Post-sonorant occlusivization in Kabyle

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The aim of this paper:

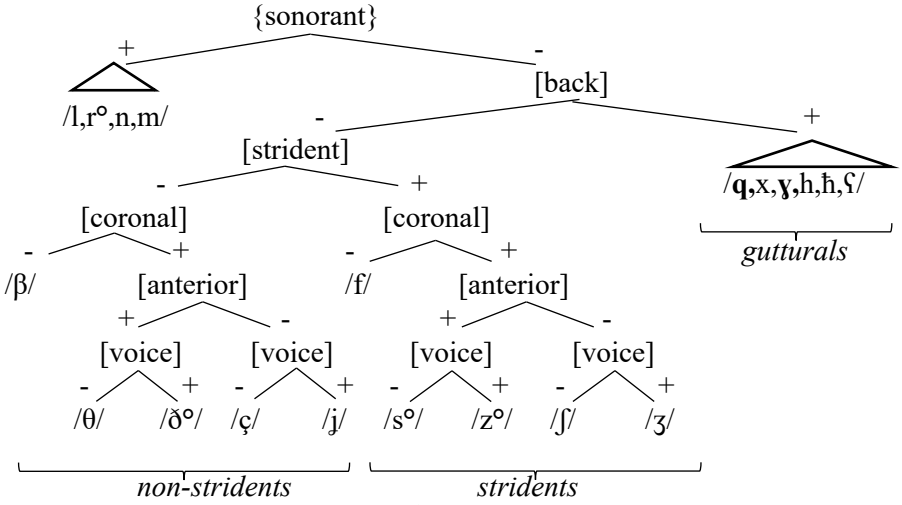
- analyze phenomena related to the **OCC**lusivization of the non-strident fricative segments in Kabyle (spirants → stops/occlusives);
- analyze the internal structure of sonorants and non-strident fricatives.

Our study focuses on the Kabyle of Chemini (South-East Bejaïa)
Kabyle/Taqbaylit is a Berber language (Afroasiatic phylum)
Kabyle has been considered as a *'spirantizing'* Berber language in opposition to the so-called *'non-spirantizing'* Berber languages such as Zenaga and Tetserret (CHAKER 2004, 2015; ELMEDALOUI 1993; KOSSMANN 1999, 2021; KOSSMANN & STROOMER 1997; RIDOUANE 2008; SAIB 1974).

The consonant system of Kabyle is composed mainly of fricatives except for the 'sonorants' (adding to this the glides and the uvular occlusive /q/[1]**).**

We present in (2) a hierarchy of a part of the segments of Chemini Kabyle (ChK) and we will focus on the segments specified for the feature [strident].

(2) (partial) consonants system of Chemini Kabyle



/X°/ = distinctive emphasis /X/~/X^{ʕ}/.

Occlusivization whenenver a fricative is geminated

The data in (3) show the formation of the INTENSIVE AORIST (IMPERFECTIVE) stem. This former is formed by the association of the root to a template where the second consonant is geminated i.e. association to two skeletal positions. This gemination leads to OCCLUSIVIZATION.

[1] We will not discuss /q/ in this paper. w.r.t. glides (/j/ & /w/) see BEDAR, QUELLEC & VOELTZEL (2021).

(3) Simple *vs* geminated consonants in Chemini Kabyle

		preterite/perfective $C_1C_2əC_3$	intensive/imperfective $C_1əC_2C_2əC_3$	*gloss*
(a) *sonorants*				
[r]	[rr]	[frən]	[fərrən]	*choose*
[ɹ]	[ll]	[qɹəʕ]	[qəlləʕ]	*remove, start*
[n]	[nn]	[ħnəθ]	[ħənnəθ]	*perjure*
[m]	[mm]	[qməʃ]	[qəmməʃ]	*close eyes*
(b) [-strident] *fricatives*				
[β]	[bb]	[qβəð̩]	[qəbbəð̩]	*take by force*
[θ]	[tt]	[fθəɹ]	[fəttəɹ]	*roll couscous*
[ð]	[dd]	[xðəm]	[xəddəm]	*work*
[ç]	[kk]	[zçəm]	[zəkkəm]	*stay silent*
[ʝ]	[gg]	[mʝər]	[məggər]	*harvest*
(c) [+strident] *fricatives*				
[f]	[pp]	[rfəð]	[rəppəð̩]	*carry*
[s]	[t͡s]	[fsər]	[fət͡stsər]	*expand*
[z]	[d͡z]	[ʝzər]	[ʝəd͡zd͡zər]	*notch*
[ʃ]	[t͡ʃ]	[çʃəm]	[çət͡ʃt͡ʃəm]	*enter*
[ʒ]	[d͡ʒ]	[βʒəħ]	[βəd͡ʒd͡ʒəħ]	*wide open*
(d) [+back] *fricatives*				
[x]	[xx]	[sxəð̩]	[səxxəð̩]	*punish, afflict*
[ɣ]	[**qq**]	[nɣəṣ]	[nəqqəṣ]	*reduce*
[h]	[hh]	[nhəṛ]	[nəhhəṛ]	*drive*
[ħ]	[ħħ]	[mħəq]	[məħħəq]	*grind, crush*
[ʕ]	[ʕʕ]	[nʕəɹ]	[nəʕʕəɹ]	*insult, curse*

