ALIEN SOUNDS

The phonological and lexical distribution of Klingon <tlh> /tɬ/

Chiara MELUZZI

ABSTRACT • Klingon, a ConLang created for the Star Trek franchise in 1984 by the linguist Marc Okrand, is the subject of this study, which analyzes both its phonology and lexicon. The requirement to sound alien, at least to English mother-speakers, is the major aspect of Klingon phonology: many sounds in its phonological inventory are thus highly unusual and seldom encountered entirely in other languages. Particularly, we will focus on the voiceless alveolar lateral affricate /tɬ/, transcribed as <tlh> and characterizing Klingon phonology starting with the name of the language itself. The article analyzes the distribution of /tɬ/ in Klingon lexicon, by identifying phonological restrictions and possible patterns of sound change.

KEYWORDS • Klingon; Phonology; Lexical Distribution; ConLang.

1. Introduction

Since their debut appearance in the Star Trek franchise in 1967, Klingon have undergone significant changes, both physically and linguistically. The development of Klingon language dates to 1984 and it involved the work of the linguist Marc Okrand in giving to this alien population a proper and reliable language. According to Bausani (1970), Klingon clearly reflects an artistic language (ArtLang), that is, a language designed for special aesthetic goals. Another common label used in Anglophone countries is also fictional language or FicLang (Destruel 2016), even if constructed language (ConLang) is nowadays a widely accepted umbrella term for all these non-natural languages, thus including engineer languages like Toki Pona (Coluzzi 2022).

Perhaps what was unexpected back then was the great success of Klingon outside of its fictional universe. Nowadays, Klingon claims to be the biggest fictitious language, with hundreds of speakers, a linguistic and cultural organization (the Klingon Language Institute, KLI), and language certifications (see Okrent 2010), as well as a language course on Duolingo beginning in 2018. Its use is also quite attested in popular culture and fans' autonomous productions (Meluzzi 2019). As a result, Klingon has never ceased to attract researchers, both as a cultural phenomenon and as the most widely used ConLang (Okrand et al. 2011: 111). Hayakawa et al. (2020) stated that "artificial languages have proven to be useful and versatile tools for studying language acquisition by helping to control for the immense variability that exists within natural languages". Klingon phonology presents many interesting points of discussion concerning primarily its interface with other levels of the linguistic system (that is, phonetics, the lexicon, but also morphology).

This works aims at addressing a specific issue in Klingon phonology, which is the distribution of the voiceless alveolar lateral affricate /tɬ/, transcribed with the trigram <tlh> in Klingon and as <kl> in English. This affricate could be found in the name of the language itself, that is *tlhIngan*

Hol (with *Hol* meaning 'language'). Therefore, it may be said that it plays a significant role in shaping Klingon phonology and in giving it this 'alien' sounding feature.

Following a brief overview of Klingon's history as a ConLang, we will concentrate on Klingon phonology, emphasizing the phonological constraints concerning the syllable and the minimal phonological unit in Klingon (see section 3), and then analyzing the distribution of /tɬ/ in the Klingon lexicon (section 4). In the discussion, it will be highlighted how these data from Klingon could help us in our understanding of the interface between the phonetic and phonology of languages, both natural and constructed, but also for discussing the evolutionary patterns of complex sounds like affricates.

2. A brief history of Klingon language

When they firstly appeared in the Star Trek universe, on March 23, 1967, in the episode "Errand of Mercy", Klingons were quite different from what we are used to see them nowadays from different perspectives. Their physical appearance did not show the typical wrinkled forehead, which would be later associated as the key feature of Klingons[1], and they speak in plain English, although it was said that their mother language was Klingonese (sic). The first lines in this language were uttered on screen in 1979 for the first movie "Star Trek: The Motion Picture". These lines were created and recorded on tape by James Doohan, the actor who portrayed the chief engineer Montgomery Scott, and then used by actors to perform their Klingon lines. Unfortunately, the original tapes have been lost, but the point has been made to add realism, aliens were required to talk in a language other than English, which was and still is regarded as the Federation Standard (that is to say, the common language in Star Trek universe).

