

## THE PRODUCTION OF ENGLISH CONSONANT CLUSTERS BY BAHDINI KURDISH LEARNERS OF ENGLISH

**Aveen Mohammed Hasan, Ph.D, Khalid Ibrahim Na'mat**

University of Mosul, Iraq

Email: Khalid.ibrahim2015@yahoo.comaveen.hasan@uoz.edu.krd

### Abstract

The present study investigated the production of English consonant clusters (CCs) by Bahdini Kurdish (BK) learners of English. It examined whether there was an improvement in the production of CCs of 4<sup>th</sup> year students in comparison to that of 2<sup>nd</sup> year and it further identified the types of CCs that were problematic for both 2<sup>nd</sup> and 4<sup>th</sup> year students. The study was based on a production test composed of 40 words. The words were produced by 50 undergraduate students from College of Languages, Duhok University purposively selected from the 2<sup>nd</sup> and 4<sup>th</sup> years of their study. From each level, twenty-five students were taken and their ages ranged between 20 and 23. The respondents were asked to read the whole wordlist aloud and their production was recorded. The data was transcribed using the International Phonetic Alphabet (IPA) symbols and were listened to by the researcher and two phonologists to indicate the correct/incorrect CCs production in their performance. The findings revealed that BK learners of English, in general, were able to produce CCs correctly with a high rate. However, the rate of correct production got decreased significantly with the increase of the number of consonants in the cluster. Furthermore, the production of all patterns of CCs by the 4<sup>th</sup> year students was better compared to that of the 2<sup>nd</sup> year students. Finally, the study showed that transfer was the major factor for the incorrect rate of the production of English CCs by BK learners. This was mainly due to the differences of the syllable structure between Kurdish and English, lack of enough knowledge in the field of phonetics and phonology as well as lack of practicing CCs in their daily life.

**Keywords:** Consonant clusters, Bahdini Kurdish, Learners of English, Syllable Structure, Transfer

### 1. Introduction

According to the constraints the languages have, some sequences of sounds are acceptable to occur in some languages, but some are not. These constraints are called phonotactics, the allowed combinations of sounds in the structure of syllables. These phonotactics differ from one language to another in what order and how many phonemes does each syllable have. For example, onset clusters in English can consist of one to three consonants and one to four

consonants can occur in coda clusters: (C)(C)(C)V(C)(C)(C), where parentheses indicate optional constituents (Revell, 2011; Yavaş, 2011). However, in Bahdini Kurdish, a subdialect of northern Kurmanji (henceforth BK), one to three consonants are permitted to occur in onset clusters and one to two in coda clusters: (C)(C)(C)V(C)(C) (Ali & Abdullah, 2019). This difference in the phonotactics of the two languages affects the Bahdini learners of English and leads to pronunciation errors regarding the consonant clusters (henceforth CCs). Sequences of three and four consonants in coda part do not have their counterparts in BK. Consequently, BK learners of English will face difficulty in producing clusters of three and four consonants correctly. The current study is an attempt to investigate the BK learners of English production of the CCs and identify whether there will be any problems especially with those that do not occur in their mother tongue.

The study especially aims at: (1) investigating the production of English CCs by BK learners of English in the 2<sup>nd</sup> and 4<sup>th</sup> year of their study. (2) investigating whether there is an improvement in the production of the 4<sup>th</sup> year CCs in comparison to the 2<sup>nd</sup> year. (3) identifying the type(s) of English CCs that are considered challenging for the students of 2<sup>nd</sup> and 4<sup>th</sup> stages.

Thus, the current study attempts to answer the following questions: (1) Do BK learners of English pronounce CCs in English correctly? (2) Do 4<sup>th</sup> year students pronounce all types of English CCs better than 2<sup>nd</sup> year students when they reach a higher level? (3) Is BK learners' performance of English CCs influenced by their first language (L1) phonological system?

It is hypothesized throughout the study that: (1) BK learners of English face difficulty in producing those English CCs that are absent in their L1. (2) The production of English CCs by the 4<sup>th</sup> year students gets improved in comparison of the 2<sup>nd</sup> year students. (3) Most BK learners' mispronunciation of CCs in English trace back to the negative transfer.

The study is based on the theory of transfer which was first emerged in the Contrastive Analysis Hypothesis theory (CAH) formulated by Lado (1957). This theory seeks to investigate how L2 learners tend to rely on their L1 when attempting to produce utterances in the L2. This theory is one of the methods used by a plethora of researchers to study the errors occurring in all linguistic subsystems, which occur in both spoken and written language, made by L2 learners. It also is considered a hot issue in second language acquisition and has been viewed differently by many researchers regarding the importance of the L1 influence on the L2 (for more details, see section 3).

The study is limited to the production of English CCs by BK learners of English, which is a subdialect of Kurdish language spoken by the people of Duhok, Zakho, Akre and Amedi. It is also restricted to the English learners at university level. Furthermore, the data is limited to the production of CCs by the participants, while perception is left out of the scope of this study. The study is hoped to be of importance to both BK learners and teachers of English because it investigates a common phonological phenomenon which is different in both languages. Therefore, it is hoped to be valuable especially to BK learners so as to improve their pronunciation while speaking in L2.

## 2 Literature Review

### 2.1 Consonant Clusters

Revell (2011: 120) defines CCs as a sequence of consonant sounds that occur together at the beginning or end of the syllable with no vowel between them. Rogers (2013: 89) points out that English is one of those languages which has a considerable number of consonants in CCs. However, not all sequences of consonants are permitted because of the severe restrictions regarding how many, which and in what order these sounds can occur at the margins of syllables. The study of the possible combinations of sounds in a language is called phonotactics. The phonotactics of languages are dissimilar. Therefore, some sequences of consonants may occur in some languages, but not in others.

O'Connor (1980:46) states that CCs are not permitted to occur at all in some languages (e.g. Piraha and Maori) and in some others (e.g. Vietnamese, Mandarin, Swahili, Cantonese, Tamil and Yaruba), only few ones may occur. Consequently, speakers of these languages may face difficulty in combining two or more consonants together without being separated by a vowel. By contrast, in some other languages (e.g. German and Russia) many sequences of consonants appear together initially and finally. As a result of this, speakers of these languages will not have any difficulty in stringing together two to four consonants in English.

Based on what has been said above, it can be concluded that CCs refer to a group of consonants that occur together in the onset and coda parts of a syllable. To study CCs in two different languages, it is essential to know what CCs are permitted and not permitted in each language. In order to achieve this, this section tries to investigate the possible occurrence of CCs that are found in both languages, English and BK.

### 2.2 The Production of CCs by L2 Learners

Different studies have analyzed the production of English CCs by learners from other languages (Chang, 2004; Nasr, (2011); Jabbari and Samavarchi, 2011; Alotaibi 2021; Khudhair, 2023), but no studies have analyzed the production of CCs by the BK learners of English.

One of the remarkable researches that scrutinized the production of English CCs by Chinese learners was Chang (2004). He studied the difficulties encountered by Chinese English as a foreign language (EFL) learners during the production of CCs. It was found that the errors committed by Chinese L2 learners were due to the interference of their L1 phonological system which permits only one consonant to occur in the onset position of their syllable structure. This is completely in contrast with the English syllable structure that allows one to three consonants in the syllable onset. This difference between the syllable structure of the two languages led Chinese EFL learners to transfer. Accordingly, this caused them to resort to use the phonological processes such as the deletion of a sound cluster in the onset of their L1 syllable structure and the insertion of a vowel between a sequence of consonants to break up the cluster for the simplification of pronunciation.

Nasr (2011) carried out a study on CCs in English to identify whether percentage of CCs errors decreases with the increase of proficiency level or not. The participants were 100

university students selected from English Department-College of Arts-Duhok University. They were from four stages, 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup>. From each stage, twenty-five students were chosen. To record the required data, a production test composed of (25) words covering all types of English CCs was used. After the data analysis, the results showed that the performance of the 4<sup>th</sup> stage students was the best compared to that of other stages. This indicated that the rate of correct production of CCs gets increased with the increase of proficiency level. Similarly, Jabbari and Samavarchi (2011) examined the obstacles that Persian L2 learners faced in producing English CCs. The participants of the study were provided with a production task consisting of a list of words with CCs. Their production of words was recorded and acoustically analyzed. The findings revealed some phonological changes in the performance of L2 CCs by the participants. These changes seemed to be affected by the participants' L1 phonological system. They formed a syllable structure that is similar to the syllable structure in their L1 through the insertion of a vowel in the onset and that is different from the L2 one. On his side, Alotaibi (2021) investigated the effect of the differences of syllable structure between Arabic and English in the production of English CCs. The participants were 12 Saudi EFL learners of English with intermediate proficiency level. After analyzing the obtained data, it was found that Saudi learners' production of English CCs was highly affected by their L1 phonological system. They changed the syllable structure of English to match their L1 phonological system as a result of language transfer.