OCClusivization/SPIRANTIZATION in other Afroasiatic languages (Hebrew, Tigrinya): ELMEDLAOUI (1993), LOWENSTAMM & PRUNET (1986)).

We give a representation of the verb √mʝr *'harvest'* in (4) that realizes [mʝər] in the AORIST but [məggər] in the INTENSIVE where an additional position allows gemination of the medial consonant C2.

(4) √mʝr : aorist *vs* intensive

[m**ʝ**ər] *harvest*.AOR

C_1	v	**C_2**	V	C_3	V
|		|	|	|	
m		**ʝ**	ə	r	

[mə**gg**ər] *harvest*.INT

C_1	V	**C_2**	v	**C_2**	V	C_3	V
|	|		**ur**		|	|	
m	ə		**ʝ**		ə	r	

However, OC Clusivization can also occurs without gemination/additional position: in **post-sonorant** environment.

(5) Some examples of sonorant + /β, θ, ð, ç, ʝ/ in Chemini Kabyle

	/r/__	/l/ __	/n/ __	/m/ __
/β/	[r**β**u] *litter*	[ɹ**β**uβəɣ] *soaked*	[m**b**əh] *warn*	[im**b**uxən] *soot*
/θ/	[θir**θ**əwθ] *rheum*	[l**t**əf] *massage*	[n**t**u] *depressed*	[θasum**t**a] *pillow*
/ð/	[r**ð**əx] *crush*	[al**d**un] *lead*	[an**d**a] *where*	[θam**d**a] *pond*
/ç/	[r**k**u] *rotten*	[θiɹ**k**iθ] *louse*	[ŋ**k**əṛ] *deny*	[am**k**an] *place*
/ʝ/	[ar**g**az] *man*	[aɹ**g**am] *flange*	[ŋ**g**i] *drain*	[am**ʝ**uð] *cutting*

(6) Distribution of post-sonorant OCCLUSIVIZATION

	/r/__	/l/__	/n/__	/m/__
a. /β/	-	-	+	+
b. /θ/	-	+	+	+
c. /ð/	-	+	+	+
d. /ç/	+	+	+	+
e. /ʝ/	+	+	+	-

"+" = *OCC*lusivization ; "-" = *No OCCLUSIVIZATION.*

Post-sonorant occlusivization does not affect all ChK's fricatives : only the non-strident fricatives (which are impacted to varying degrees).
In (7), the verb √rʝl in the aorist, as in [mjər] in the previous example (4), /ʝ/ surfaces [g] after /r/ in the absence of gemination/additional position.

(7) √rʝl
/rʝəl/ → [r**g**əl] *close, shut*

C_1	v	C_2	V	C_3	V
|		|	|	|	
r		**ʝ**	ə	l	

Analysis:

Government Phonology Framework/Element Theory: KLV (1985, 1990), HARRIS (1990, 1994), HARRIS & LINDSEY (1995), LOWENSTAMM (1996), SCHEER (2004), NASUKAWA (2000), BACKLEY (2011).

Fricatives and occlusivization
/β, θ, ð, ç, ʝ/ only: [-strident].

SAIB (1974, *inter alia*): diachronic process which spirantized proto-Berber stops in Tamazight & Tachelhit resulting in [-strident] fricatives. He notes, however, in (8), that this diachronic process does not explain what is happening in synchrony.

(8) SAIB (1974: 11): While the summary of the historical changes reveals the differences observed in Berber dialects and explains the alternations that now occur, the problem of how to account for the present situation is not necessarily resolved by the diachronic account.