Beginning in 1984, Klingon will be developed as a legitimate language, marking a watershed moment in the ConLang's history. Indeed, in the third movie of the franchise, "The Search of Spock", released that year, a Klingon battleship and its crew played a central role as antagonists of Captain Kirk and his team. In line with the previous attempt in 1979, it was decided that Klingon needed to speak their own language. However, since the screen time allowed to Klingon characters had thus become extensive, the lines and dialogues had to be consistent, and not to give the impression of just random sounds put together. Indeed, as Okrand et al. (2011: 115) said, "the best way to make a language sound real was to make it real". In 1984, the screenwriter Harve Bennet contacted the linguist Marc Okrand, who started to work on the creation of Klingon as an autonomous and original language. The main results of Okrand's work were published in 1992 in the first edition of Klingon grammar and dictionary (also referred to, at least in scientific publications, as Okrand 1992). In the same year, the Klingon Language Institute was created.

It is very likely that the publication of Klingon grammar and dictionary followed the great success of public towards Klingon characters, starting with Commander Worf: portrayed by Michael Dorn. He first appeared on screen in 1987 and remained an iconic and beloved character

---

[1] Klingon ridges (Kl. *vIlHomDu'*) are so important in defining a 'real' Klingon that one of the most common and violent insult is to say to someone that his/her mother has a plain forehead. However, it must be noted that neither the word for 'forehead ridges' nor the insult appear in the original Klingon dictionary (Okrand 1992) nor in the further appendix in Okrand (1997). The name and expression could be found in the Duolingo online course, available since 2018, prepared and uploaded with the collaboration of the Klingon Language Institute.

in both TV-series of the Star Trek franchise "The Next Generation" and "Deep Space 9". Certainly, due to the success of Klingon characters and the curiosity around their language, in 1997 a book titled "Klingon for the Galactic Traveler" (henceforth referred to as Okrand 1997) was also published. The book represents a sort of tourists' guide focused on human travelers (or space officers) that need an introduction to Klingon language and culture to avoid gaffes or potential conflicts, especially since Klingons are notoriously very belligerent. Despite its oddity, this publication is extremely important from a linguistic standpoint: in addition to updating the dictionary with new entries, the concept of sociolinguistic and diachronic variability of Klingon is explicitly addressed for the first time, with information about various social and linguistic uses across the vast Klingon Empire. This could in part be ascribed to an attempt to fix the various incongruences in the representation of Klingon in the Star Trek franchise across time (e.g., Klingon physical features or actors' pronunciation), but the result was to propose a language, which evolves and changes across time, space and society, similarly to what happens in natural languages.

3. Klingon grammar and phonology

In the creation of Klingon, the main aim was to have a language that sounded alien at least to English speakers, which represented the main audience. Three major factors had to be considered as well: the new language's sounds had to be consistent with those heard by the audience in the first film in 1979 (i.e., those created by James Doohan), the language had to portray the main cultural features usually associated with Klingons (e.g., fierceness and a warrior life style), and the alien language had to be performed on screen by human actors. So, on the one hand, the language had to be consistent with the representation of Klingons that has already been portrayed in the TV-series and in the movies, other than sounding 'alien' in the way already proposed in the first movie in 1979. On the other hand, there was the physiological limitation of having human actors, with human vocal folds to sound alien: for (human) actors to effectively produce the script in the target (alien) language, the language itself had to include only sounds that human can produce. For instance, it was impossible for humans to produce a plosive nasal sound, because nasal and plosive are two different manners of articulations, because human sounds are produced in the oral cavity, and they could also but not exclusively involve the nasal one. However, we could theoretically imagine an alien population that speaks through something similar to a mouth and to a nose, thus potentially having a series of (alien) nasal plosives opposed to (humanly more common) oral plosives.

As Okrand frequently said (e.g., Okrand et al. 2011), these were the foundations for Klingon distinctive phonology, as well as his judgments on morphology and syntax. From a morphological perspective, Klingon is an agglutinative language, with morphemes clearly differentiated and with a precise order in their application. One of the most peculiar characteristics is the system of verbal prefixes, which marked both the subject and object, even if the object is not explicitly mentioned, as in the following examples in (1).

