ are almost regularly interchanged by illiterate people especially in the dialect of Erbil (Mackenzie, 1961: 29) as in /saħat/ and /saʕat/ 'health'. The voiced fricative /ɣ/ mostly occurs in Arabic loan words. It is sometimes in free variation with its voiceless counterpart /x/, as in /bɑx/ and /bɑɣ/ 'farm'. we have searched in more than ten studies, but none mentioned a minimal pair based on /ɣ/ and /x/; in fact, all of these studies denied the existence of such minimal pairs. Nevertheless, we could think of one pair: /dɑχ/ 'sorrow' vs. /dɑɣ/ 'to burn someone's place in his/her body as a punishment' or 'the metal stick used for this purpose'. The /v/ is denied phoneme status in CK by Fattah (1997), who asserts that all CK words that contain /v/ have come from Northern Kurdish/Kurmanji Kurdish (KK), where it is a very common phoneme; however, it rarely occurs in CK. It occurs in a few onomatopoeic words such as /gɪvagɪv/ 'buzzing of bee' or 'eolian - the sound of the wind', /vɪravɪr/ 'vroom' and in some proper names like /ɑvɑn/, /vijɑn/, /lɑvɑn/, etc. The glottal semivowel /h/ does not occur in word-final position in CK, except interjections like /ɑh/, and /ah/ 'Oh', as in /ah bira ro/, /ɑh bɪrɑ ro/ 'Oh brother' and in /bahbah/ 'an expression used for delicious food or surprise'. /bahbah/ is used especially by Kurdish CK speakers in Iran, where it also exists in Farsi (Persian).

Affricates

In Kurdish there are two affricate phonemes, voiceless /ʧ/ and voiced /ʤ/. In the Erbil dialect and other CK sub-dialects such as Pizhdar (Iraq) and Mukri (Iran), which both lie to the east of the Erbil dialect, the affricates are alveopalatal /tɕ/ and /dʑ/ in Erbil dialect (Mackenzie, 1961) and postalveolar in Sulaymaniah dialect (Ahmed, 2019). There are minimal pairs between the voiced alveopalatal affricate /ʤ/ in the voiced postalveolar affricate /ʤ/ in the Erbil dialect as in /ʤɪja/ 'grass' and /ʤɪja/ 'separate', /ʤe/ 'ear' and /ʤe/ 'place'. Based on the minimal pairs, /ʤ/ is a phoneme in Erbil dialect. /tɕ/ and /ʧ/, however, are in free variation with each other in both dialects. The affricates in CK are considered single phonemes. All affricates occur initially, medially, and finally.

Nasals

CK has three nasal consonants /m, n, ŋ/, where the phoneme /ŋ/ is controversial and considered an allophone of /n/ (Fattah, 1997, 2010). However, there are minimal pairs based on /n/ vs. /ŋ/ that support /ŋ/ as a phoneme as in /han/ 'they exist' versus /haŋ/ 'honeybee' and /bɑn/ 'roof' versus /bɑŋ/ 'to call out' (Rahimpour & Dovaise, 2011: 75). The /ŋ/ phoneme is heard and seen in Sulaymaniah dialect much more than in Erbil (Hawler) dialect. /ŋ/ does not occur word initially, it occurs medially and finally in Sulaymaniah dialect, as in /haŋɑw/ 'step' and /dɑŋ/ 'sound'. It occurs only medially in Erbil dialect, it does not occur finally as it does in Sulaymaniah dialect as in /pɑŋka/ 'fan, ventilator', /haŋgɑw/ 'step', /dɑŋg/ 'sound'. In Erbil dialect, /g/ and /k/ sounds are pronounced after /ŋ/. In Sulaymaniah dialect, /k/ is pronounced after /ŋ/ but /g/ is not.

Laterals

CK Kurdish has two voiced laterals: /l/ and / ɬ/. The latter does not occur initially and it is found in Sulaymaniah dialect and some Erbil subdialects. In English, the laterals are

allophones of the same phoneme, but unlike English, laterals are two independent phonemes with minimal pairs as in /ʧɪl/ 'forty' and /ʧɪɬ/ 'branch'. Several more minimal pairs serve to give phonemic status to both sounds (see Blau, 1980: 39; Rahimpour & Dovaise, 2011: 75; Hamid, 2016: 23; Gharib, 2018: 36; Ahmed, 2019: 41). A dark /ɬ/ can change to a light /l/, while any light /l/ (also one that was once dark) can be changed to a light /ɾ/, as in /dɪɬ/ 'heart' which can be pronounced as /dɪl/ or /dɪɾ/, and /baɬe/ 'yes' which can be pronounced as /bale/ or /baɾe/. This is happening only in Erbil-accented speech.

Rhotics

CK has two voiced rhotic consonants, /r/ and /ɾ/. There are several minimal pairs that based on these different rhotics, like /kar/ 'donkey' and /kaɾ/ 'deaf'. The former is a palatal-alveolar trill and the latter is an alveolar flap. /r/ occurs in all word positions while /ɾ/ does not occur initially but only medially and finally. However, /ɾ/ rarely occurs initially by a specific speaker group in Erbil city, who are called *Hawleri* (their mother tongue is Turkmani).

Glides or semi-vowels

There are three glide consonants: /w, j, h/. /w & j/ are voiced while /h/ is voiceless. Unlike other scholars (e.g., Mackenzie, 1961: 1; Amin, 1979: 21; Thackston, 2001: 1; Rahimpour & Dovaise, 2011: 75; Hamid, 2016: 14; Gharib, 2018: 149; Ahmed, 2019: 36), who consider /h/ a glottal fricative, we consider it a glide in this study. According to Hamid (2016) and Hama Saeed and Hamid (2020), /w/ is velar or labiovelar, but others consider it labial (MacKenzie, 1961; Marif, 1974; Amin, 1979; Taher & Ahmed, 2014; Gharib, 2018; Ahmed, 2019; Dinler & Aydin, 2022). We consider it both bilabial and labiovelar, as it is in English, and we do not perceive any difference between the CK glides and their English counterparts.

Vowels

Vowel sounds are classified as voiced, they are characterized by a continual vocal fold vibration and as continuants. Like consonants, there is no consensus among linguists on the number of vowels in Kurdish. There is also disagreement over the existence of the long vowels and diphthongs in CK. The number of CK vowels ranges between 6 and 11 (Table 2.3), which according to World Atlas for Language Structures (WALS), is a large ("large" in WALS defined as having more than 7 vowels) inventory of vowels. Some vowels do not exist in some specific dialects. For example, /ʉ/ only exist in the Goran dialect of CK; it is a dialect spoken in the area between Erbil and Duhok cities, where Duhokians speak Bahdini Kurdish.

Table 3
Kurdish vowels in earlier studies (chronologically ordered) compared with the present study.