On his part, Khudhair (2023) conducted a study to see whether learners' production of English CCs is influenced by their L1 phonological system or not. The results showed that learners faced no difficulty in producing those patterns of L2 CCs that are similar to their L1 such as the two-initial and final CCs. This is due to the presence of these two patterns in the syllable structure of learners' L1. However, many of them failed to pronounce three initial and three and four-final CCs correctly. This is because of the absence of these three patterns in the onset and coda position of learners' L1 syllable structure. They used epenthesis to look like the phonological feature of their L1.

In regard to the syllable structure, two hypotheses are proposed. As far as the first one is concerned, Tarone (1978: 23) states that learners reactivate their processes of learning L2 and at the same time attempt to simplify the syllable structure of the L2 via phonological processes of insertion and elision. As for the second one Komos (2006: 7) demonstrates that L2 learners transform their L1 syllable structure to that of the L2. Consequently, this influences their L2 performance.

## **2.3CCs in English**

In general, English CCs can be of two main types: initial CCs and final CCs.

### **2.3.1 Initial CCs**

Roach (2009:57) classifies initial CCs into two subtypes: two-initial CCs and three-initial CCs. The former one is composed of two types. The first type consists of a pre-initial /s/ followed by a small set of initial consonants such as /p, t, k, f, m, n, l, w, j/. These CCs are found in words such as 'smash' /smæʃ/, 'stone' /stəʊn/, 'skirt' /skɜ:t/. The second sort is composed of a set of initial

consonants /p, t, k, b, d, g, f, θ, ʃ, h, v, m, n, l/ followed by one of the post-initial /w, r, j, l/ as in ‘plea’ /pli:/, ‘twist’ /twɪst/, ‘quick’ /kwɪk/, ‘blind’ /blaɪnd/. (see also O’Connor, 1980). Table 1 from Yavaş (2011) shows the possible occurrence of two-initial CCs.

Table 1: Two-Initial CCs in English

	p	t	K	f	M	N	L	w	j	R
p	--	--	--	--	--	--	plʌndʒ	--	pjʊə	prɪnt
t	--	--	--	--	--	--	--	twɪn	tju:n	traɪ
k	--	--	--	--	--	--	klaʊn	kwɪlt	kju:t	kri:p
b	--	--	--	--	--	--	blɪŋk	--	bju:ti	braɪd
d	--	--	--	--	--	--	--	dwel	dju:n	draɪv
g	--	--	--	--	--	--	glæns	--	--	grəʊ
f	--	--	--	--	--	--	fləʊ	--	fju:	fru:t
v	--	--	--	--	--	--	--	--	vju:	--
θ	--	--	--	--	--	--	--	θwæk	--	thrəʊ
m	--	--	--	--	--	--	--	--	mju:t	--
n	--	--	--	--	--	--	--	--	nju:	--
l	--	--	--	--	--	--	--	--	lju:d	--
s	spai	steɪ	skɪn	sfiŋks	smɔ:l	snəʊ	slaɪd	swɪŋ	sju:	--
h	--	--	--	--	--	--	--	--	hju:ɟ	--
ʃ	--	--	--	--	--	--	--	--	--	ʃraɪn

In Table 1, Yavaş (2011: 140) illustrates the permitted two CCs in onset position in English such as affricates /tʃ, dʒ/ that do not occur in onset clusters, voiced fricatives /v, ð, z, ʒ/ and voiced plosive /b, d, g/ cannot serve as second consonant(C2). Additionally, Yavaş (2011: 140) mentions some restrictions in which initial two CCs are disallowed to occur. They are as follows:

- /v/ can only be a first consonant (C1) and it only combines with /j/ as in view /vju:/.
- The approximants /w, r, j/ can occur as C1. The lateral /l/ can precede only /j/ (for some speakers only).
- Fricatives can’t occur as C2 except the /f/ and this can follow only /s/. This can be found in some rare words as in ‘sphere’.
- Stops and nasals can’t serve as C2 except after /s/ as in ‘spend’, ‘smart’.
- /ʃ/ and /s/ are complementary: /ʃ/ can serve as C1 and only before /r/ as in ‘shrink’, whereas /s/ never occurs before /r/.
- The fricative /h/ and the nasal /m/ can serve as C1 only before /j/ (e.g. ‘humid’, ‘mute’).
- /θ/ occurs only before /r/ and /w/ (e.g. throne, thwack).
- Labials /p, b, m/ don’t occur as C1 with the labial approximant /w/.
- Alveolar plosives /t, d/ as C1 can’t cluster with alveolar lateral /l/.

As for three-initial CCs, Revell (2011: 121) demonstrates that this pattern comprises a pre-initial /s/ followed by one of voiceless plosives /p, t, k/ as initials which in turn can be followed

by one of the approximants /l, w, r, j/ as post-initials (Roach, 2009; Yavaş, 2011) as in ‘spring’ /sprɪŋ/, ‘stew’ /stju:/, ‘square’ /skweə/. The possible occurrence of triple onsets can be shown in Table 2. (from Hewings, 2007).

Table 2: Three-Initial CCs in English

Pre-initial	Initial	Post-initial			
		L	R	W	J
S	p	splɪnt	sprɪnt	-----	spju:
	t	-----	strɔ:	-----	stju:pɪd
	k	sklɜrəʊsɪs	skru:	skwi:z	skju:ə

Thus, English allows up to three CCs in the onset.

### 2.3.2 Final CCs

According to Revell (2011:121), final CCs fall into three subcategories: two-final CCs, three-final CCs and four-final CCs. Two-final CCs can be of two types: the first consists of a pre-final consonant /m, n, ŋ, l, s/ followed by a final consonant, any consonants except /w, r, j, h/ such as ‘help’ /help/, ‘mosque’ /mɒsk/, ‘send’ /send /, ‘jump’ /dʒʌmp/, ‘sink’ /sɪŋk/. The second type consists of a final consonant followed by a post-final consonant which forms a small set of consonants /t, d, s, z, θ/ as in words ‘passed’ /pa:st/, ‘cleaned’ /kli:nd/, ‘drops’ /drɒps/, ‘walls’ /wɔ:lz/, ‘fifth’ /fɪfθ/ (see also Roach, 2009). It is worth mentioning that the post-final consonants /s, z, t, d, θ/ are treated as separate morphemes since they are suffixes used differently. For example, the suffix (s) forms plurality, third person singularity, possessiveness and ordinality and it is pronounced in three different forms such as /s/, /z/, and /ɪz/ depending on the preceding consonants as in ‘mops’ /mɒps/, ‘hand’ /hændz/ and ‘matches’ /mætʃɪz/ respectively. The (ed) suffix is used to form the past tense. Finally, the suffix (th) is added to words to change an adjective into a noun as in ‘wide’ /waɪd/, ‘width’ /wɪdθ/, ‘long’ /lɒŋ/, ‘length’ /leŋθ/.

As far as three CCs in the coda, Baker and Hengeveld (2012:326) state that, in English, a coda can consist of three consonants (e.g. ‘guests’ /gests/). In this regard, Roach (2009: 59) mentions two types of this pattern; the first one is identified as (pre-final + final + post-final) as shown in words ‘crisps’ /krɪspz/, ‘bends’ /bendz/, ‘prompt’ /prɒmpts/, ‘twelfth’ /twelf θ/ and ‘sink’ /sɪŋk/. As for the second type, it comprises a final + post-final1 + post-final2. In this form, no pre-final consonant exists. Moreover, consonants of post-final2 consist of one set of /t, d, s, z, θ/ as illustrated in words such as ‘text’ /tekst/, ‘fifths’ /fɪfθs/, ‘lapsed’ /læpst/, ‘breadths’ /bredθs/, and ‘gifts’ /gifts/.