(1)
(a)   jI – vum
        1st P.Sing. Subj./Null Obj. – work
        I work
(b)   vI – Sup
        1st P.Sing.Subj./3rd P. – eat
        I eat

In (1a), the form *jIvum* 'I work' shows the prefix *jI-* that indicates the 1st person singular with a null object. In (1b) *vISup* 'I eat' indicates that there is a 3rd person singular or plural object as marked by the prefix *vI-*. It should be noted that forms like *jISup* are still possible if the speaker wants to indicate a general action of eating (Okrand 1992: 33).

The syntax of Klingon shows a basic OVS order, with the subject potentially marked by the suffix –'e when it is necessary to avoid ambiguities (Okrand 1992: 59). This word order is rather unusual in natural languages, since it could be found only in 11 of the 1,376 languages listed on WALS (Dryer 2013), mainly belonging to the Carib family (e.g., Kuikúro in Brazil).

If the morphology and syntax certainly contribute to the construction of Klingon as an alien language, it is true that, at least for the general public, the phonetics and phonology is the primary (and, sometimes, only) level on which a perceptive judgement is based. Okrand had to design a dependable sound system that quickly transmits such expectations to the listeners when constructing a language that had to appear alien and unfriendly, and having English speakers as the main target. As Peterson (2015: 26) clearly wrote, "in addition to the history of cultural stereotyping, which certainly plays a role, it's the comparison of entire sound systems that produces a phonaesthetic character in the mind of the listeners: the sounds present, the way they're combined, the intonational phrasing, and the speech rate – plus a number of sociological factors". This means that it is not only the presence of one or two sounds, which are all previously attested in world's languages, since they had to be produced by human actors. The peculiar feature was thus the simultaneous presence of rare sounds and marked articulation in the same phonological repertoire, in a way that is un-paralleled in natural languages (see also Okrand et al. 2011: 116).

In her MA thesis, Malvárez Ocaña (2020) compared Klingon phonology to Sindarin one and claimed that "Klingon was constructed more simply. There are no apparent exceptions. Every sound is pronounced the same way regardless of the phonetic environment" (Malvárez Ocaña 2020: 25). She also noticed a tendency towards "postalveolar, retroflex, velar, uvular and glottal sounds" (*ibidem*). In more precise terms, we may say that there is no contextual allophonic variability in Klingon, and that Klingon phonological repertoire is characterized by the present of "back consonants", which could be naively described as "harsh" sounds. Klingon consonant repertoire is reported in Fig. 1, which has been reconstructed based on Okrand (1995) and following works, and thus showing some differences with respect to Malvárez Ocaña's (2020) chart.

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Retroflex	Palatal	Velar	Uvular	Glottal
Plosive	p b			t		ɖ			q	ʔ
Nasal	m			n				ŋ		
Rhotic				r						
Fricative		v			ʒ	ʂ		x ɣ		
Affricate					tʃ dʒ				ɑx	
Lateral fricative				tɬ						
Approximant		w					j			
Lateral Approximant				l						

Fig. 1. Klingon phonological repertoire: consonant system.

If we look at the consonant system of Klingon in Fig. 1, it appears clear that it is unbalanced towards the back of the mouth, and with a preference for voiced sounds. This preference for voiced alternative contrasted with natural languages, in which voicing tend to be avoided and many lan-

guages do not show voicing contrast in one or more places of articulation (cf. Maddieson 2013). Even these sounds that Peterson (2015) calls 'basic consonants', like bilabial plosives, nasals, and laterals, have their own unique articulation in Klingon. Okrand (1992) stated that /p/ and /t/ must be phonetically realized as aspirated, whereas the voiced counterpart of /t/ is instead retroflex.