Author (year)	Proposed vowel inventory										
Wahby (1929)	i	ɨ	ị	e	a	ɑ	u	ʉ	we	o	ü
Wahby (1933)	i	ī	ɨ	e	a	ɑ	u	ʉ	ö	o	
McCarus (1958)	i	ɨ	ị	e	ə	ɑ	u	ʉ	we	o	ü
Mackenzie (1961)	i	ī		ē	a	ā	u	ū	ø	o	
Amin (1979)	i	ī		ē	a	ā	u	ū		o	
Blau (1980)	i			ê	a	â	u	û	ö	o	
Wais (1984)	i	ɪ		ē	a	ā	u	ū		o	
Fattah (1997, 2010)	i	ɪ		é	a	á	u	ú	ö	ó	
Mahwi (2008)	i	ɨ		e	ə	a	u		œ	o	
Rahimpour & Dovaise (2011)	i			ê	a	â	u	û		ô	
Salih (2014)	i			e	ə	ɑ	ʊ	ʊ:		o	
Hamid (2016)	i			e	a	ɑ	u			o	
Ahmed (2019)	i	î		ê	a	â	u	û		ô	
Present study	i	ɪ		e	a	ɑ	u	ʉ		o	
Accepted by all	✓			✓	✓	✓	✓			✓	

McCarus (1958, 1997), Ahmad (1986), Fattah (1997) and Ahmed (2019) exclude diphthongs from the CK vowel system, while Mackenzie (1961), Aziz (1976) and Blau (1980) include them. Mackenzie (1961) listed 19, Aziz (1976) listed 8, Blau (1980: 35) listed 10, Rahimpour and Dovaise (2011) listed 6 diphthongs, and Asadpour and Mohammadi (2018) recognize 7 diphthongs. Each of the diphthongs postulated is a simple vowel followed by one of the semivowels /w, j/ (Rahimpour & Dovaise, 2011: 77).

Vowel length is one of the most debated topics in the phonology of CK. Ahmad (1986), Fattah (1997) and McCarus (1997) argue that vowel length is phonologically relevant, while Mahwi (2009) argues that long and short vowels are in complementary distribution so that vowel length is not contrastive in CK. Minimal pairs can rarely be found between short and long vowels in CK. For example, in Sulaymaniah dialect there is /kur/ 'boy' vs. /ku:r/ 'bent, hunchback', /qut/ 'short' vs. /qu:t/ 'food' but the vowel can be pronounced short in Erbil dialect. In sum, CK does not have a contrast between short/lax and long/tense vowels.

In this study, we also do not consider diphthongs and vowel length phonologically relevant in CK. The eight vowels we recognize in this study are specified in the following table.

Table 4

Proposed vowel inventory for Central Kurdish, with IPA transcription, examples in syllable initial, medial and final position, orthographic representation in Arabic script, and glosses. Target sounds in bold red print.

IPA	Initial	Medial	Final	Gloss		
i ئی	/**i**ʃ/ **ئی**ش	/p**i**l/ پ**ی**ل	/wɑz**i**/ وازی	work	battery	game
ɪ not written	-	/pɪl/ پل	-	-	finger	-
e ێ	/**e**wɑra/ **ئێ**وارە	/p**e**ɬaw/ پ**ێ**ڵاو	/p**e**/ پ**ێ**	evening	shoe	foot
a ە	/**a**ndam/ **ئە**ندام	/p**a**l/ پ**ە**ل	/pɑr**a**/ پارە	member	limb	money
ɑ ا	/**ɑ**w/ **ئا**و	/p**ɑ**ɬ/ پ**ا**ڵ	/ʃ**ɑ**rɑz**ɑ**/ ش**ا**رەزا	water	shoulder	expert
o ۆ	/**o**jɪn/ **ئۆ**ین	/p**o**l/ پ**ۆ**ل	/b**o**/ ب**ۆ**؟	turn	class	why
u و - وو	- -	/p**u**l/ پ**و**ل-پ**وو**ل	/ʧ**u-u:**/ چ**وو**	tunnel	stamp/ money	went
ʉ ئِو	- -	/p**ʉ**l/ پ**و**ل	/m**ʉ**/ م**وو** - م**و**	-	stamp	hair

When vowels occur initially, they are preceded by a glottal stop [ʔ] in Perso-Arabic orthography. See initial examples in Table 2.4. So, [ʔ] is not an independent phoneme in CK; it is an allophonic feature on the vowel (abrupt onset). The orthographic symbol 'و' corresponds with either the (unmarked) vowel /u/ or with a marked (typologically unusual) vowel that is transcribed as either unrounded back /ɯ/ or unrounded central /ʉ/. Following established practice (see Table 3), we will use the IPA symbol /ʉ/ for this vowel. The /u-ʉ/ contrast is not observed in all CK varieties. The /ʉ/ vowel is realized in Goran dialect, which is spoken by people of the specific area between Erbil and Duhoh City. However, /ʉ/ is typically merged with /i/ in, for example, Sorani Kurdish, where words /mʉsɪl/ '*Mosul city*', /mʉ/ *'hair'*, and /pʉl/ 'stamp', become /musɪl/, /mu/, and /pul/. At the same time, when the words /mʉsɪl/, /mʉ/, and /pʉl/ are repeated or imitated by other Kurdish Sorani dialect speakers, they become /misɪl/, /mi/, and /pil/, which sometimes causes misunderstanding. Vowel /u/ can be long and is written with a geminate letter in Kurdish orthography, when it occurs finally and in some words medially, like /nusin/ نووسین 'writing', /du/دوو 'two', and /bɪʧuk/ بچووك 'small'. It does not cause misunderstanding when it is written as a single letter or when pronounced short, because – as mentioned before – there are no other minimal pairs than /kur/ 'boy' vs. /ku:r/ 'bent, hunchback' and /qut/ 'short' vs /qu:t/ 'food', both of which examples are spoken in Sulaymaniah dialect.

In this study, we will focus on eight vowels /i, e, a, ɑ, o, u, ɪ, ʉ/. /ɪ/ is seen in Kurmanji Kurdish as well as in CK orthography, when these varieties are written in the Latin alphabet. However, /ɪ/ does not appear in the Perso-Arabic orthography.