With regard to four-final CCs, Roach (2009. 59f), states that this pattern consists of a pre-final consonant plus a final which in turn followed by post-final1 and post-final2 as shown in words ‘twelfths’ /twelfθs/, ‘tempts’ /temptz/ and ‘glimpsed’ /glɪmpst/. Since a few words require a different analysis, this leads Roach (2009: 60) to indicate another pattern of four-final CCs which is characterized as a final consonant followed by post-final1 + post-final2 + post-final3. This pattern shows that no pre-final constant is allowed as illustrated in words such as ‘sixths’ /sɪksθs/ and ‘texts’ /tekstz/.

In a nut shell, it can be said that English has nine types of CCs. Moreover, unlike the initial CCs, the possible occurrence number of final CCs can be increased by the addition of the suffixes /t, d, s, z, θ/. Although English has fewer number of four-final CCs compared with other clusters in both parts of the syllable, they are found such as the clusters /-mpts/ and /-lfθs/ in ‘tempts’ and ‘twelfths’ respectively. Usually, these clusters are reduced in connected speech to /-mts/ and /-lfs/.

## 2.4CCs in BK

CCs are also prevalent in BK such as the clusters /kr-/ , /str-/ and /-xt/ in the words /kret/ ‘ugly’ /stran/ ‘song’ and /text/ ‘bed’ respectively (Ali, 2005). Ali and Abdullah (2019: 101) point out that like many other languages, BK permits CCs in onset and coda of the syllable. Thus, CCs in BK fall into two major types: initial and final which are as follows:

### 2.4.1 initial CCs

According to Hasan (2008: 5) and Nasr (2011:56f) the possible occurrence of sequences of initial two CCs in the syllable onset are presented in Table 3.

	z	k	n	l	r	j	t	ʒ	v	ʃ
b	/bzm/ goat	/bkuz/ killer				/bjav/ domain				
k			/kner/ tree							
p				/plmg/ tiger						
d					/drɛw/ lie					
s			/snor/ frontier				/stand/ occupied			
f					/fri:/ flew					
v						/vjan/ love				
ʃ			/ʃni:n/ harvest		/ʃri:k/ stingy	/ʃja/ mountain				
m					/mri:/ dead			/mʒar/ topic		
l									/lvok/ vigorous	
r								/rʒi:n/ spill		
w							/wtar/ speech			/wʃe/ word

Table 3: initial two CCs in syllable onset

As far as three-initial CCs are concerned, Ali and Abdullah (2019: 105) emphasize that in BK, this pattern of cluster can appear in very few and rare words. They provide the following examples:

Examples in Kurdish	IPA	Meaning
1- Fricative + plosive + flap	/str-/	stran/stran/ ‘song’
	/str-/	stri/stri:/ ‘thorn’

## 2.4.2 Two-Final CCs

	n	l	r	t	s	k	x	g	dʒ	ʃ	m	v
q	/teqn/ mud											
b		/zɪbl/ manure										
p			/kɪpr/ sulfur									
ʃ				/ɪʃt/ spilt								
f	/kɪfn/ shroud				/mɪfs/ colander							
v		/kavl/ a devastated area	/brvr/ axe									
ʃ						/kɛʃk/ spoon						
n							/ʃɛnx/ to kill	/dʒɛn/ war	/ben/ anaesthetiz e			
r						/strk/ a type of kurdish herb			/xɛrdʒ/ to spend money	/kɪʃ/ belly	/gɛrm/ hot	
l						/sɪlk/ chard					/hɪlm/ stream	
j	/dejn/ debt		/qejr/ spinster			/dajk/ mother						/pejv/ word

According to Hasan (2008: 6f), the possible sequences of consonants that can appear together in the syllable coda are presented in Table 4.

Based on what has been said above, it is concluded that in Kurdish Bahdini only three types of CCs can be found. Accordingly, the occurrence of any CCs in both initial and final positions of the syllable are disallowed with the exceptions of the ones listed above.

## 3. What is Transfer?

Linguists interested in second language acquisition (SLA) use different terms to refer to the same linguistic phenomenon among them are interference (Weinreich, 1953), mother tongue influence (Corder, 1983), language transfer (Odlin, 1989; Gass & Selinker, 2008;), transfer analysis (James, 1994), transfer (Hudson, 2000; Heine & Kuteva, 2005; Brown, 2014; Yule, 2017), cross linguistic influence (Jarvis, 2002; Kellerman & Sharwood, 1986; Kellerman, 1995; Mcmanus, 2022), code copying (Johanson, 2002) and language mixing (Odlin, 2003). Despite the terminological diversity aforementioned, in the current study the term transfer is used as it is considered a conventional term used in contemporary L2 studies. Transfer has been defined by many linguists under different terminologies. Weinreich (1953: 1) under the term of interference views transfer as those deviation instances that result from the rules of the linguistic system of both languages that occur in the performance of bilinguals due to their familiarity with two or more languages. Besides, Osgood (1953: 520) defines it in the field of language learning as the



impact of the prior activity on the learning of the later task. On his part, Lott (1983: 213) considers transfer as those errors that learners make in the use of the L2 resulting from the effect of the L1. Odlin (1989: 27) introduces the most comprehensive and widely accepted definition of transfer as the influence resulting from the similarities and differences between the L2 and any other language that has been acquired previously. Hudson (2000: 169) considers transfer as the effect of the previous knowledge on the acquisition of the subsequent knowledge (see also Ausubel, 1963; Jarvis & Pavlenko, 2008). To Brown (2014: 94), transfer refers to the carryover of the earlier knowledge or performance to the following learning. Lastly, Yule (2017: 213) views transfer as the use of linguistic elements such as sounds, structures and expressions from the L1 to L2 when performing it.

### 3.1 Types of Transfer

In this section, a detailed presentation is given to the classification of transfer taking some factors into consideration such as transfer directionality, transfer effects and the linguistic levels at which transfer occurs.

Concerning directionality, it needs to be stated that studies that investigated transfer did not only focus on the influence of L1 on L2 because it is unnatural to assume that the L2 in all cases is affected by the L1 (Moattarian, 2003). Based on this view, a clear distinction is made between two kinds of directions of transfer by Jarvis and Pavlenko (2008): the forward transfer and the reverse transfer. The former occurs when the prior learned language influences the subsequent learning one (L1→L2); whereas the latter occurs when the new learned language influences the prior learned one. In other words, the influence takes place in the opposite direction (L2→L1). Under the term of interference, Ellis, et al (1984: 49) and Gass and Selinker (2008: 94) refer to the two aforementioned kinds of direction as proactive inhibition and retroactive inhibition respectively.

Transfer is also classified according to the influence it possesses on the new learning language (Brown, 2014). Brown divides transfer into positive and negative (view also, Odlin, 2001). The former occurs when the learner's previous knowledge results in learning the following task correctly i.e., when a prior unit or structure of the L1 benefits the current learning subject matter of the L2 with no errors. In this regard, Hudson (2000: 169) demonstrates that positive transfer occurs when the features of the L1 are the same to those of the L2. He adds to say that although this type of transfer helps learners successfully in learning L2, the results are less discussed. Consequently, they usually go without noticing. Negative transfer occurs when learner's prior knowledge hinders the performance of his/her next task (Brown, 2014), i.e. when an earlier learned item in the L1 is applied incorrectly to a subsequent item in the L2. This traces back to the dissimilar linguistic features especially between the two completely different languages (Yule, 2017). Additionally, Yule clarifies that negative transfer occurs more commonly during the early stages of L2 learning, but it decreases gradually when the learner makes progress and becomes more familiar with L2. Hudson (2000: 170) refers to this type of transfer as 'interference' since it leads to errors in L2. To sum up, it can be said that positive transfer

facilitates the process of learning L2. By contrast, negative transfer hinders this process as it leads to the production of errors. Consequently, it delays the process of SLA. As for the linguistic levels at which transfer occurs, some earlier studies in 1980s and 1990s noticed that some subsystems of language such as lexicon and morphology are more exposed to the effects of transfer than the others such as syntactic which is considered less problematic for L2 learners (Håkansson, 1995). However, the subsequent works emphasized that all linguistic elements are vulnerable to be transferred to L2. Thus, this phenomenon can occur at all linguistic levels such as phonological, lexical, syntactic, semantic and even pragmatic (Corder, 1971, 1981; Ellis, 1985; and Odlin 1989). In the current study only the phonological level will be analysed (for a detailed explanation of other linguistic levels, see Jarvis & Pavlenko, 2008). In general, the phonological transfer is used to refer to how a person's knowledge of the sound system of a particular language can influence his/her perception as well as production of the speech sounds in another different language (Jarvis & Pavlenko, 2008). In this sense, any cross linguistic comparison of the sound system of the L1 and L2 needs to encompass a description of both phonetics and phonology of the L1 and L2 (Briere, 1968, cited in Odlin: 1989). Phonological transfer can occur at segmental as well as suprasegmental level. It is believed that negative phonological transfer occurs when L2 learners replace the correct sound patterns of the L2 with the incorrect ones of their L1. This is considered the major source of pronunciation errors.