The same 'backness' of Klingon phonology could also be found in its vowel system, as reported in Fig. 2.
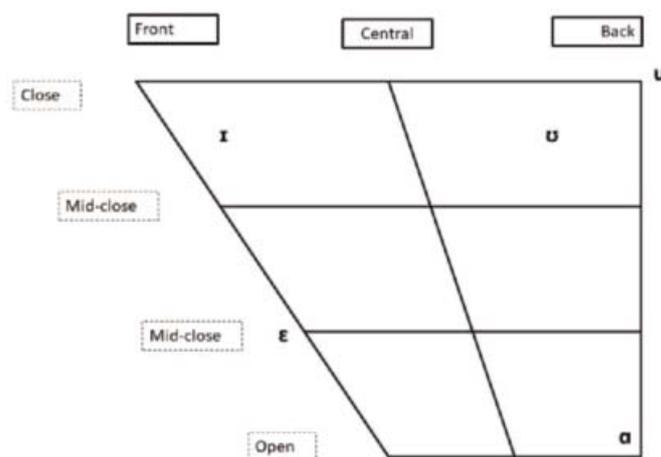

Fig. 2. Klingon phonological repertoire: vowel system.

Only a single occurrence of a free allophone is listed in Klingon phonology (Okrand 1992: 16). The anterior vowel /ɪ/ could be realized as either near-closed like in the word *DIp* 'noun', which is the typical realization, but also as a closed front unrounded vowel [i] like in the Italian word 'pila'.

The unmarked syllable structure in Klingon is CVC, which also tends to correspond to the lexical morpheme and to the basic form of the noun. Although not explicitly addressed in prior accounts of Klingon phonology, to the best of my knowledge, it should be emphasized that Klingon words always began with a consonant, implying that syllable onset is required. Conversely, the coda could be avoided, even if this occurs only rarely in Klingon lexicon (e.g., *He* 'course, route' or *Do* 'velocity') and a syllable ending with a glottal stop <'> seems to be the unmarked realization.

Furthermore, as correctly noted by Malvárez Ocaña (2020: 26), there are quite few consonantal clusters in Klingon, and basically only with a rhotic or approximant sound preceding a consonant. However, Klingon is an agglutinative language, so sequences of consonants, in heterosyllabic position, are always possible, without phonological restrictions involving word formation or compounds, although it should be noted that the topic has been only slightly addressed in the official grammars of Klingon languages, with the only notes being Okrand (1992: 19-20). Conversely, there is no phonological gemination in Klingon, despite Malvárez Ocaña's (2020: 38) claim. As stated in Okrand (1997: 138), indeed, two identical consonants could be found one after the other for morphological reasons, but the standard pronunciation is that of two separated sounds; the realization as phonetically long is explicitly referred to as an innovation characterizing the speech of the young, in informal situations.

As stated before, the attention to sociolinguistic variability is specifically addressed in Okrand (1997), who listed possible generational speech differences, but also the topic of regional variability of Klingon across the different planets of the Klingon Empire with respect to Klingon standard (ta'Hol) as spoken in the capital in Qo'noS. For instance, vowel nasalization is a common feature

in Krotmag dialects, whereas in Morska region the voiceless velar fricative [x] is silent when syllable-final, and there is a reduction of back affricates into fricatives, with a more advanced place of articulation too. Therefore, the voiceless uvular stop [q] followed by a voiceless uvular fricative [χ] is realized as a velar fricative [x] in Morska, as in the examples in (2a), quoted from Okrand (1997: 22) with our phonetic transcription. In this case, the variation is only in the phonetics, without affecting the transcription.

Furthermore, in Morska the voiceless alveolar lateral affricate /tɬ/ is realized as a voiceless alveolar affricate [ts] when in coda position, and as a voiced velar fricative followed by an alveolar lateral approximant [ɣl] when at the onset of the syllable. This last variation also corresponds to a different graphic convention between ta' Hol and Morska dialect, as in the example (2b) quoted again from Okrand (1997: 22) with our phonetic transcription:

(2)   Morska dialect
(a)   'help/aid'   ta' Hol <Qah> ['qχɑx]   Morska <QaH ['xɑ]
(b)   'Klingon'   ta' Hol <tlhingan> ['tɬɪŋan]   Morska <ghlingan> ['ɣlɪŋan]
(c)   'to drink'   ta' Hol <tlhutlh> ['tɬutɬ]   Morska <ghluts> ['tsuɣl]

The pronunciation would be quite different in the words, albeit few (see section 4), which present the phoneme /tɬ/ both as onset and coda of the syllable, with Standard ['tɬutɬ] opposed to Morskan ['tsuɣl] for the word tlhutlh 'to drink,' as reported in (2c).