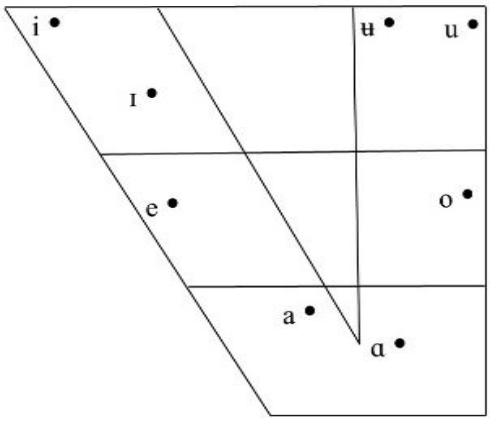

Figure 2. *IPA diagram of CK vowels.*

Syllable Structure and Consonant Clusters

Like English, the Kurdish syllable consists of an onset (any consonant preceding the vowel) and a rhyme, which is the remaining part of the syllable. The syllable rhyme contains two parts: a nucleus (it contains the vowel and it is the obligatory part of the syllable) followed by an optional coda (any consonants after the vowel). Each word contains at least one syllable (McCarus, 1958: 23), and each syllable in the Kurdish language should have at least one consonant and one vowel but cannot be a single vowel in isolation (Karimi Doostan, 1996, 2002; Rahimpour & Dovaise, 2011). Karimi Doostan (1996, 2002) mentions CV, CVC, CVCC, CCV, CCVC and CCVCC syllable structures in all Kurdish dialects including CK spoken in the western parts of Iran and CVCCC rarely observed for Mahabad city Kurdish, while Amin, (2009) listed CCVCC, CCVC, CCV, CCCV, CVC, CV, CVCC, CVCCC. Dovaise and Rahimpour (2011) as well as Omar and Hamad (2016) have represented the syllable structure of Kurdish as (C) CV (C) (C) (C). Mohammadi and Bijankhan (2021) have argued that their syllable structure in CK was established phonetically while the main motivation of the syllable structure in most earlier studies was based on the orthography of the Kurdish language. They argue that the earlier descriptions of Kurdish syllable structure do not represent the actual phonology. They reanalyzed the most common syllable types in the earlier studies, and established that the range of types varies from CV to CCVCCC, citing Mohammed's (2021: 92) گەیشت /gajɪʃt/ 'arrived' as an example of a final CCC cluster, arguing that the short lax front vowel /ɪ/ should be ignored. The most common types by Mackenzie (1961) and Mohammadi and Bijankhan (2021) are CCVCC and CGVCC (where G stands for a glide /w/ or /j/). Recognizing the phonological insertion of a high front lax vowel /ɪ/ in final CCC, with no symbol in the writing system, reduces the phonological syllable structure to C(C, G)V(C)(C). According to Dovaise and Rahimpour (2011) as well as Paulmony and Hussein (2019), who ignore the inserted (epenthetic) front lax vowel /ɪ/, Kurdish permits clusters of three consonants finally and two consonants initially.

Some foreign and local linguists like McCarus (1958), Amin (2009), and Mohammed (2021) have stated that there is an onset structure type CCCV by showing only one example, which is /tχwa/ تخوا 'an expression used for confirmation when asking about something'. However,

the evidence is questionable, since /tχwa/ can be analysed as a surface realization of /tuχwɑ/ or /tu aw χudɑja/,توخوا, تو ئه و خودايه which (in literally translation) means 'you and God' in Erbil dialect. It's used for asking someone for something or persuading them to do something by trying to make yourself sound friendly. The equivalent English word is 'pretty please!'. The /u/ epenthesis in the CC onset cluster, like the /ɪ/ epenthesis in final CCC discussed above, this is not reflected in the CK Perso-Arabic writing system. The CK consonant clusters exhibit only a subset of the arrangements found in English (Omar & Hamad, 2016).

Stress

In Kurdish, polysyllabic words typically have one stressed syllable, with the remaining syllables being unstressed (Rahimpour & Dovaise, 2011). Shifting the stress can alter the word's grammatical meaning: for example, /ˈ**bar**zi/ 'you are tall' versus /barˈ**zi/ '**height', /ˈ**ka**ri/ 'you are deaf' versus /kaˈ**ri**/ 'deafness', especially in the Erbil dialect of CK. Yarmohammadi (1996) considered word stress essentially morphological, which is a characteristic of most Iranian languages.

Research by foreign and Kurdish linguists such as McCarus (1958, 1997), Amin (1979), Ahmed (1986), and Rahimpour and Dovaise (2011) indicates that in Kurdish, the primary stress typically falls on the final syllable of a word

English

This section provides the description of the phonetic features of American English (AmE) and British English (BrE), focusing on consonants, vowels, syllable structures, and stress patterns. The accent that has been chosen for this study for BrE is Received Pronunciation (RP) or BBC Pronunciation (Roach, 2009; Ladefoged, 2001:70), also known as Standard Southern British (IPA, 1999:4; Deterding, 1997; Deterding & Poedjosoedarmo, 1998), which is considered the most familiar accent in English L2 courses throughout the world (Cruttenden, 2001; Wells, 1982). RP is the accent commonly recommended for foreign learners of BrE and frequently used by instructors teaching English to nonnative speakers (Roach, 2009), including those in Iraq and the Kurdistan Region.

The other accent is General American (GA) selected to represent AmE. The reason behind including both BrE and AmE in this study is to determine whether GA is easier to learn by Kurdish EFL learners than RP.

English Phonemes

The number of English phonemes varies from one variety to another, but in general the language is considered to have 22 or 24 consonants, 2 semivowels and 20 vowels in the BrE. In AmE, 15 to 19 vowels are usually considered (Bizzocchi, 2017).

Consonants

The contribution of consonants to making the English understood is much higher than the contribution of vowels (O'Connor, 1998: 24) Both AE and BrE have equal consonant inventories with 24 consonants, i.e., /p, b, t, d, k, g, ʧ, ʤ, f, v, θ, ð, s, z, ʃ, ʒ, m, n, ŋ, l, r, w, j, h/. Consonants vary according to their manner of articulation, place of articulation, and voicing (O'Connor, 1998; Roach, 2009), as shown in Table 5. The voiced consonant phonemes are /b, d, g, ʤ, v, ð, z, ʒ, m, n, ŋ, l, r, w, j/ and the voiceless ones are /p, t, k, ʧ, f, θ, s, ʃ, h/. The

consonants are described with eight different places of articulation and six different manners of articulation, which are shown in Table 5. The stops, fricatives, and affricates are considered obstruents (due to the obstruction of airflow), while the nasals, liquids, and glides called sonorous consonants because they have a greater degree of resonance and allow spontaneous voicing (Balogné & Szentgyörgyi, 2006: 15-16). In Table 5, when a cell contains two symbols, they mark the voiceless (left) and voiced (right) counterparts.

Table 5
Articulatory features (manner and place) of English consonants. When a cell contains two symbols, the one to the left is voiceless, the one to the right is voiced. The glottal stop [ʔ] has no phoneme status.