Aït Ndhir Tamazight problem:

(9) SAIB (1974: 17): […] instead of an alternation of simple/identical geminate stops, as in Tachelhiyt, the alternation exhibited by this dialect is one between non-strident spirants and geminate stops.

Underlying consonants: stops or fricatives? spirantization or occlusivization rule?
No single STOPS surface in Aït Ndhir Tamazight: → underlying segments = FRICATIVES.

(10) SAIB (1974: 20, *fig*. 31) *occlusivization rule*
SD: [-strident, + continu]$_1$ (#) [-strident, + continu]$_2$
SC: [- continu]$_1$ [- continu]$_2$
(where 1 = 2)

ELMEDLAOUI (1993): same point of view: he establishes an 'Occlusivization rule' (Strenghthening rule).
OUAKRIM (1995: 46sqq) a.o.: same reasoning but: fricative/stop contrast = lax/tense contrast.

Chemini Kabyle: **OCC**lusivization of all front fricatives.

(11) Stridency: simples and geminates

	non-strident			*strident*	
	simple	*geminate*		*simple*	*geminate*
/β/:	[β]	[bb]	/f/:	[f]	[p͡p]
/θ/:	[θ]	[tt]	/s/:	[s]	[t͡st͡s]
/ð/:	[ð]	[dd]	/z/:	[z]	[d͡zd͡z]
/ç/:	[ç]	[kk]	/ʃ/:	[ʃ]	[t͡ʃt͡ʃ]
/j/:	[j]	[gg]	/ʒ/:	[ʒ]	[d͡ʒd͡ʒ]

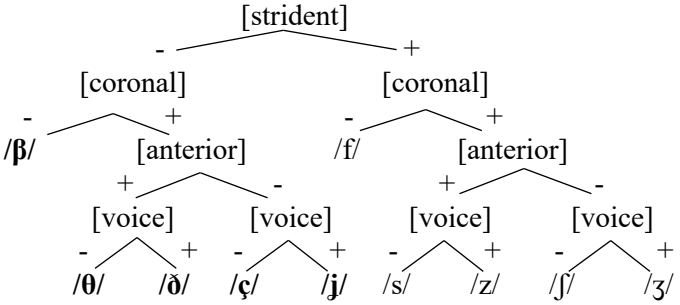
ELIAS (2020) and references therein for a recent analysis and discussion of length/strength in Kabyle.

Only non-strident fricatives undergo **Post-Sonorant OCCLUSIVIZATION**.

Modified Contrastivist Specification (DRESHER 2009, 2021, HALL 2007, 2011).

(12) Stridency Hierarchy in Chemini Kabyle

[strident] >> [coronal]>>[anterior]>>[voice]



Unequal involvement of post-sonant occlusivization

(13) Distribution of post-sonorant OCCLUSIVIZATION

	/r/__	/l/__	/n/__	/m/__
a. /β/	-	-	+	+
b. /θ/	-	+	+	+
c. /ð/	-	+	+	+
d. /ç/	+	+	+	+
e. /j/	+	+	+	-

"+" = *OCC*. "-" = *No OCC*.

/r, l, n, m/: members trigger OCCLUSIVIZATION at different degrees.

This heterogeneous behavior in (13) is consistent with Backley's hypothesis about sonorants:

(14) BACKLEY (2011: 149) […] because voicing is not phonological in nasals, or in any other sonorants, it is not represented by an element. This leads us to the conclusion that 'sonorant' is not actually a grammatical category; it does not count as a natural class because sonorants (vowels, glides, liquids, nasals) have no phonological properties in common.

(15) **"Sonorants" can, under conditions, host [-strident] fricatives content.**

Non-stridency as headedness

non-strident fricatives: headed elementary content hence their capacity to spread.

(16) [-strident]: HEAD [+strident]: ¬HEAD

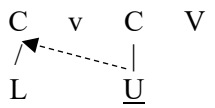
Elements of non-strident fricatives of Chemini Kabyle are given in (17).

(17) /β/ = U *labial*
/θ, ð/ = I *coronal*
/ç, ʝ/ = v *dorsal*

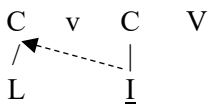
The coronal nasal /n/
The coronal nasal /n/ systematically causes the **OC**Clusivization of [-strident] fricatives, see also the table in (13).