4. The distribution of Klingon <tlh>

We will now focus in detail on the trigram <tlh> representing the voiceless alveolar lateral affricate /tɬ/, which could be found in the name of the language itself; <tlhingan> ['tɬɪŋan]. This sound seems to have been added to Klingon phonological repertoire to avoid the use of voiceless velar occlusive /k/ for phonesthetic reasons and also for their association to other widespread alien characters in the Seventies pop-culture (e.g., Superman's name Kal-El and its planet Krypton). Okrand et al. (2011: 117) explicitly stated that they tried to avoid /k/ at least at the beginning of names, but "unfortunately, /k/ had already been established as part of the language in the name Klingon itself, as well as in the names of all of the male Klingon characters in the original Star Trek series". The solution was to introduce this complex voiceless alveolar lateral affricate as part of Klingon phonology, and to state that Earthlings misheard it as a sound common to their own phonological system /tɬ/, that is a voiceless velar occlusive /k/[2]. This was also used to justify why the name of the population (and of the language) is transcribed as either <tlhingan> or <Klingon>, depending on the language.

This sound is described by Okrand (1992: 15) as not occurring in English, which was supposedly the first language of his readers, but as «very much like the final sound in *tetl*, the Aztec word for *egg*, if properly pronounced"[3]. The author then described its pronunciation in articulatory

---

[2] From a linguistic perspective, this is again extremely accurate, since it has been widely demonstrated that the role of speech perception (or mis-perception) in shaping sound change, in particular in cases of contact between different phonological systems (cf. Ohala & Jones 1993, among many others).

[3] The example given by Okrand (1992: 15) is in itself worth a full paper concerning the status of <tl> in Uto-Aztecan languages, and its evolution in Nahuatl, which is (probably) the language addressed here as

terms: "to produce this sound, the tip of the tongue touches the same part of the roof of the mouth it touches for *t*, the sides of the tongue are lowered away from the side upper teeth, and air is forced through the space on both sides between tongue and teeth. The sound is produced with a great deal of friction" (Okrand 1992: 15). This description left unclear whether <tl> ought to be considered as an occlusive with a long fricative release or as a proper affricate sound. The second interpretation seems more plausible given the reference to Uto-Aztecan languages, in which the diagram <tl> is usually understood as a voiceless alveolar lateral affricate, although in some Nahuatl varieties this phoneme is pronounced more as a plosive with lateral release (e.g., Ixquihuacan Nahuatl, Sasaki 2014; but see also Munro 1983).

For the analysis of the distribution of /tɬ/ in the Klingon lexicon, we used the original Klingon dictionary as published in Okrand (1992), and we integrated it with novel words and expressions that appeared in Okrand (1997). Among the 1808 lexical units of both our resources, the [tɬ] sound appears only in 104 words, which is in the 5.75% of the Klingon original lexicon. However, only 103 instances are proper words, while one is the demonstrative suffix *–vetlh* 'that', which could not appear as an independent word.

Phonologically, the voiceless alveolar lateral affricate could appear both at the onset of the syllable (50 cases on 104, e.g., *tlhup* 'to whisper'), or in coda position (52 cases on 104, *ratlh* 'to remain'). This latter position also includes six regularly derivate words, which are also included as lexical units in the dictionary. We have three cases of nouns derived from verbs with the *–wI'* suffix (cf. Okrand 1992: 19-20), as in *HotlhwI'* 'scanner' from *Hotlh* 'to scan', *lotlhwI'* 'rebel' from *lotlh* 'to rebel, *ghitlhwI'* stylus from *ghItlh* 'to write'; two cases of adjectives with a negative mark as in *motlhbe'* 'unusual' from *motlh* 'usual', and *matlhHa'* 'disloyal' from *matlh* 'loyal'[4]. Finally, the last case is an interesting case of a name derived not from a verb but from another name, *vatlhvI'* 'percent' from *vatlh* 'a hundred'.