		Place of articulation							
		Bilabial	Labio-dental	Dental	Alveolar	Palato-alveolar	Palatal	Velar	Glottal
Manner of articulation	Stop	p, b			t, d			k, g	ʔ
	Fricative		f, v	θ, ð	s, z	ʃ, ʒ			
	Affricate					ʧ, ʤ			
	Nasal	m			n			ŋ	
	Lateral				l				
	Retroflex						r		
	Glide	w					j		h

Stops
There are six stops (plosives) in English. The voiceless stops are /p, t, k/ and their voiced counterparts are /b, d, g/. Stop consonants occur in all positions; initially, medially and finally (O'Connor, 1998; Roach, 2009). The glottal stop [ʔ] is often an alternative pronunciation of /p, t, k/ in British dialects such as Cockney (London) (Balogné & Szentgyörgyi, 2006: 87; Ladefoged & Disner, 2012: 141) and Scots English, e.g., Glaswegian (Macafee 1983: 33; Shuken, 1984: 123; Chirrey, 1999). Ladefoged and Johnson (2010: 73) state that preglottalisation (glottal reinforcement) happens in many accents of English, without specifying any accents, such that 'syllable final /p, t, k/ are accompanied by an overlapping glottal stop gesture, as in pronunciations of *tip*, *pit*, *kick* as [tɪʔp, pɪʔt, kɪʔk]'. In an initial position in a stressed syllable, voiceless stops are aspirated. (Ladefoged & Johnson, 2015: 77).

Fricatives
O'Connor (1998) and Roach (2009) list nine fricative consonants in English /f, v, s, z, θ, ð, ʃ, ʒ, h/. Hughes and Halle (1956), however, mention only eight fricatives, since they exclude /h/, which is better analyzed as a glide. We adhere to the latter analysis. /f, θ, s, ʃ) are voiceless (fortis) while /v, ð, z, ʒ/ are voiced (lenis). /ʒ/ is of limited occurrence (Jones, 1918).

Affricates
There are two affricate consonants in English of which /ʧ/ is voiceless and /ʤ/ is voiced. They often have rounded lips. Chomsky and Halle (1968) and O'Connor (1998) consider affricates a special kind of stop consonants; the air is trapped and released with definite friction of /ʃ/

and /ʒ/. Affricates are postulated here under the *one-phoneme analysis.* Like voiceless stops /p, t, k/, /ʧ/ is aspirated (but only slightly) but not strongly enough for it to be necessary for foreign learners to give much attention to it (Roach, 2009).

Nasals

There are three nasal consonants in English: /m, n, ŋ/. Nasal consonants are voiced bilabial, alveolar and velar. The soft palate is raised in the all three consonants and the air comes out through the nose (O'Connor, 1998; Roach, 2009). /ŋ/ is not considered a phoneme by some authors; moreover, it it occurs between vowels as well as finally but not word-initially.

Lateral

English has only one lateral, alveolar and voiced phoneme, which has two different allophones (O'Connor, 1998). The alveolar clear /l/ and the dark or velarized /ɬ/. Clear /l/ occurs in syllable onsets only, while dark /ɬ/ only occurs in coda position (O'Connor, 1998; Roach, 2009). /l/ is a liquid or approximant alongside with /r/ (Ladefoged, 1999; Yoshida, 2016); the category can be split further into lateral and rhotic.

Retroflex

In RP English, the /r/ sound is retroflex because the tip of the tongue is curled backwards (Catford, 1977: 150; Trask 1996: 308). It is quite different from the "r-sounds" of many other languages where tongue-palate contact is made (Roach, 2009). It is generally voiced, and articulated only before vowels and never before consonants in RP English (O'Connor, 1998; Balogné & Szentgyörgyi, 2006; Roach, 2009). This is traditionally called r-dropping (Balogné & Szentgyörgyi, 2006). Foreign learners typically use the [r] sound that is presented by the letter 'r' in their own (written) language (O'Connor, 1998). General American English and other varieties of English, e.g., in Scotland, Canada, India, Ireland, Barbados, and South-West-England are referred to as rhotic accents; in these varieties the /r/ sound is preserved in all pronunciation contexts, including the coda position (MacArthur, 1998)

Semi-vowels

The three English semivowels /w/, /j/, and /h/ share similarities with vowels in terms of phonetics, but behave like consonants phonologically in the sound system (Gimson, 1980: 35; Roach, 2009: 80; Pitman, 2010). According to Padgett (2008), glides are regarded as non-syllabic realizations of vowels. English /w/ is voiced. Balogné and Szentgyörgyi (2006) mention that /w/ is a "labial-velar with two stricture places of open approximation: labial and velar." /j/ is a voiced palatal.

Vowels

As mentioned before, vowel sounds are classified as voiced and they are characterized by a continual vocal fold vibration and as continuants. The tongue, the lips and the jaw are the main articulators of vowel phonemes. According to the World Atlas of Language Structures (WALS), the inventory of English vowels is larger than that in the majority of languages of the world, which contain 5 to 6 vowel sounds (Maddieson, 1984: 127; 2013). Compared with other languages, English therefore has a large (i.e., having more than 7 vowels) vowel inventory.

The number of the vowels in English is undecided, not only because of the different varieties of English, but also because of the different analyses by linguists of a single variety such as Standard Southern British English (Deterding, 2004). There are 20 vowels in British English, 12 vowels are pure (monophthong) /ɪː ɪ, e, ɜː, ʌ, uː, ʊ, ɒ, ɔː, æ, ɑː, ə/ and 5 are diphthongs /aɪ, ɔɪ, eɪ, aʊ, əʊ/. Other diphthongs, /ɪə, eə, ʊə/, can be analyzed as surface realizations of /i, e, u/ followed by coda /r/. According to Bizzocchi (2017), the diphthongs are not phonemes, but clusters of a vowel phoneme and a semi-vowel /j/ or /w/. As far as pure vowels are concerned, there are 7 short (lax) vowels /ɪ, e, ʌ, æ, ʊ, ɒ, ə/ and 5 long (tense) vowels (see Figure 3) /ɪː, ɜː, uː, ɔː, ɑː/ (O'Connor, 1998; Roach, 1999, 2009; Deterding, 2004). Diphthongs can be classified into closing diphthongs /aɪ, ɔɪ, eɪ, aʊ, əʊ/ and centering diphthongs [ɪə, eə, ʊə] (see Figures 4-5). There are differences between AE and BrE vowels regarding the numbers and their phonetic symbols, as explained below. In American English (AE), there are 15 vowels in total /ɪː ɪ, e, ɜː, ʌ, uː, ʊ, ɒ, ɔː, æ, ɑː, ə, aɪ, ɔɪ, aʊ/ (Labov et al., 2006: 14-15; Ladefoged, 1999: 42; Wells, 1982: 120, 472), i.e., 12 pure vowels and three diphthongs (see Figures 6A-B). The monophthongs split into seven long (tense) vowels /i, e, æ, ɑ, ɔ, o, u/ and four short (lax) vowels /ɪ, e, ʌ, ʊ/ (Lehman & Heffner, 1940; Peterson & Lehiste, 1960; House, 1961; Wang & Van Heuven, 2006; Celce-Murcia et al., 2010).