(18) /n/ + /β, θ, ð, ç, ʝ/ in ChK

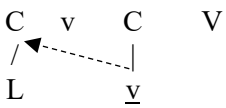
a. /nβ/ → [mb]



b. /nθ, nð/ → [nt, nd]



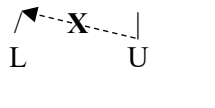
c. /nç, nʝ/ → [ŋk, ŋg]



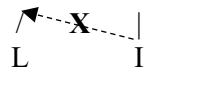
Homorganicity: Headed elementary content spreading.

No Homorganicity & No OCClusivization with [+strident] fricatives.
(19) /n/ + /f, s, z, ʃ, ʒ/ in ChK

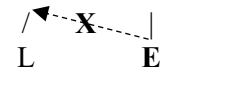
a. /nf/ → [nf]



b. /ns, nz/ → [ns, nz]



c. /nʃ, nʒ/ → [nʃ, nʒ]



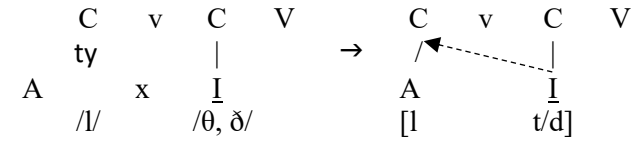
When spreading occurs, the content of the headed expression is interpreted on two positions (as for geminates): it entails OCClusivization.

The lateral /l/
In Chemini Kabyle, the lateral is realized:
- as an approximant [ɹ] when simple,
- as [l] when geminated and when it precedes /θ/ or /ð/.

BEDAR & QUELLEC (2020): bipositionality of [l] + shared content with /θ,ð/.
BACKLEY (2011: 165): laterals may contain |A| and |I|.

In Chemini Kabyle: [ɹ] is the result of a lenition process leading to the loss of |I|.
/l/ can surface as [l] provided that the adjacent segment contains headed-I.

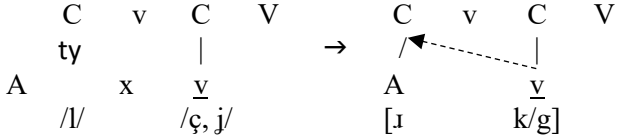
(20) /l/ + /θ, ð/ in ChK
/lθ, lð/ → [lt, ld]



The representation in (21) illustrates the case of the sequences of palatal fricatives /ç, ʝ/ after the lateral: we note that the lateral is realized as an approximant while the fricatives are occlusivized.

(21) /l/ + /ç, j/ in Chemini Kabyle

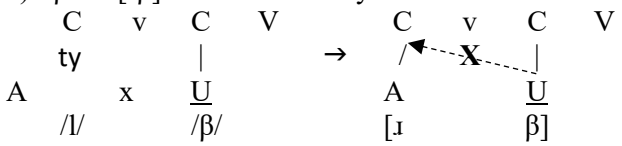
/lç, lj / → [ɹk, ɹg]



|v| has no hot features:

– spreads and is interpreted on two positions >> OCCLUSIVIZATION.
– the lateral is bipositional but, lacking |I|, not interpreted as [l] >> [ɹ]

(22) /lβ/ → [ɹβ] in Chemini Kabyle



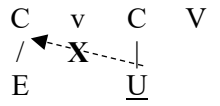
Lateral accepts only |I|: |U| cannot spread >> neither OCCLUSIVIZATION, nor [l].

The rhotic /r/

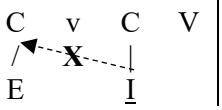
The rhotic rejects |I| (/θ, ð/) and |U| (/β/): only /ç, j/'s OCCLUSIVIZATION is attested.
|v| can interpret its content on the preceding position without modifying the rhotic (no significant change in duration, no change in quality).

(23) /r/ + /β, θ, ð, ç, j/ in ChK

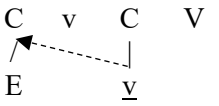
a. /rβ/ → [rβ]



b. /rθ, rð/ → [rθ, rð]



c. /rç, rj/ → [rk, rg]



|**E**|: up to now we don't know the content of /r/ in ChK (and in Kabyle).
Backley (2011 : 165): /r/ = |A|.

(24) |A|, |R|, nothing?

i. Distinct representation for the rhotic [r] and the ungeminated lateral [ɹ].
i'. Type I : Split-R dialect (Youssef: 2019): /r/~/r^{ʕ}/ neutralized (/r/→ [r^{ʕ}]/__ [+back]). If /r/ = |A|, /r^{ʕ}/ would be |A|$^{|A|}$?
ii. |R| (HARRIS 1990, 1994): no processes justifying the use of this prime.
iii. un/underspecified (RICE 1992, 2005, AVERY & RICE 1988, NATVIG 2020) /r/ does not explain /ç, j/ occlusivization and why /β, θ, ð/ do not. If /r/ had no content, all [-strident] fricatives should be subject to occlusivization.