All the examples above follow the general tendency of Klingon lexicon of having monosyllabic words, with a non-marked syllable constituted by an onset, a nucleus and a coda, thus with the structure C_1VC_2. An exception is represented by few words that could be found only in the 1997 Guide, two of them showing our target sound. *nItlhpach* 'fingernails' could be reconstructed as a compound word from *nItlh* 'finger' and *pach* 'talon'. However, *'atlhqam* (Okrand 1997: 92), a type of fungus used for fermentation, seems to be a compound but with only the second member attested in the Klingon lexicon (*qam* 'foot', but there is no record for **'atlh*).

Furthermore, three words present the affricate simultaneously both at the onset and at the coda of the syllable: *tlhutlh* 'to drink', *tlhetlh* 'to progress' and *tlhatlh* 'gladst', a typical Klingon dish similar to fungus or seaweed. In case of *tlhutlh* and *tlhatlh*, it is evident that they both pertain to the semantic sphere of food, and one could argue that there is an onomatopoeic value associated to them (especially in case of *tlhutlh* that phonetically reproduces the sound of drinking).

Conversely, *tlhetlh* may be semantically related to a similar verb *tlhe'* 'to turn'. This would imply a possible relationship between <'> and <tlh>, thus leading to the hypothesis of a sound change from /ʔ/ to /tɬ/. This does not find any correspondence in natural languages, in which af-

———————————

"Aztec"; indeed, it is worth remembering that the Klingon dictionary has been published for the general public, not for language specialists or phoneticians.

[4] Adjectives in Klingon are in reality verb forms used as adjectives: so *motlh* literally mean 'to be usual' and it takes the verbal negative suffix *-be'*. The verbal suffix *–Ha'* implies also a change of state. Both *-be'* and *-Ha'* are described as rover suffixes, thus meaning that they could vary their position in relation to other suffixes (Okrand 1992: 47).

fricates tends to be simplified as either stops or, more commonly, fricatives (see Meluzzi 2021, on the sound change involving affricates in Romance languages).

However, it could be the case that Klingon follows other phonological patterns in language change through time, so the question must be if this allegedly /ʔ/>/tɬ/ sound change finds other correspondences in the Klingon lexicon. There are, indeed, some possible correspondence: *ja'* 'to tell, to report' and *jatlh* 'to speak', *Do'* 'be fortunate' and *Dotlh* 'status', *wa'* 'one' and *watlh* 'to be pure', *po'* 'to be expert, to be skilled' and *potlh* 'something important'. Unfortunately, other correspondences require too much imagination to be effectively considered as a prove of the phenomenon. For instance, it is quite difficult to see a possible relation between *lu'* 'Yes! (exclamation)' and *lutlh* 'to be primitive', or between *tlhu'* 'to be tempted' and *tlhutlh* 'to drink' (but see also *tlhuH* 'to breathe') Furthermore, other words are clearly contrasting examples for a possible /ʔ/>/tɬ/ sound change (*yo'* 'fleet of ships' and *yotlh* 'field of land'; *ne'* 'yeoman' and *netlh* 'ten thousand').

Perhaps some correspondence could be traced between words ending in [tɬ] and words ending in a simple voiceless alveolar plosive [t], phonetically realized as aspirated, at least in standard realizations (Okrand 1992: 15). So, we have, for instance, *'utlh* "officer"[5] and *'ut* "to be essential / necessary", or *'etlh* "sword/blade" and *'et* "fore". Furthermore, the typical Klingon sword is transcribed as *bat'leth* in Federation Standard (that is, in English), but is *betleH* in Klingon: betleH 'sword of honor' is a compound, with contraction, from *batlh* 'honor' and *'etlh* 'sword'. In this case, the change from [tɬ] to [x] is phonetically more plausible, and it could be found also in the couple of words *tlhutlh* 'to drink' and *tlhuH* 'to breathe'.