The schwa sound /ə/ is still a controversial subject among scholars. Some claim that it is the reduced form of any other vowel. According to its phonological characteristics, there are two types. The first type is lexical vowel reduction (Van Bergem, 1995) or obligatory schwa (Bolinger, 1985), which is found in content words like *apart*, *datum*, *soda*); it occurs in all positions (initial, medial, and final) (Roca & Johnson, 1999; Whitley, 2004). The other type is non-lexical or non-obligatory schwa (Sugiura, 2015). It occurs in function words like *of*, *at*, and *to*. It is also called an acoustic reduction vowel (Van Bergem, 1995).

Vowels can be described according to length (long, short), backness (front, central, back) and height (high, mid, low), see Figures 3-4-5.

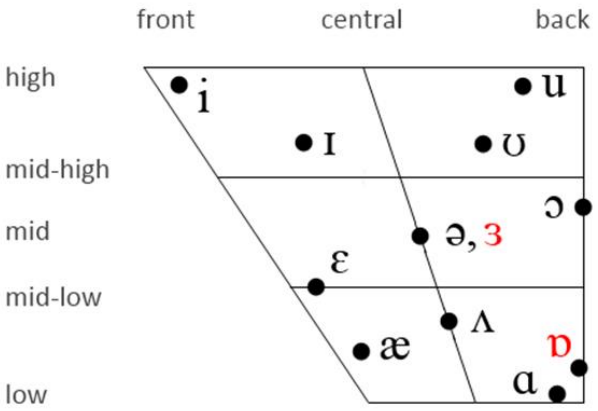

Figure 3. *BrE and GA pure vowels (copied from Roach, 1999: 242). Vowels used exclusively in British English are shown in red.*

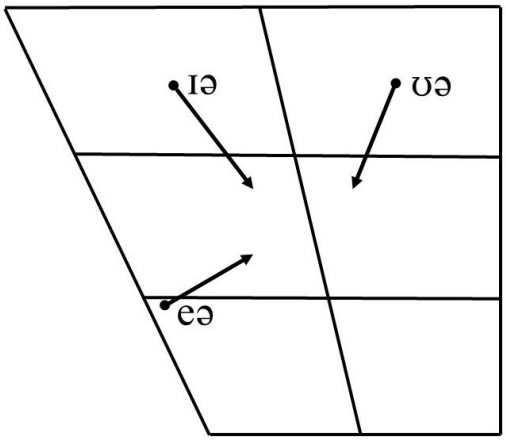

Figure 4. *RP closing diphthongs (Copied from Roach, 1999: 242).*

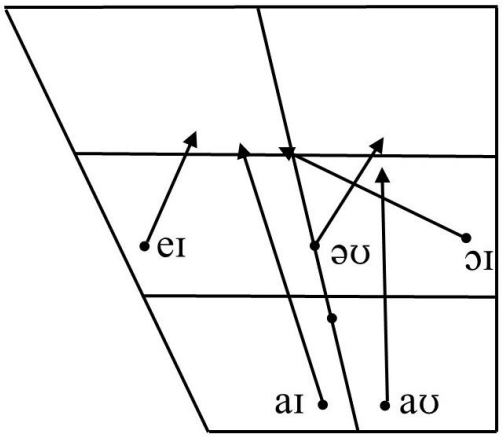

Figure 5**.** *RP centering diphthongs (copied from Roach, 1999: 242).*

Syllable Structure and Consonant Clusters

English has a more complex syllable structure than Kurdish. The onset part can contain maximally three consonants and the coda maximally four. The phonological syllable structure in a monosyllabic word (# signifies the word boundary) shows this pattern of arrangements: #CCCVCCCC# (O'Connor & Trim, 1953: 115; Abercrombie, 1967: 75; Yule, 2010: 45; Brown, 2015: 89; Collins et al., 2019: 175). That is to say, the onset can be a cluster of up to three consonants, i.e., either one, two, three prevocalic consonant(s), or none (e.g., *struggle* /strʌgl/). The coda may contain as many as four consonants. i.e., either one, two, three or four postvocalic consonant(s), or none), (e.g., *texts* /tɛksts/). The structure of the nucleus is usually a vowel and sometimes a syllabic consonant (Balogné & Szentgyörgyi, 2006: 66), i.e., sonorants /l, r, m, n, ŋ/) as in *button*, *lock 'n key*, *bottle*, etc. The highest degree of sonority is in glides, but the highest sonorous sounds are the vowels. The least sonorous consonants are oral plosives and fricatives. Figure 6 (after Balogné & Szentgyörgyi, 2006) illustrates the degree of sonority. The degree of sonority increases from obstruents to glides.

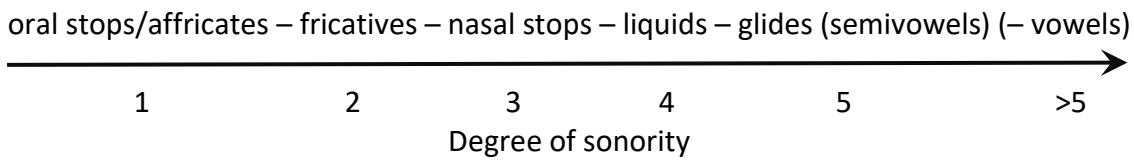

Figure 6. *Degree of sonority (after Balogné & Szentgyörgyi, 2006: 15)*

This sonority hierarchy may be invoked to understand the restrictions on the possibilities to combine different consonants in an onset or coda. Generally, we observe that the degree of sonority increases from edge to nucleus, while the difference in sonority between abutting Cs should be at least 2, so that #CC clusters like /pn, kn, tm, fn, gn/ are disfavored in the languages of the world, and do not occur in English. The sonority principle also accounts for the observation that the possible onset and coda clusters are often each other's mirror images.

A word-initial syllable can have a zero onset (Roach, 2009: 57). In CV syllables, any consonant except /ŋ/ (/ʒ/ is rare) can occupy the onset of the syllable (Durand, 1990: 216; Roach, 2009: 57). In connected speech (e.g., in word-medial or final position), /ŋ/ occurs, as in *ha-nging*, *si-nging*, just as single coda consonants are parsed as the onset of the next syllable even after a short/lax vowel (Van Heuven, 1992), as in *willow*, *belly*, *pulling*, *stopping*, *stuffing*.