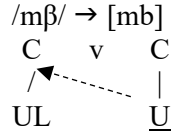
/r/ does have elementary content (or a particular structure, which we don't know yet) blocking the occlusivization of [-strident] fricatives except /ç, j/ because the latter are made of |v|.

The labial nasal /m/

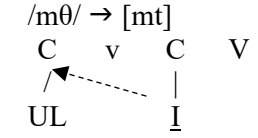
OCCLUSIVIZATION post-/m/ everywhere except for the voiced palatal /j/ in ChK :

(25) Attested /m/ + /β, θ, ð, ç, j/ in ChK

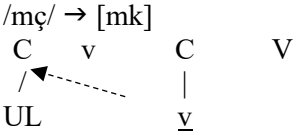
a. /mβ/ → [mb]



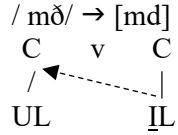
b. /mθ/ → [mt]



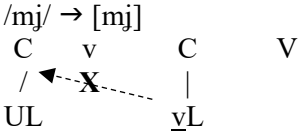
c. /mç/ → [mk]



d. / mð/ → [md]



e. /mj/ → [mj]



No modification of /m/: does not accept any external content and it contains |U|.

i. No problem with bilabial fricative |U| >> sharing content (HONEYBONE 2004).
ii. Should permit /ç, ɟ/ occlusivization given their content |v| >> this is never the case for /ɟ/.
iii. Should block /θ, ð/ occlusivization given their content |I| >> this is not the case in ChK|.

(26) Expected /m/ + /β, θ, ð, ç, ɟ/ in ChK

a. /mβ/ → [mb]
C v C V
/ |
UL U
DO: U-SHARING

b. /mθ/ → [mθ]
C v C V
/ X |
UL I
DO NOT: *IU

c. /mç/ → [mk]
C v C V
/ |
UL v
DO: v-CONTENT

d. / mð/ → [mð]
C v C V
/ X |
UL IL
DO NOT : *IU

e. /mɟ/ → [mg]
C v C V
/ |
UL vL
DO : v-CONTENT

Other varieties of Kabyle: Aït Mengellat (DALLET 1982), Makouda (Boudjima) and Boghni.

(27) Dialectal variation and post-/m/ occlusivization I

	/mβ/	/mç/	/mɟ/	/mθ/	/mð/
Occlusivization	***expected***			***unexpected***	
Fricative content	U	v	vL	I	IL
Makouda & Boghni	[m**b**]	[m**k**]	[m**ɟ**]/__[ə,i,a] ![mh]/__[u]	[m**θ**]	[m**ð**]
Aït Mengellat	[m**b**]	[m**k**]	[m**ɟ**]	[m**t**]	[m**ð**]
Chemini	[m**b**]	[m**k**]	[m**ɟ**]/__[ə,i,a] ![mh]/__[u]	[m**t**]	[m**d**]
Status	***constant***			***variable***	

! In all these varieties: occlusivization post-/r,l,n/ consistent with what we described in Chemini Kabyle.

(28) Dialectal variation and post-/m/ occlusivization II

i. the **bilabial** is always subject to occlusivization.
ii. the **unvoiced palatal** is systematically subject to occlusivization (as expected). However, it is never the case for **its voiced counterpart /ɟ**/. Notice that for Chemini, Boghni and Makouda, if /mɟ/ is followed by [u], **/ɟ**/ is debuccalized ([h]).

>> Voicing conflict: *LL

iii. The **coronals** /θ, ð/ give variable results:

– Boghni and Makouda do not show occlusivization (as expected) as if the nasal was unable to bear both |I| and |U| elements.

>> Element conflict: *IU

– In Aït Mengellat, no occlusivization for the voiced coronal but for the unvoiced.

>> Voicing conflict: *LL

– In Chemini, occlusivization is systematic.

>> Neither Voicing, nor Element conflict.

Special status of /m/: more structure?

Conclusion

The outcome of our analysis:

– Synchronically, the underlying segments of Kabyle are fricatives, but not occlusives as has been previously stated in the literature: Occlusivization process (spirants → stops/occlusives).

– Post-Sonorant Occlusivization brings into play the nature of elements, their status, the internal structure of segments and the intersegmental relationship.

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