#### 4. Syllable Structure in English and Kurdish

To investigate the pronunciation problem of English CCs that BK learners confront, it is necessary to shed light on the syllable structure of both languages so as to show the main points of similarities and differences between them.

##### 4.1 English Syllable Structure

A syllable is the minimum unit of speech. Every utterance must have at least one syllable. For descriptive purposes, a syllable can be divided into two main constituents: onset and rhyme. Any consonants occurring before the rhyme constitute the onset of the syllable. The rhyme of a syllable can be subdivided into the nucleus/peak which is the vowel and the coda which consists of any consonants that follow the nucleus/peak (Ladefoged & Johnson, 2015 and Davenport & Hannahs, 2020, see also Giegerich, 1992 Carr, 2013). In the word 'bile', for example, the first segment /b/ forms the onset (O) of the syllable. The diphthong /ai/ constitutes the nucleus (N) and the consonant /l/ constitutes the coda /C/. The two constituents (N) and (C) form the rhyme (R) /ail/ (Carr, 2013). The syllable as a tree structure is represented as follows where the Greek 'σ' (sigma) stands for syllable:

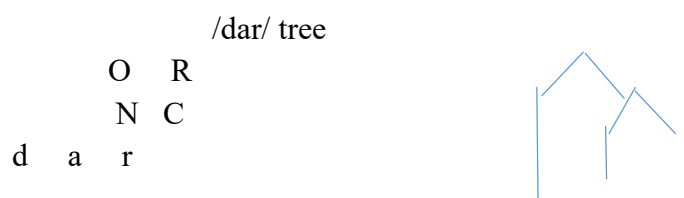


Besides, the syllable in English can consist of up to three consonants in the onset position as in ‘street’ and this onset can be any consonant except /ŋ/ and /ʒ/; whereas four consonants can occur in the coda position as in ‘twelfths’. According to non-rhotic accent, BBC pronunciation, the coda can be any consonant except /w/, /r/, /h/ and /j/. Thus, the maximum syllable structure in English is (C)(C)(C)V(C)(C)(C), where the segments between parentheses are optional (Roach, 2009: 58f). Collins and Mees (2008:74) demonstrate that a syllable that ends in a consonant such as ‘ant’ is termed as a closed syllable while the one that ends in a vowel like ‘bee’ is called an open syllable. Yavaş (2011: 139f) provides the following list of the possible forms of syllable structure in English (see also Collins and Mees: 2008).

- V as in ‘are’ /ɑ:/ - CV as in ‘bee’ /bi:/
- VC as in ‘own’ /əʊn/ - VCC as in ‘aunt’ /ɑ:nt/
- CVC as in ‘bin’ /bɪn/ - CVCC as in ‘dance’ /dɑ:ns/
- CCV as in ‘flee’ /fli:/ - CCVC as in ‘climb’ /klaɪm/
- CCVCC as in ‘skills’ /skɪlz/ - CVCCC as in ‘bends’ /bendz/
- VCCC as in ‘ants’ /ænts/ - CCCV as in ‘straw’ /strɔ:/
- CCCVC as in as in ‘street’ /stri:t/ - CCCVCC ‘splint’ /slɪnt/
- CCVCCC as in ‘crisps’ /krɪspz/ - CVCCCC as in ‘sixths’ /sɪksθs/
- CCCVCCC as in ‘sprints’ /sprɪnts/ - CCVCCCC as in ‘prompts’ /prɒmpts/

#### 4.2 BK Syllable Structure

The syllable structure in BK is somewhat simple compared to that of English. Generally, the onset in BK is composed of one to two consonants that precede the rhyme (Hasan, 2008). However, Ali and Abdullah (2019: 194) explain that in BK the onset is made up of one to three consonants. The rhyme is further divided into two constituents: nucleus/ peak and coda. The nucleus is an obligatory part and is occupied by a vowel. The coda can consist of only one to two consonants occurring after the nucleus (Ways, 1984). Thus, the maximum syllable structure in BK consists of (C)(C)(C)V(C)(C). The following tree structure illustrates the BK syllable structure of the word /dar/ tree:



Ali and Abdullah (2019: 194) lists the possible forms of Kurdish syllable structure. They are as follows:

Kurdish Examples	IPA	Meaning in English
1- V such as	e	/ɛ/ ‘yes’
2- CV such as	ba/ba/	‘wind’
3- VC such as	av/av/	‘water’
4- CVC such as	ber/ber/	‘stone’

- 5- CCV such as                      trî/tri:/‘grapes’  
 6- VCC such as ærd/erd/ ‘floor’  
 7- CCVC such as brîn/bri:n/ ‘cut’  
 8- CVCC such as dest/dest/‘hand’  
 9-CCVCC such as stêng/steng/‘wasp’  
 10- CCCV such as strî/stri:/‘thorn’  
 11- CCCVC such as                      stran                      /stran/‘song’

In conclusion, it can be said that in both languages the onset and coda CCs are permitted to occur. In English, one to three consonants can occur word initially and one to four finally. English has 18 forms of structure. By contrast, syllable structure in BK is relatively simple compared to that of English. Generally, the onset and coda parts of the Kurdish syllable consist of only two consonants. However, in Bk the onset constituent can consist of one to three consonants. BK takes 11 forms. Additionally, the aforementioned maximum syllable structures in both languages are logical possibility but no words can be found in the two languages with these forms.

## 5. Methodology

This section deals with the procedures followed in conducting the study. It includes a description of the study population, speech materials, the method used for data collection and the test procedure.

### 5.1 Participants

The participants of the current study consist of 50 (25 males and 25 females) EFL undergraduate native BK learners of English. They were students from English Department, College of Languages, University of Duhok during the academic year of 2022-2023. 13 males and 12 females were from the second stage; whereas 12 males and 13 females were from the fourth stage. They are chosen randomly without taking their scientific level into consideration so as not to affect the results of the study. The age of the students ranges between 18-22 years old. All of them had spent at least 12 years learning English before joining college. They were selected out of nearly 300 students, namely second and fourth stage students. None of them had been to an English speaking country and did not have any previous exposure and communication with native speakers of English. Those who have been in one of the English-speaking countries for some time are excluded because this will affect the results of the study. Moreover, those students whose mother tongue is not BK are also eliminated. Table 5 shows the main data on the population of the study.

**Table 5: The Participants of the Study**

Level	Gender		Total
	Males	Females	
Second year	13	12	25
Fourth year	12	13	25

Total	25	25	50
-------	----	----	----

## 5.2 Speech Material

In the field of scientific research, researchers employ different kinds of speech materials to collect data. For example, Hassan (2014), Ghounane (2018) Farrah and Halahlah (2020) and Jahara and Abdelrady (2021) conducted recorded production tests and questionnaires as instruments to analyze the pronunciation errors committed by English language students; whereas Haji and Mohammed (2019) rely only on a recorded production test as a tool to investigate the pronunciation of English monophthongs by Kurdish EFL University students. In this study, the method used for collecting data is a production test which is designed to examine the production of English CCs by BK learners of English at university level. The test is a read speech of (40) words which have been carefully designed for this purpose. The wordlist includes all the types of CCs of English. (15) words have initial CCs and (25) have final CCs. Initial CCs have three patterns: pre-initial /s/+initial /p, t, k, m, n, l, w, j, f/, initial /p, t, k, b, d, g, m, n, f, v, h, Ø, ʃ/+post-initial /l, w, r j/ and the three CC pattern pre-initial /s/+initial /p, t, k/+post-initial /l, w, r, j/. Table 6 presents the initial CCs wordlist in which five words are chosen for each pattern.