In any case, it seems difficult to find clear instances of possible sound change relationship on different lexical items, at least with the data at present.

5. Discussion

The data emerging from this first analysis of the distribution of the voiceless alveolar affricate in Klingon original lexicon opens the path to discuss different relevant aspects concerning both ConLangs but also, more generally, the interface between phonology and other levels of the language, regardless of the nature of the language itself.

In particular, concerning the analysis of Klingon phonology and phonetic variability, it has been shown how the only phonological rule concerns the syllable structure, which ought to be of the type C_1VC_2, with no words starting with a vowel (i.e., obligatory onset), and only few consonantal clusters allowed. Gemination is only a phonetic feature in youth speech, and phonetic variability generally involves anteriorization of the sounds, either consonants or vowels, but without phonological implications. However, these changes are almost limited to the Morska region, which is a peripheral area of the Klingon empire, thus responding to the sociolinguistic and dialectological criteria of the isolated area.

An outstanding feature in Klingon phonology are the number of affricates, including some very unusual affricates like the voiceless uvular /qx/ and the voiceless alveolar lateral /tɬ/. Affricates in natural languages are extremely changeable sounds that are also hotly contested from a phonological standpoint (see Clements 1999, and Meluzzi 2021). There is a general agreement on the rarity of such sounds, especially in some places of articulation. It has been argued, for example,

---

[5] Okrand (1997: 50-51) also points out that the form *'utlh* is an arcaism, prevalently used by elder, during official cerimonies or in written formal texts. The more common Klingon word for "officer" is *yaS*.

that alveolar voiced affricates, and voiced affricates in general, tend to convert into voiceless and eventually into fricatives because the articulatory limitations of voicing differ from those of frication (Żygis et al. 2012). In case of the voiceless alveolar later affricate in Klingon, we have seen some possible correlations between the affricate and the glottal stop, albeit with contrasting data, but also some cases of possible reductions of the affricate either to an alveolar voiceless occlusive or into an alveolar fricative. The affricate is retained in Morska dialect, however the location of articulation changes depending on the position in the syllable. This could indicate that this phoneme, albeit very characteristic also from a phonesthetic perspective, would probably undergone sound change. This hypothesis could be probably verified in further studies by considering also new lexicon and social variation added to Klingon by Stark Trek franchise.

Finally, it is worth noting that the examination of Klingon phonology presented here has revealed a general lack of a morpho-phonological interaction. This is in line with other, albeit preliminary, descriptions of the phonologies of other ConLangs as reported in Malvárez Ocaña (2020) and Blalock Ng & Schwendiman (2017). Three hypotheses could be made to justify the absence of a morpho-phonological interface in ConLang. A first hypothesis is that it is too difficult to consider interfaces in planning a new language. Although it could be a perfectly plausible hypothesis, it is an over-simplistic answer that does not help to further our understanding of how languages work. The other hypothesis, instead, considers that phonology has a minimal impact in languages with advanced flectional morphology. However, less is known about agglutinative languages, like Klingon. In this way, the ConLang data might aid in understanding this property in natural languages. Finally, we should also consider that morpho-phonology is not a key feature in world languages, in contrast with morpho-phonetics that has just proved to be very salient from both a systemic view of language and a psychological perspective of speech perception (see, for instance, Stein & Plag 2021).

6. Conclusions and further perspectives

In this work, we presented some insights into Klingon phonology and its interface with the lexicon. The discussion of this data has demonstrated how the study of ConLangs might pave the way for more research and a general better knowledge of how languages operate in structured systems, as well as how they might change.

Further studies should widen the analysis on Klingon lexicon, by considering also the most recent scripts, and fandom productions (see, on this point, Meluzzi 2019). Finally, in line with previous work of Hayakawa et al. (2020), it will be interesting to use Klingon to evaluate how learners track statistical regularities in phonology and at the morpho-phonological interface.

REFERENCES

Bausani, Alessandro (1970), *Le lingue inventate*, Roma, Ubaldini.