In #CC onsets, 26 different clusters of two consonants are possible. These are /sm, sn, st, sw, sk, sl, sp, sf, θw, dw, tw, θr, dr, tr, kw, kr, kl, pr, fr, br, gr, pl, fl, bl, gl, ʃr/ (Jackson, 1980: 43), excluding semi-vowels /h, j/, voiced fricatives, and affricates, which are never part of any onset cluster. Restrictions are bigger in #CCC onsets, where, according to Roach (2009: 57), nine clusters are possible, i.e., /spl, spr, spj, str, stj, skr, skj, skl, skw/ (/s/ followed by voiceless stops plus a liquid or glide).[1] /s/ is the first consonant in most #CC clusters and in all the #CCC. In coda CCCC#, the rightmost sound is always /s/. Long vowels or diphthongs can be followed by CCC# max as in /fi:sts/ (*feasts*) and /eɪtθs/ (*eighths*). Only short vowels can be combined with CCCC# as in /glɪmpst/ (*glimpsed*) and /tɛksts/(*texts*).

Sometimes it is hard to specify the correct status of a consonant whether it is coda or onset. Scholars have postulated ambisyllabic consonant where it arguably belongs to both syllables (coda and onset). Single syllables (which are only nucleus and consist of a vowel, have only rhyme) are words like *eye*, and *owe* (Ladefoged & Johnson, 2010: 248).

Stress

Stress is the perceived degree of prominence that makes a syllable more important or 'prominent' than any other syllable in a word. Phonetically, prominence involves factors such as greater loudness, change in pitch, added length, and more extreme vowel quality (Roach, 2009: 74; Van Heuven, 2018: 1). Stress can be perceived even if only one or two of these cues are present (Fry, 1958; Van Heuven, 2018; Van Heuven & Turk, 2020). According to Ladefoged (1993: 249-250), a speaker stresses a syllable physiologically "by extra tensing of the muscles

[1] The clusters /spj, stj, skj/ only occur when followed by long /u:/ (or its r-conditioned surface variant /ʊə/. In American English, /j/ is often deleted in /(C)Cj/ clusters. This makes it more likely that the /j/ is a property of the nucleus than of the onset, and should not be analysed as the third member of a #CCC cluster.

of the ribcage and by extra activity of the laryngeal muscles," and perhaps also by applying "increases in the muscular activity in the articulatory movements." Most traditional textbooks, e.g., Roach (2009: 74-75), postulate three levels of word stress for English. Primary stress occurs on the most prominent syllable; the stress symbol (ˈ) is marked in front of it. Secondary stress is weaker than the primary stress; the symbol (ˌ) is marked in front of it. In unstressed syllables, prominence is absent and there is no mark. Stress in English can change the meaning of the same sequence of segments.

This concept is crucial in English language learning, as it affects both comprehension and oral intelligibility (Checklin, 2012). Cutler (2005, 2012) discusses the importance of word stress in English, highlighting its role in giving certain syllables and words greater prominence. Field (2005) showed that incorrectly placed word stress compromises the correct recognition of English words, for native English listeners as well as for many nonnative listeners (see also Van Heuven's (2022) analysis of Field's results.

Lexical stress, the emphasis placed on a particular syllable within a word, is a key component of word pronunciation (Bobda, 1997). It is closely related to sentence stress, which highlights a particular word or syllable within a sentence (Cutler, 2005), typically by the speaker executing a large(r) pitch change on the word (Van Heuven, 2018). The two types of stress are interconnected, with sentence stress typically being realized on the lexically stressed syllable of individual words (Mumtaz et al., 2020). The prominence of sentence stress can vary based on factors such as information structure and prosodic structure (see Lee, 2013 for a summary of the literature).

Comparison of CK and English Sound Systems

In this part, we will formulate predictions and hypotheses of possible errors that Kurdish L1 learners of English may commit, that represent learning problems when acquiring L2 proficiency. we will compare the phonological features (segmental and suprasegmental) of both (Kurdish and English) languages in the light of previous literature. The participant' L1 will be considered as Central Kurdish (CK). The different phonological systems of Kurdish and English will affect Kurdish learners' L2 acquisition. In this study, we concentrate on English as L2 and make this analysis from the view of Kurdish learner's English as L2 or FL starting with segmental (vowels and consonants) and followed by some suprasegmental features differences.

Prediction of Problems in Consonant Production

While learning a new language, sounds in the L2 may resemble sounds in learner's native language (L1) to different degrees. According to Flege (1995), there are three types of sounds (identical, new, similar). The first category of the L2 sound (identical sound) is a sound that exists in both L1 and L2, they have the same phonetic transcription with the same diacritics. The second type (new sounds) are sounds that have no match in the learner's L1, they are more difficult to learn. The third type is similar sounds; a sound in L2 that has similarity with their nearest counterpart sounds of learner's L1 but is not exactly the same. They are the most difficult to learn because they are close enough to L1 sounds to be falsely considered identical by the learner – but not for the native listener of the target language. (Flege, 1987; Wang, 2007; Van Heuven, 2017; Chang, 2019).

According to the explanation of both sound systems, most of the consonants are shared between Kurdish and English. For Kurdish learners, only two consonants in English are new sounds: /θ, ð/. Kurdistan Region is a region inside Iraq and the formal languages of Iraq are Arabic and Kurdish. /θ/ and ð/ do exist in Arabic and are therefore taught in the Kurdistan Region in compulsory lessons from the 4th grade (primary school) until the 12th grade (secondary school). Kurdish EFL learners may have incorporated /θ, ð/ as authentic categories in their conception of Arabic, which may then transfer to English. Another sound which is different from Kurdish is /r/: it may be recognized as alveolar trill /r/ and flap /ɾ/. Kurdish consonants are never aspirated, so that the aspirated plosives in English are expected to constitute similar sounds for Kurdish EFL learners.

Table 6
Estimation of pronunciation problems with consonants by Kurdish learners of English. Grey cells denote absent consonants in Kurdish.

English target	Kurdish substitutions/typical errors
/p, b, t, d, k, g/	Counterparts are available in Kurdish with a little difference for /t/, which is dental in Kurdish.
/p^h, t^h, k^h/	Aspiration is not available in Kurdish; aspirated plosives will be replaced by non-aspirated counterparts. Since the difference is a matter of diacritics, the aspirates will be similar sounds, and are predicted to be a long-lasting pronunciation problem.
/f, v, s, z, ʃ, ʒ/	Counterparts are available in Kurdish.
/θ, ð/	Absent in Kurdish. They are rarely replaced by /s & z/ by some Kurdish speakers but almost all the Kurdish speakers can articulate these two sounds correctly because they are available in Arabic (most Kurdish speakers are bilingual in Kurdish and Arabic).
/ʧ, ʤ/	Counterparts are available in Kurdish.
/m, n, ŋ/	Counterparts are available in Kurdish. Quite probably /ŋ/ does not occur in the CK coda, and will be realized as /ŋk/ in coda position.
/l/	Counterparts are available in Kurdish with also dark and light /l/.
/r/	CK has no approximant /r/. CK alveolar trill /r/ and flap /ɾ/ will be substituted. Approximant /r/ is a new sound, and will be a problem.
/w, j, h/	Identical counterparts are available in Kurdish.