**Table 6: Initial Consonant Clusters Word list**

Types of Consonants Initially	Clusters	Selected Examples
Two initial-consonant	-Pre-initial /s/ + initial /p, t, k, m, n, l, w, j, f/	scare /skeə/ swear /sweə/ snow /snəʊ/ spend /spend/ smell /smel/
Three initial-consonant	- Initial /p, t, k, b, d, g, m, n, f, v, h, Ø, ʃ/+post-initial /l, w, r j/	twice /twais/ queen /kwi:n/ mute /mju:t/ bribe /braɪb/
	- Pre-initial /s/ + initial /p, t, k/+post-initial /l, w, r, j/	fly /flaɪ/ splash /splæʃ/ squash /skwɒʃ/ scratch /skrætʃ/ stupid /stju:pid/ straw /stroʊ/

Final CCs have five patterns: two CCs included pre-final /m, n, ŋ, l, s/+any final consonant except /w, r, j, h/ and any final consonant except /w, r, j, h/+post-final /t, d, s, z, Ø/, three CCs patterns are pre-final /m, n, ŋ, l, s/+any final consonant except /w, r, j, h/+post-final /t, d, s, z, Ø/ and any final consonant except /w, r, j, h/ + post-final 1+post-final 2 and four CCs pattern include re-final) /m, n, ŋ, l, s/+any final consonant except /w, r, j, h/ or post-final 1+post-

final 2 (post-final 3). Table 7 illustrates the final CCs patterns wordlist in which five words are chosen for each pattern.

**Table 7: Final Consonant Clusters Wordlist**

Types of Final Consonants	Clusters	Selected Examples
Two final-consonant	- Pre-final /m, n, ŋ, l, s/ + any final consonant except / w, r, j, h/  - Any final consonant except / w, r, j, h/ + post-final /t, d, s, z, θ/	jump /dʒʌmp/ bent /bent/ sink /sɪŋk/ melt /melt/ dust /dʌst/  climbs /klaɪmz/ axe /æks/ eighth /eɪθ/ hugged /hʌgd/ wrapped /ræpt/
Three final-consonants	- Pre-final /m, n, ŋ, l, s/ +any final consonant except /w, r, j, h/ + post-final /t, d, s, z, θ/  - Any final consonant except /w, r, j, h/ +post-final 1 +post-final 2	grasped /gra:spt/ strengths /streŋθs/ stamps /stæmps/ bonds /bɒndz/ twelfth /twelfθ/ next /nekst/ fifths /fɪfθs/ lapsed /læpst/ breadths /bredθs/ gifts /ɡɪfts/
Four final-consonants	- Pre-final) /m, n, ŋ, l, s/ + any final consonant except /w, r, j, h/ or + post-final 1 + post-final 2 (post-final 3)	glimpsed /ɡlɪmpst/ texts /teksts/ twelfths /twelfθs/ tempts /temptst/ prompts /prɒmpts/

The selected words are common and familiar to the participants. The test words are extracted mainly from O'Connor (1980), Rogers (2000), Roach (2009) and Revel (2011).

### 5.3 Procedures of Data Collection

In this study, a production test was used as a tool for gathering the data. The test words were randomly arranged, presented in a paper to the participants to read aloud and their production was recorded. For the recording process, an electronic device of a Samsung Galaxy A33 smart phone was used because the quality of the sound of this tool was clear and audible. Before the test was distributed over the participants, it had been given to a group of three

specialists in the field of phonetics and phonology as jury members (see appendix 1). Following the suggestions of the members of the jury, some changes have been made. After this scientific step, the process of data collection started. The sound recording process of the participants was taken place in one of the teachers' quiet room at the English Language Department-College of Languages-Duhok University. The process of collecting the required data took about one month starting from the 10th of March till 10th of April 2023. It is worth mentioning that the students, in general, were not cooperative during the process of data collection. Consequently, the researcher faces some difficulties in collecting the data. For example, some students, especially, females, refused to record their voice reading the designed words. Some others were not ready to spend their break time reading the wordlist, whereas some others were reluctant whether to participate or not. However, in coordination with the head of English department and some teachers, this issue was overcome and solved. During their free time, the participants were summoned individually to record their production of the test words. Moreover, they were not told about the main purpose behind the test, but were informed that their speech was to be taken for a scientific research and their approval was granted. Additionally, they were informed that there was no need to worry about making errors while reading the words and at the same time informed that their voice recording would be kept anonymous. Before the recording began, each participant had been given enough time to take a look at the words so as to read them smoothly and at normal ease with no pause or hesitation. The participants were asked to read the wordlist clearly and once only. Moreover, they were requested to leave a pause between words while reading the words. In sum, (67) recordings were conducted by the researcher, but among these recordings only (50), 25 from each stage, were taken and used for data analysis. The remaining (17) recordings were excluded for different reasons. For example, in some recordings participants skipped some words. In some others, the recording was noisy and unclear due to the interrupters or the words had been pronounced terribly. Finally, their recordings were listened to and transcribed by the researcher.

#### **5.4 Procedures of Data Analysis**

After the collection of data was completed, it underwent a phonological analysis. The data of each participant was listened to more than one when necessary and transcribed using IPA by the researcher. It was checked for the correct production of CCs. Correct productions are given value (2) and (1) to the incorrect one. The collected data was also given to two other phonologists for checking the correct production of CCs. Inter-transcriber correlation was measured to show the reliability of the analysis. To check the reliability between the researcher's transcription and the other two transcribers (see appendix 2), statistically it has been measured by Cronbach's Alpha coefficient method that is used to measure the internal consistency among the items of content. It ranges from 0.0 to 1.0 as (Cohen et al. 2007). The results of Cronbach's alpha of CCs for both second and fourth levels are illustrated in Table 8.

Table 8: Reliability Statistics: Cronbach's Alpha Coefficient on Standardized Items

Stage	Consonant Clusters	Number of Transcribers
Second	0.9322	Three
Fourth	0.9186	

The table shows that the transcribers' procedures for the test words were consistent because the reliability scale among them scored higher rates. Then the rates of correct and incorrect productions are compared across position (initial and final), cluster complexity: the number of consonants in the CC (two, three and four) and stages (second and fourth).

## 6.Results

This section is devoted to the results of the production of all types of CCs. First, descriptively, the results of the production of initial and final clusters are indicated to identify whether the speakers' performance in initial or final clusters is better. Second, the results of the effect of cluster complexity in the speakers' production to identify whether the speakers are good at two, three or four CCs. Finally, the results of the CCs production of second year are compared to those of the fourth year to identify whether the study stage have an effect on CCs production by the speakers.

The results are reported via showing the percentage of the correct production of each the designed item of CCs. After that, the total percentage of each type of CCs is taken out. Following this, the mean of the total percentages between the whole type of CCs is calculated. Finally, these total percentages of both 2<sup>nd</sup> and 4<sup>th</sup> learners' performance of CCs are compared and contrasted across position, number of consonants in the cluster and stages. Statistically, to determine whether the differences between the sub and main types of CCs in the performance of 2<sup>nd</sup> and 4<sup>th</sup> years are significant or not, independent samples t. Test are conducted.

### 6.1 Consonant Clusters in Initial and Final Positions

In general, the results reveal that the speakers' performance in the production of initial CCs is better than that in the final position. Table 9 illustrates the performance of the speakers in initial CCs in second and fourth years respectively.



			Second year						Fourth year					
ST.	Test Words	Tran.	Correct		Total	Incorrect		Total	Correct		Total	Incorrect		Total
			N	%		N	%		N	%		N	%	
Two-Initial Clusters	scare	/skeə/	24	96.0%	94.4%	1	4.0%	5.6%	25	100.0%	99.2%	0	0.0%	0.8%
	swear	/sweə/	21	84.0%		4	16.0%		24	96.0%		1	4.0%	
	snow	/snəʊ/	24	96.0%		1	4.0%		24	96.0%		1	4.0%	
	spend	/spend/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
	smell	/smel/	20	80.0%		5	20.0%		25	100.0%		0	0.0%	
	twice	/twais/	23	92.0%		2	8.0%		25	100.0%		0	0.0%	
	queen	/kwi:n/	24	96.0%		1	4.0%		25	100.0%		0	0.0%	
	mute	/mju:t/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
	bribe	/braɪb/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
	fly	/flaɪ/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
Three-Initial Clusters	splash	/splæʃ/	24	96.0%	92.0%	1	4.0%	8.0%	19	76.0%	91.2%	6	24.0%	8.8%
	squash	/skwɒʃ/	21	84.0%		4	16.0%		23	92.0%		2	8.0%	
	scratch	/skrætʃ/	22	88.0%		3	12.0%		22	88.0%		3	12.0%	
	stupid	/stju:pid/	23	92.0%		2	8.0%		25	100.0%		0	0.0%	
	straw	/strɔ:/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
Mean			93.2%		6.8%		95.2%		4.8%					

Table 9: Results of Initial CCs in 2<sup>nd</sup> and 4<sup>th</sup> years

Table 9 indicates that the speakers have a good rate of correct production of initial CCs: 93.2 for second year and 95.2 for fourth year, while low rate of incorrect productions: 6.8 for second year and 4.8 for fourth year. Similarly, the speakers have also a good rate of correct production of final CCs, but it is lower than that of initial CCs. Table 10 illustrates the performance of the speakers in final CCs in second and fourth years respectively.