Blalock Ng, Sara, Schwendimann, Abigail (2017), *Properties of Constructed Language Phonological Inventories*, in "Papers of the University of Washington", 2, pp. 1-7.

Clements, George N. (1999), *Affricates as non contoured stops*, in Osamu Fujimura (ed.), *Item, order in language and speech*, Prague, Karolinum Press, pp. 271-299.

Coluzzi, Paolo (2022), *How learning Toki Pona may help improving communication strategies in a foreign or second language*, in *Language Problems and Language Planning*, 46(1), pp. 78-98.

Destruel, Matt (2016), Reality in Fantasy: linguistic analysis of fictional languages, Boston, MA thesis.

Devenny, Ashlie (2017), *Constructed Language: An Analysis of the Phonemic Sounds influenced by Historical Stereotyping*, in "Fiat Lingua", FL-000046-00.

Hayakawa Sayuri, Nig Siqim, Marian Viorica, et al. (2020), *From Klingon to Colbertian: Using Artificial Languages to Study Word Learning*, in "Bilingualism: Language and Cognition", 23, pp. 74-80.

Maddieson, Ian (2005), *Issues of phonological complexity: Statistical analysis of the relationship between syllable structures, segment inventories and tone contrasts*, in "UC Berkeley PhonLab Annual Report", 1(1), pp. 259-268.

Maddieson, Ian (2013), *Voicing in Plosives and Fricatives*, in Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures Online*, Leipzig, Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info/chapter/4, Accessed on 2022-09-14.)

Dryer, Matthew S., (2013), *Order of Subject, Object and Verb*, in Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures Online*, Leipzig, Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info/chapter/81, Accessed on 2022-09-14.)

Meluzzi, Chiara (2019), *Real Communities for Invented Languages. Dothraki and Klingon on the Web*, in "American Language Journal", (3)2, pp. 16-29

Meluzzi, Chiara (2019), *Dental affricates loss and maintenance in Romance languages: a (socio)-phonetic perspective on sound change*, in Laura Biondi, Francesco Dedè, Andrea Scala (eds.), *Change in Grammar: Triggers, Paths, and Outcomes*, Alessandria, Edizioni dell'Orso, pp. 95-116.

Munro, Pamela (1983), *Selected Studies in Uto-Aztecan Phonology*, in "International Journal of American Linguistics", 49(3), pp. 277-298.

Okrand, Marc (1992), *The Klingon Dictionary*, New York, Pocket Books.

Okrand, Marc (1997), *Star Trek Klingon for the Galactic Traveler*, New York, Pocket Books.

Okrand, Marc et al. (2011), *Wild and Whirling Words: The Invention and use of Klingon*, in Michael Adams (ed.), *From Elvish to Klingon. Exploring Invented Languages*, Oxford, Oxford University Press, pp. 111-134.

Ohala, John J., Charles Jones (1993), *The phonetics of sound change*, in Charles Jones (ed.), *Historical linguistics: Problems and perspectives*, London, Routledge, pp. 237-278.

Okrent, Akira (2010), *In the land of invented languages*, Philadelphia, Random House.

Peterson, David J. (2015), *The art of language invention*, London, Penguin.

Stein, Simon D., Plag, Ingo (2021), *Morpho-phonetic effects in speech production: Modeling the acoustic duration of English derived words with linear discriminative learning*, in "Frontiers in Psychology", Aug 2;12:678712. doi: 10.3389/fpsyg.2021.678712. PMID: 34408699; PMCID: PMC8366231.

Żygis, Marzena, Susanna Fuchs, Laura Koening, (2012), *Phonetic explanations for the infrequency of voiced sibilant affricates across languages*, in "Laboratory Phonology", 3 (2), pp. 299-336.

CHIARA MELUZZI • is a Researcher in Linguistics at University of Milano "La Statale", where she also teaches General Linguistics for Communication. Her main research interests involved experimental phonetics and sociolinguistics as applied to various contexts, including ConLang. She supervised many BA thesis on different ConLangs, and, in 2019, she published an article on the use of Dothraki and Klingon on the web (American Language Journal).