Prediction of Problems in the Perception and Production of Vowels
Many scholars stressed that the role of vowels in contrasting accents and dialects of English is larger than that of consonants (Farran, 2022: 29). The differences in accents of English is seen more in the use of the vowels than in consonants (Ladefoged & Johnson, 2015: 41). In the right-hand column of the following table is an estimation of the English vowel sounds by Kurdish learners. The table lists all the vowel phonemes of (RP) English in the left-hand column. The grey cells denote the absent vowels in Kurdish.

Table 7
Estimation of pronunciation problems with simplex vowels by Kurdish learners of English.

English	Kurdish substitutions / typical errors
iː	It is usually replaced by Kurdish /i/, which may be too short.
ɪ	It does not exist in Kurdish, and will be confused with English /iː/, as there is no length contrast in Kurdish high-front vowels.
æ	Not too short in Kurdish, mostly realized as /ɑ/ in Kurdish and confused with English /ɑː/
ɑː	Mostly realized as Kurdish /ɑ/ and confused with English /ɑː/
ʌ	Absent in Kurdish, it is realized as Kurdish /a/
e	Counterpart exists in Kurdish
ʊ	Mostly realized as Kurdish /u/ and confused with English /uː/
uː	Mostly realized as Kurdish /u/ and confused with English /ʊ/
ɔː	Not too long in Kurdish. It is realized as Kurdish /o/ and confused with English /ɒ/
ɒ	Not too short, it is realized as Kurdish /o/ and confused with English /ɔː/
ɜː	Absent in Kurdish, confused with Kurdish /e/ which is an identical vowel in both Kurdish and English.
ə	Absent in Kurdish, mostly realized as Kurdish /a/. It is confused with English /ʌ/.

It is seen that there are shared sounds among languages, transcribed and labeled in the same way but there are still differences between them that the native listeners can easily perceive it that is not perceived by L2 learners easily (Yavaş, 2011: 19).

As we see in the vowel contrasts in Table 7, English has roughly twice as many vowels as Kurdish. There are two main reasons for vowel errors by Kurdish learners of English. One is that there are vowels in English that do not exist in Kurdish. The other reason is that there is no tense (long) and lax (short) vowel contrast in Kurdish, which appears as a similar sound (Flege, 1995) or a new sound (Bohn, 1998) and it is also easy to hear.

Prediction of Problems in Consonant Clusters

A range of studies have explored the challenges faced by EFL students in pronouncing consonant clusters, particularly when the syllable structure of their L1 differs from that of English. Kurdish EFL learners like Persian, Chinese, and Arabic, EFL learners struggle with initial and final consonant clusters, with epenthesis being a common error (Chang, 2004; Jabbari & Arghvan, 2010; Keshavarz, 2017; Al-Yami & Al-Athwary, 2021). The influence of L1 phonological systems on the learning of consonant clusters is evident. The syllable types of CK will never be a problem for English learners of Kurdish, but many English syllable types (i.e., the complex ones) will be a problem for Kurdish EFL speakers. The CK consonant clusters are only a subset of the arrangements found in English (Omar & Hamad, 2016). Recognizing the phonological insertion of a high front lax vowel /ɪ/ in final CCC, with no symbol in the writing system, reduces the CK phonological syllable structure to C({C,G})V(C)(C).[2] According to Dovaise and Rahimpour (2011) as well as Paulmony and Hussein (2019), who ignore the epenthetic front lax vowel /ɪ/, Kurdish permits clusters of three consonants finally and two consonants initially (which view we disagree with, see the previous sections). English has a

[2] This schema departs from our earlier analysis in which the CK syllable may start with a vowel (which in that case has a hard onset). The present schema considers the hard onset not a feature of the vowel but posits a glottal stop to fill a mandatory consonant slot. The two analyses can be treated on a par.

more complex syllable structure than Kurdish. The onset can contain up to three consonants and the coda as many as four. The phonological syllable structure shows this pattern of maximal arrangements: CCC{VV,VG,VC}CCC (Abercrombie, 1967: 75; O'Connor & Trim, 1953: 229; Yule, 2010: 45; Brown, 2015: 89; Collins et al., 2019: 175).[3] Most Kurdish learners mispronounce even relatively simple final clusters of two consonants. For instance, they pronounce *self* as /selɪf/, they split the /l/ and /f/ into two syllables by inserting an epenthetic vowel [ɪ]. Similarly, they pronounce *worked* as /wɒrkɪt/ or /wɒrkɪd/ instead of the correct BrE pronunciation /wɜːkt/. Kurdish EFL speakers conduct the same mistake with the initial clusters of three consonants in English.

Prediction of Problems in Stress

A range of studies have identified problems in word and sentence stress among EFL learners. Indonesian EFL teachers often misplace or double stress verbs, particularly on suffixes (Utami & Yulia, 2022). Arab Sudanese (Ahmed et al., 2022) and Chinese (Bu & Zhou, 2021) EFL students struggle with stress placement, often due to mother tongue interference. Mandarin EFL learners tend to improperly assign word stress, particularly in two- and three-syllable words (Liu, 2017). Taiwanese EFL learners have difficulty identifying and discriminating word stress, particularly when pitch cues are manipulated (Ou, 2010). Explicit teaching of stress rules has been found to be effective in improving stress pattern usage (Ali & Ahmed, 2022). Internet-based pronunciation lessons have also been shown to enhance accurate production of stressed syllables (Hismanoglu, 2012). Iraqi EFL learners struggle with resetting the parameters of word stress production and perception (Ali & Ghani, 2016).

Learner's L1 stress pattern transfer has a great impact on the production of L2 stress patterns. This transfer can be negative or positive, and is caused by the similarities and differences between the sound systems of the languages (Malghani & Bano, 2014). Incorrect English word stress by L2 learners has negative impact on L2 learner's intelligibility (Field, 2005; Lepage & Busà, 2014). Since lexical stress in English alters the meaning and/or the part of speech of words, e.g., ˈ***pro***.*test* (n.) and *pro*ˈ***test*** (v.), ˈ***de***.*sert* (n.) and *de*ˈ***sert*** (v.), or ˈ**re**.cord (n.) and reˈ**cord** (v.), CK EFL learners, who do not have such contrasts in their L1, may face problems. Kurdish stress is considered essentially morphological, which is a characteristic of most Iranian languages (Yarmohammadi, 1996, as shown by the examples given on page 1163. Kurdish is said to be a syllable-timed language (Rahimpour & Dovaise, 2011: 77).