			Second Year						Fourth Year					
Subtype	Test Words	Transcription	Correct		Total	Incorrect		Total	Correct		Total	Incorrect		Total
			N	%		N	%		N	%		N	%	
Two-Final Clusters	Jump	/dʒʌmp/	24	96.0%	84.8%	1	4.0%	15.2%	24	96.0%	88.4%	1	4.0%	11.6%
	Bent	/bent/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
	Sink	/sɪŋk/	21	84.0%		4	16.0%		25	100.0%		0	0.0%	
	Melt	/melt/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
	Dust	/dʌst/	25	100.0%		0	0.0%		25	100.0%		0	0.0%	
	climbs	/klaɪnz/	20	80.0%		5	20.0%		16	64.0%		9	36.0%	
	Axe	/æks/	22	88.0%		3	12.0%		23	92.0%		2	8.0%	
	eighth	/eɪtθ/	14	56.0%		11	44.0%		11	44.0%		14	56.0%	
	hugged	/hʌgd/	18	72.0%		7	28.0%		23	92.0%		2	8.0%	
	wrapped	/ræpt/	18	72.0%		7	28.0%		24	96.0%		1	4.0%	
Three-Final Clusters	grasped	/graːspt/	14	56.0%	73.2%	11	44.0%	26.8%	17	68.0%	80.0%	8	32.0%	20.0%
	strengths	/streŋθs/	6	24.0%		19	76.0%		15	60.0%		10	40.0%	
	stamps	/stæmps/	25	100.0%		0	0.0%		24	96.0%		1	4.0%	
	bonds	/bɒndz/	25	100.0%		0	0.0%		18	72.0%		7	28.0%	
	twelfth	/twelfθ/	21	84.0%		4	16.0%		23	92.0%		2	8.0%	
	Next	/nekst/	24	96.0%		1	4.0%		24	96.0%		1	4.0%	
	fifths	/fɪfθs/	13	52.0%		12	48.0%		17	68.0%		8	32.0%	
	lapsed	/læpst/	16	64.0%		9	36.0%		22	88.0%		3	12.0%	
	breadths	/bredθs/	15	60.0%		10	40.0%		15	60.0%		10	40.0%	
	Gifts	/grɪfts/	24	96.0%		1	4.0%		25	100.0%		0	0.0%	
Four-Final Clusters	glimpsed	/glɪmpst/	14	56.0%	64.8%	11	44.0%	35.2%	21	84.0%	76.8%	4	16.0%	23.2%
	Texts	/teksts/	13	52.0%		12	48.0%		16	64.0%		9	36.0%	
	twelfths	/twelfθs/	14	56.0%		11	44.0%		16	64.0%		9	36.0%	
	tempts	/temptst/	21	84.0%		4	16.0%		22	88.0%		3	12.0%	
	prompts	/prɒmpts/	19	76.0%		6	24.0%		21	84.0%		4	16.0%	
Mean			74.3%			25.7%			81.7%			18.3%		

Table 10: Results of Final CCs in 2<sup>nd</sup> and 4<sup>th</sup> years

Table 10 indicates that the speakers have a good rate of correct production of final CCs: 74.3 for second year and 81.7 for fourth year, while lower rate of incorrect productions: 25.7 for second year and 18.3 for fourth year. Some speakers were not able to produce the clusters correctly due to the phonological processes such as insertion of a vowel, deletion and substitution of sounds. This is done by learners so as to simplify the pronunciation of CCs as shown in words: *hugged*

/hɑːɡɪd /, eighth /eɪt/ and climbs /klaɪms/ respectively and in grasped /graːspɪd/, next /nekest/, twelfth /twelfs/ and breadths /bredθs/. Thus, by comparing the mean rates of correct productions of initial and final CCs, it can be observed that the production of initial CCs is better than that of final.

The results in Table 9 and 10 show that the performance of 2<sup>nd</sup> year in initial CCs pattern is better compared to that of final CCs pattern. However, statistically no significant differences are seen between the two patterns since the p (sig) is more than the significance level ( $p.0.30 > 0.05$ ) as illustrated in Table 11 below.

Table 11: Results of the independent samples test of initial and final CCs-2<sup>nd</sup> year.

CCs	Stage	N.	Mean	Std.	Test	P(sig)
Initial CCs	2nd	25	1.92	0.08	-1.03	0.30
Final CCs	2nd	25	1.77	0.20		

Similarly, although the rate production of 4<sup>th</sup> year in initial CCs pattern is better than the final CCs pattern, statistically no significant differences are observed between the two main types as the p (sig) is higher than the significance level ( $p.0.35 > 0.05$ ) as indicated in Table 12 below.

Table 12: Results of the independent samples test of initial and final CCs-4<sup>th</sup> year.

CCs	Stage	N.	Mean	Std.	Test	P(sig)
Initial CCs	2nd	25	1.95	0.08	0.92	0.35
Final CCs	2nd	25	1.81	0.12		

## 6.2 Consonant Clusters Complexity

The results presented in tables 9 and 10 show that the number of incorrect productions increases as the number of consonants increases in both initial and final clusters. The statistical one-sample test is performed to identify the patterns of CCs for both 2<sup>nd</sup> and 4<sup>th</sup> years in terms of complexity. The results of the test are presented in Table 13.

Table 13: Results of the one-sample test for comparing the mean, std and t. value of patterns of CCs in terms of complexity in 2<sup>nd</sup> and 4<sup>th</sup> year students.

Initial CCs	Stage	N.	Mean	Std.	Test	P (sig)
Two-initial	2 <sup>nd</sup>	25	1.93	0.07	127.72	0.001
	4 <sup>th</sup>	25	1.99	0.02	359.71	0.001
Three-initial	2 <sup>nd</sup>	25	1.92	0.11	83.13	0.001
	4 <sup>th</sup>	25	1.91	0.15	62.23	0.001
<b>Final CCs</b>						
Two-final	2 <sup>nd</sup>	25	1.84	0.12	71.35	0.001
	4 <sup>th</sup>	25	1.88	0.09	95.48	0.001
Three-final	2 <sup>nd</sup>	25	1.73	0.15	55.02	0.001
	4 <sup>th</sup>	25	1.80	0.15	57.89	0.001
Four-final	2 <sup>nd</sup>	25	1.64	0.29	28.38	0.001
	4 <sup>th</sup>	25	1.76	0.20	42.99	0.001

Table 13 indicates that the four-final CCs pattern is the most difficult to be pronounced correctly compared to those of the patterns for the 2<sup>nd</sup> year students. This is because the t. value of this pattern is the lowest (28.38) compared to those of other patterns. Also, the standard deviation (std.) of this pattern is the highest (0.29) compared to those of other forms of CCs. This indicates that the higher the standard deviation of the pattern of CCs is, the more difficult it is. Additionally, the mean which this pattern scored is the lowest, which is (1.64), among the means of other patterns. The other patterns of CCs namely three and two-final and three and two-initial come after one another in terms of pronunciation difficulty. This is because the t. values of these patterns of CCs scored 55.02, 71.35, 83.13 and 127. 72 respectively.

Similarly, the results of the one-sample test for the 4<sup>th</sup> year students indicate the four-final CCs pattern is the most difficult one with the least t. value (42.99) compared to those of other patterns of CCs. Moreover, the (std.) of this pattern scored 0.20 which is the greatest among those of other CCs patterns. With regard to the mean of this pattern, it has the lowest mean (1.76) in comparison with the means of other CCs patterns. The other forms of CCs such as three-final and three-initial, two-final and two initial follow each other in terms of pronunciation difficulty with the t. value 57.89, 62.23, 95.48 and 359.71 respectively.

The table 13 above indicates that the three-initial pattern of CCs is more difficult than the two-initial one for both 2<sup>nd</sup> and 4<sup>th</sup> year students. Also, the four-final CCs pattern is the most problematic for both groups and the two-initial pattern is the least difficult for both 2<sup>nd</sup> and 4<sup>th</sup> year students. Finally, three-final CCs pattern is more difficult than two-final one for both groups. This proves that the errors of producing CCs get increased with the increase of the number of CCs in both initial and final positions.

### 6.3 Consonant Clusters in Second and Fourth Stages

The results in tables 9 and 10 show that, generally, 4<sup>th</sup> year students pronounced all types of CCs in initial and final positions better than the 2<sup>nd</sup> year students. However, the statistical analysis of the independent samples test indicated that no significant differences are seen between the two independent groups because the P (sig) of the aforesaid two main types of CCs which are comprised of 0.30 and 0.35 respectively are greater than the significance level ( $p = 0.30$  and  $0.35 > 0.05$ ) as shown in Table 14.

Table 14: Results of the independent samples test of initial and final CCs- 2<sup>nd</sup> and 4<sup>th</sup> year students.

CCs	Stage	N.	Mean	Std.	Test	P (sig)
Initial CCs	2 <sup>nd</sup>	25	1.92	0.088	-1.03	0.30
	4 <sup>th</sup>	25	1.95	0.080		
Final CCs	2 <sup>nd</sup>	25	1.77	0.20	-0.92	0.35
	4 <sup>th</sup>	25	1.81	0.12		

The table shows that the mean and std. of 4<sup>th</sup> students are better than those of the 2<sup>nd</sup>, but the p values do not reach the significance level. Furthermore, the initial two and three CCs are

compared across stages. The results indicate that there is a significance difference between second and fourth years in two CCs as the P value is 0.00. while, no statistically differences between the two stages are observed in three CCs and in all types of final CCs. Table 15 presents the main results of the comparison.

Table 15: Results of the independent samples test of initial and final CCs- 2<sup>nd</sup> and 4<sup>th</sup> year students.

CCs Types	Sub-type	Stage	Mean	Std.	T. Test	P. (sig.)
Initial CCs	Two-initial CCs	2 <sup>nd</sup>	1.94	0.08	-2.77	0.00
		4 <sup>th</sup>	1.99	0.02		
	Three-initial CCs	2 <sup>nd</sup>	1.92	0.10	-0.04	0.96
		4 <sup>th</sup>	1.92	0.12		
Final CCs	Two-final CCs	2 <sup>nd</sup>	1.84	0.12	-1.10	0.27
		4 <sup>th</sup>	1.88	0.09		
	Three-final CCs	2 <sup>nd</sup>	1.73	0.15	-1.53	0.13
		4 <sup>th</sup>	1.80	0.15		
	Four-final CCs	2 <sup>nd</sup>	1.64	0.29	-1.68	0.09
		4 <sup>th</sup>	1.76	0.20		

The table shows that the performance of 4<sup>th</sup> year is better than that of the 2<sup>nd</sup> year in all types of CCs, however statistically, the difference is only significant in two initial CCs.

## 7 Discussion

Regarding the first question addressed in the present study whether BK learners of English are able to pronounce CCs in English or not, the results revealed that English CCs are not produced 100% correctly by the participants but the rate of the correct production is high. Second and fourth stages produce initial CCs better than the final ones. Moreover, the performance of the participants in producing two-initial CCs pattern is better in comparison to that of the three-initial CCs. Similarly, two-final CCs pattern is pronounced better than three and four-final CCs patterns. This traces back to the fact that two-initial and two-final CCs patterns are found in the onset and coda position of the BK syllable structure. The high rate of correct production of two-initial and final CCs patterns is the result of positive transfer which helps BK learners in producing the two aforesaid patterns of CCs successfully as stated by Hudson (2000). Additionally, the results showed that some participants failed in producing three-initial and three and four-final CCs patterns correctly. This is because of the unavailability of these patterns in their L1. Consequently, the results confirmed that the number of incorrect production of CCs increase remarkably with the increase of the number of consonants in a cluster. The low rate of the correct production of three-initial and three and four-final CCs is the result of the negative transfer which leads BK learners to make errors in producing these patterns of clusters as proposed by Brown (2014). These results are consistent with the results of the previous study by Khudhair (2023).

As far as the second research question whether 4<sup>th</sup> year students produce all types of CCs better than 2<sup>nd</sup> year students, the results showed that the performance of the former group is better compared to that of the latter group in producing all types of English CCs. In spite of this, statistically the results indicate that no significant differences are seen between the two groups with the exception of two-initial CCs pattern in which the difference is statistically significant. This result is in line with the result of previous study (Nasr, 2011) who came up with the conclusion that the number of CCs errors decreases when the learner proceeds from one level to another.

Finally, as for the third question whether BK learners' performance of CCs is affected by the phonological system of their L1, the results revealed that the participants' productions of CCs is heavily influenced by the interference of their L1. Due to the differences of the syllable structure between Kurdish and English, many BK learners tend to apply their L1 syllable structure into L2 when producing CCs. This divergence between the linguistic systems of the two languages has led BK learners to use a syllable structure that inevitably contrasts with the one in L2. Accordingly, many BK learners resort to use phonological process such as the insertion of a vowel between a sequence of consonants so as to break up the cluster to simplify the pronunciation of particularly three-initial and three and four-final CCs as in 'next' /nekest/ or 'glimpsed' /glimpist/. These results go with the results of previous studies (e.g. Chang 2004; Jabbari and Samavarchi 2011 and Alotaibi 2021) who claimed that L2 learner's production of CCs is highly affected by the phonological system of their L1.

Thus, the hypotheses that BK learners of English encounter difficulties in pronouncing those patterns of CCs that are absent in their L1, 4<sup>th</sup> year students produce all types of CCs patterns better than the 2<sup>nd</sup> year students and finally BK learner's production of English CCs is influenced by the phonological system of their L1 are all confirmed

### **Conclusion**

The results of the data analysis of CCs of both levels have come up with the following conclusions that transfer was the major factor for the incorrect rate of the production of English CCs by BK learners from Department of English Language-College of Languages at University of Duhok. This is mainly due to the differences of the syllable structure between Kurdish and English. Other factors that led BK learners to produce English CCs incorrectly are lack of enough knowledge in the field of phonetics and phonology as well as lack of practicing CCs in their daily life. Despite this, in general, BK learners of English are good at the production of the CCs because of the high rate of correct production. However, the rate of correct production gets decreased significantly with the increase of the number of consonants in clusters. Additionally, the performance of 2<sup>nd</sup> and 4<sup>th</sup> year students in producing initial CCs better in comparison with that of the final CCs. It is also concluded that the production of all patterns of CCs by the 4<sup>th</sup> year students is better compared to that of the 2<sup>nd</sup> year ones.