In Kurdish, stress is primarily cued by a pitch change associated with the stressed syllable. Word stresses not coinciding with sentence stress will not be marked by lengthening (reflecting the syllable-timed rhythm of CK). This behavior is expected to carry over in the speech of CK EFL speakers, so that word stress will be ambiguous (unclear) when a word has no sentence stress. On the other hand, CK EFL speakers will probably mark every content word in English by sentence stress, as has also been observed for Arabic EFL speakers. The performance of Kurdish EFL in stress has been shown as better than the performance of Iraqi Arabic EFL by Al-Thalab and Abdalla (2021)), so that there will be too many sentence stresses – but at least every stress is clearly indicated by a pitch movement. Relocation of stress from one syllable to another in Kurdish will change the word to a sentence and vise-versa, e.g.,

[3] The schema shown earlier does not account for all syllable types. This one does. The elements listed between curly brackets represent a disjoint but compulsory choice.

/ˈroiʃtɪn/ ‘they went’ and /roiʃˈtɪn/ ‘to leave’ which is not found in English (Marif, 1976:73). In Kurdish, most of the words are stressed on the final syllable (Rahimpour & Dovaise, 2011: 77)

Word and sentence stress, and prosody in general, is more or less redundant, while the segmental structure contains practically all the information that is needed to decode the message. Experiments have shown that prosody can be omitted entirely from the spoken text without compromising word recognition (Van Heuven, 2022 and references therein). Prosody becomes important, if not indispensable, if the segmental speech quality is degraded – as in speech in noise or when the speaker has a foreign accent. Although redundant, unexpected (erroneous) word and sentence stresses may compromise the intelligibility and comprehensibility of spoken English. Ghosh and Levis (2021), following Field (2005), show that (incorrect) vowel quality and direction of stress shift are predictors of the (un)intelligibility of non-standard stress pronunciations. Cutler (1986, 2005) has shown that incorrect stress on full vowels does not affect the early stage of word recognition in English (lexical access), while lexical access is affected by stress in a related language such as Dutch (Van Heuven, 1988; Van Heuven & Jongenburger, 1995; Cutler & Van Donselaar, 2002). The later (confirmatory) stage of the word recognition process, however, is compromised by incorrect stress on full vowels in both languages.

Incorrect sentence stress can have various communicative effects (see Hahn, 2004; Van Heuven 2022, and references therein). Kutscheid et al. (2021) show that listeners may misinterpret word and sentence stress due to a high-pitch bias, which can slow down speech comprehension.

Even though English stress is somewhat irregular but it does not mean that there are no regularities (Dash, 2013; Farran, 2022; Ambalegin & Afriana, 2023). English stress is basically weight-sensitive, which means syllable structure (partly) determines stress position. The syllables fall into two classes, i.e., heavy and light syllables (Goedemans & Van der Hulst, 2013; Ruppel, 2017). Syllable weight and word stress are associated, to the extent that heavy syllables attract stress (Turk et al., 1995; Gordon, 2006; Goedemans & Van der Hulst, 2013).

Non-native learners face challenges due to the complex principles governing English stress patterns. According to Farran (2022), higher-order rules must be applied before basic ones, particularly with morphologically complex words. These words require decomposition into stem morphemes and affixes, with stress patterns determined by the lexical category of the stem. For example, in adjective compounds like "sky blue," the trailing stem receives the primary stress, whereas in other cases, the leading stem is stressed, as in "skyscraper" (Chomsky & Halle, 1968).

Angelina (2015) prefers that learners should follow word stress pattern rules that are provided in pronunciation textbooks for learning, but the intricacy of English stress and the complexity of the rules, EFL learners often resort to memorizing the stress pattern of each word individually, rather than trying to understand the underlying regularities (Farran, 2022: 34). Self-study and technology are other ways to raise students’ awareness of English word stress (Sardegna and Jarosz, 2023). Learners’ listening to native speakers and active teaching by EFL teachers are also means of learning English rule stress (Ambalegin & Afriana, 2023).

Conclusion

Our contrastive analysis of CK and English concluded that English has 44 phonemes, while in contrast the number of phonemes in Kurdish which are accepted by scholars is 34 (see tables 1, 2, and 3). This means there must be sounds in English that are missed in Kurdish, and therefore create potential learning difficulties for CK EFL learners.

The main reasons to expect vowel errors by Kurdish learners of English are that there are vowels in English that do not exist in the Kurdish sound system including vowels that depend on features that are not employed in Kurdish, i.e., diphthongization, tense (long), and lax (short), which may cause problems for Kurdish learners.

Another difference is that Kurdish has a transparent phonetic writing system, i.e., the pronunciation of words is fully predictable from the way they are spelled, and vice versa. English, in contrast, has an opaque morphophonological orthography, so that the segmental pronunciation of words is not always predictable from the way they are written. EFL learners, therefore, will have to be taught many, often complex, spelling to pronunciation correspondence rules, and still have to separately remember the pronunciation of words that are exceptions to the rules. For these reasons, the writing system of English is a major obstacle for EFL learners trying to acquire an acceptable pronunciation.

Regarding syllable structure and consonant clusters, English has more complex clusters (maximally CCCVCCCC) than Kurdish; CK exhibits only a subset of the arrangements found in English. Recognizing the insertion of a high front lax vowel /ɪ/ in final CCC, with no symbol in the writing system, the maximal syllable structure in CK reduces to CCVCC.

Concerning stress; length, loudness, and pitch are the main phonetic correlates of stress production in English. But in CK Kurdish, length and loudness are considered to be the primary phonetic cues for stress. (McCarus 1958, 1997; Ahmad 1986; Fattah 1997; Mahwi 2009). No pitch level difference is reported between stressed syllables and their unstressed peers. Nor is any relation reported between stressed syllables and tones in CK. To understand this, an acoustic study is recommended to find more about phonetic cues of stress in CK (Hamid, 2016: 121).

Lexical stress in English alters the parts of speech of the words, it will be an obvious problem which is seen by Kurdish EFL learners. In Kurdish, a change in the position of stress may result in a change in the grammatical meaning of that word, it changes the word into sentence and vice-versa (see *stress* on page 1163).

Finally, this review paper potentially makes the teaching English as a second language more effective. Instructors have to take into consideration various factors when teaching pronunciation to the EFL students. There are a variety of techniques and strategies that instructors can engage to help the students enhance their speaking skills, e.g., by explaining the segmental features of English and then engaging the student in exercises that focus on speech production (Yenkimaleki & Van Heuven, 2021). Communicative pronunciation teaching and learner-centered methods are also as effective approaches (Nguyen, 2021, 2023). Using videos of authentic pronunciation would be another effective way to improve learner's pronunciation (Kim, 2015; Putra, 2018; Rai, 2023).

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