## References

1. Ali, Sh. and Abdullah, A. (2019). *Phonology*. Hewler: Hivi Press.
2. Alotaibi, A. N. (2021). *Phonological constraints on the utterance of L2 clusters by Saudi ESL learners*. Arab World English Journal, 12(4),551-559. <https://dx.doi.org/10.24093/1wej/vol12no4.36>.
3. Ausubel, D. P. (1963). *The psychology of meaningful verbal learning*. New York: Grune& Stratton.
4. Baker, E. and Hengeveld, K. (2012). *Linguistics*. Oxford: John Wiley & sons, Ltd. Publication.
5. Brown, H. D. (2014). *Principles of language learning and teaching: A course in secondlanguage acquisition*. (6<sup>th</sup>ed.) New York: Pearson Education.
6. Carr, Ph. (2013). *English phonetics and phonology*. (2<sup>nd</sup>ed.). UK: Wiley-Blackwell.
7. Chang, F. C. (2004). *Chinese-speaking EFL learners' performances of processing English consonant clusters*: International Conference on English Instruction and Assessment. National Chiayi University. Retrieved 2004 from <https://www.6b97f75e958c81ba7e6cf39f10a3fa2f28cebfbcb>.
8. Collins, B. and Mees, I. M. (2008). *Practical phonetics and phonology: A resource book for students*. (2<sup>nd</sup>ed.). London: Routledge.
9. Corder, P. (1971). *Idiosyncratic dialects and error analysis*. International Review of Applied Linguistics, 9(2), 147-159. <https://doi.org/10.1515/iral.1971.9.2.147>.
10. Corder, P. (1983). A role for the mother tongue. In S. Gass& L. Selinker (Eds.), *Language transfer in language learning* (pp. 85–97). Rowley, MA: Newbury House.
11. Davenport, M. and Hannahs, S.J. (2020). *Introducing phonetics and phonology*. (4<sup>th</sup>ed.). London: Routledge.
12. Ellis, R. (1985). *Understanding second language Acquisition*. Oxford: Oxford University Press.
13. Els, T., Bongaerts, T, Extra, G., Os, Van C, & Janssen-van Dielen, A. (1984). *Applied linguistics and the learning and teaching of foreign languages*. London: Arnold.
14. Farrah, M &Halahlah, N. (2020). *Pronunciation problems among Palestinian major students in Hebron University*. <https://doi.org/10.33806/ijais2000.20.1.11>.
15. Gass, S. &Selinker, L. (2008). *Second language acquisition: An introductory course*. (3<sup>rd</sup>ed.). New York: Routledge.
16. Ghounane, N. (2018). *Difficulties encountered in teaching English pronunciation for EFL learners*, 9(1), 426-439.<https://doi:10.46217/1065-009-001-022>.
17. Giegerich, H. J. (1992). *English phonology: An introduction*. Cambridge: Cambridge University Press.
18. Håkansson, G. (1995). *Syntax and morphology in language attrition: A study of five bilingual expatriate Swedes*. International Journal of Applied Linguistics,5(2),153-171. <http://dx.doi.org/10.1111/j.1473-1492.1995.tb00078.x>.
19. Hasan, A. M. (2008). *Consonant clusters in Kurdish in the northerkurmanji Kurdish*.

- University of Duhok. Retrieved 15 July 2008 from <https://www.researchgate.net/publication/314079021>
20. Hassan, E. M. (2014). *Pronunciation problems: A case study of English language students at Sudan University of science and technology. English language and literature studies*, 4 (4),31-44. <http://doi.org/10.5539/ells.v4n4p31>.
  21. Heine, B., &Kuteva, T. (2005). *Language contact and grammatical change*. Cambridge: Cambridge University Press.
  22. Hewings, M. (2007). *English pronunciation in use: Advanced self-study and classroom use*. Cambridge: Cambridge University Press.
  23. Hudson, G. (2000). *Essential introductory linguistics*. Oxford: Blackwell.
  24. Jabbari, A. A., and Samavarchi, L. (2011). *Persian learners' syllabification of English consonant clusters*. *International Journal of English Linguistics*, 1(1), 236-246 <https://doi.org/10.5539/ijel>.
  25. Jahara, S.F and Abdelrady, A.H. (2021). *Pronunciation problem encountered by EFL learners: An empirical study*. *Arab world English journal*, 12(4). <https://dx.doi.org/10.24093/awej/vol12n04.14>.
  26. James, C. (1994). *Don't shoot my dodo*. *IRAL – International Review of Applied Linguistics in Language Teaching*, 32(3), 179-200. <https://doi.org/10.1515/iral.1994.32.3.179>.
  27. Jarvis, S. (2002). Topic continuity in L2 English article use. *Studies in Second Language Acquisition*, 24(3), 387-418. <https://www.jstor.org/stable/44486626>
  28. Jarvis, S., &Pavlenko, A. (2008). *Cross-linguistic influence in language and cognition*. New York: Routledge.
  29. Johanson, L. (2002). *Contact-induced change in a code-copying framework*. *Contributions to the Sociology of Language*, 86, 285-314.<https://doi.org/10.1515/9783110892598.285>.
  30. Khudhair, H. J. (2023). *The investigation of the L1 transfer to L2 in producing English consonant clusters by EFL Iraqi students*. *Iraqi Journal of Humanitarian, Social and Scientific Research*. Retrieved 8 February 2023 from <https://www.iasj.net/iasj/download/80a3e61601cc8dec>.
  31. Kellerman, E., &Sharwood Smith, M. (1986). *Cross-linguistic influence in second language acquisition*. New York: Pergamon Press.
  32. Kellerman, E. (1995). *Cross-linguistic influence: Transfer to nowhere?* *Annual review of applied linguistics*, 15,125-150. <https://doi.org/10.1017/S0267190500002658>.
  33. Komos, J. (2006). *Speech production and second language acquisition*. New Jersey: Lawrence Erlbaum.
  34. Lado, R. (1957). *Linguistics across Cultures: Applied Linguistics for Language Teachers*. Ann Arbor, Michigan: University of Michigan.
  35. Lott, D. (1983). *Analysing and counteracting interference errors*. *ELT Journal*, 37 (3), 256-261. <https://doi.org/10.1093/elt/37.3.256>.



37. Ladefoged, P. and Johnson, K. (2015). *A course in phonetics*. (7th ed.). Heinle&Heinle, A division of Thomson learning, license.
38. Mcmanus, K. (2022). *Cross linguistic influence and second language learning*. New York: Routledge.
39. Moattarian, A. (2013). *Bidirectional cross-linguistic Influence in language learning: Linguistic aspects and beyond*. International Journal of Linguistics, 5 (4), 38-49. <https://doi.10.5296/ijl.v5i4.3746>.
40. Nasr, L. (2011). *The interlanguage phonology of Kurdish learners: Cases of vowel epenthesis, consonant deletion and metathesis*. M.A. thesis. University of Duhok. <https://doi.10.13140/RG.2.2.29467.69922>.
41. O'Connor, J.D. (1980). *Better English pronunciation*. (2<sup>nd</sup>ed.). Cambridge: Cambridge University Press.
42. Odlin, T. (1989). *Language Transfer: Cross linguistic Influence in Language Learning*. Cambridge: Cambridge University Press.
43. Odlin, T. (2001). *Language transfer-cross-linguistic influence in language learning*. Shang Hai: Shang Hai Foreign Language Education Press.
44. Odlin, T. (2003). Cross linguistic influence. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp. 436–486). Oxford, UK: Blackwell.
45. Osgood, C. E. (1953). *Method and theory in experimental psychology*. Oxford: Oxford University Pres
46. Revell, P.R. (2011). *English phonology and pronunciation teaching*. London: Continuum international publishing group.
47. Roach, P. (2009). *English phonetics and phonology: A practical course*. (4<sup>th</sup>ed). Cambridge: Cambridge University Press.
48. Rogers, H. (2013). *The sounds of language: An introduction to phonetics*. Routledge: Pearson education Ltd.
49. Tarone, F. (1978). The phonology of interchange. In Richard, J. C. (Ed.) *Understanding second and foreign language learning: issues and approaches* (pp. 15-33). Rowley-Newbury House. <https://doi.org/10.1177/003368827901000212>.
50. Ways, F. (1984). *Phonetics*. Baghdad: Aladab Press.
51. H. A. Kanber, S. H. H. Al-Taai, and W. A. M. Al-Dulaimi, "Recruitment of teachers for cooperative education in educational institutions," International Journal of Emerging Technologies in Learning, vol. 18, no. 3, pp. 110–127, 2023. <https://doi.org/10.3991/ijet.v18i03.36815>
52. Weinreich, U. (1953). *Languages in contact*. Publications of the Linguistic Circle of New York.
53. Yule, G. (2017). *The study of language*. (6<sup>th</sup>ed.) Cambridge: Cambridge University Press.
54. Yavaş, M. (2011). *Applied English phonology*. (2<sup>nd</sup>ed). Wiley: Blackwell.

**Appendix 1: Jury Members**

Full Name	Major	Academic Title	Affiliation
- Dr. Asma'a Amin Hussein	Phonetics and Phonology	Lecturer	Duhok University
- Dr. Sae'edIdrisSae'ed	Linguistics	Assistant Professor	Duhok University
- Dr. AnmarHammodiSae'ed	Phonetics and Phonology	Assistant Professor	Mosul University

**Appendix 2: Transcribers**

Full Name	Major	Academic Title	Affiliation
- AveenMuhammedHasan	Phonetics and Phonology	Assistant Professor	Zakho University
- ZiyadRakan	Phonetics and Phonology	Ph.D. student	Mosul University