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RESEARCH

Not as you R: Adapting the French rhotic into Berber

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This article examines the adaptation of the French rhotic in Berber. In loanwords borrowed from French, the uvular fricative is systematically interpreted as a coronal tap, despite the fact that Berber has phonemic /ʁ/ and /χ/. It is argued that this phenomenon is determined by phonological rather than phonetic factors. It is shown that Tashlhiyt Berber speakers, including monolinguals, are able to identify the French *r* as a sonorant, based on their native phonology, where many co-occurrence restrictions are analyzed in terms of sonority-sensitive dependency relations between the most sonorous segment and its neighboring segments.

Keywords: Loanword phonology; rhotics; French; Tashlhiyt Berber

1 Introduction

Many studies have attempted to establish unity in the phonological behaviour of rhotic consonants, despite their high phonetic variability. In many languages, these consonants behave as a distinct class whose phonological properties often involve the same set of features (cf. Hall 1997; Walsh Dickey 1997; Wiese 2001; 2011, among others). This paper examines the adaptation of the French rhotic in Berber. In loanwords borrowed from French, the uvular fricative (whether voiced [ʁ] or unvoiced [χ]) is systematically interpreted as a coronal tap, despite the fact that Berber has phonemic /ʁ/ and /χ/. Examples are given in (1).

(1)

	French	*Tashlhiyt Berber*	
a.	byʁo	lbiɾu	‘office’
	ʁeʒim	rriʒim	‘diet’
	sɛʁʒɑ̃	ʃɑɾˁʒˁɑn	‘sergeant’
	pɛʁmisjɔ̃	bɾmsjun	‘permission’
b.	tχɛ̃	ttɾan	‘train’
	fχɑ̃s	fɾˁɑnsˁɑ	‘France’
	sɛχtifika	ssɾtafika	‘certificate’
	metχo	metˁɾˁo	‘subway’

This phenomenon is of interest, not only for the light it sheds on the structure of rhotic consonants in the language under scrutiny, but also because it contributes to the highly debated issue on whether loanword adaptations are phonologically or phonetically driven. Two hypotheses have been raised in the literature to account for such adaptation phenomena: in one, the adaptation of loanwords is done by bilinguals who have access to the underlying form of the French rhotic (Paradis & LaCharité 2001; LaCharité & Paradis 2005), and in the other, loanword adaptation is governed by phonetic (perceptual) cues (Peperkamp et al. 2008; Bakst & Katz 2014; Peperkamp 2015). Under the phonetic hypothesis, Berber speakers should have kept the French rhotic unchanged, since they have phonemic /ʁ/ and /χ/ in their native language. As for the analysis advocated by

Paradis & LaCharité, one wonders why uneducated monolinguals who arrived in France in the early 1970s interpret the French uvular systematically as a coronal tap although they do not have access to the phonology of the source language.

An alternative analysis is proposed in this paper. It takes Paradis & LaCharité as a starting point, but argues that the surface phonotactic patterning is sufficient to infer phonological classes, making the mediation by bilinguals unnecessary. It will be shown that speakers of Tashlhiyt Berber select the coronal tap rather than the uvular fricative due to its phonotactics. They identify the French *r* as a sonorant, which patterns with *l* in complex onsets (see also Chabot 2019; and Noelliste 2019), as opposed to the uvular fricatives /ʁ/ and /χ/, which never occur after an obstruent.

The paper is organized as follows: Section 2 outlines the debate on the role of phonology and phonetics in loanword adaptation processes. Section 3 deals with the rhotic consonants in French and Berber. The relevant data will be presented and analyzed therein. Section 4 concludes the paper.

2 Phonology vs. phonetics in loanword adaptation: An overview

As noted by Kang (2011: 2258), loanword adaptation processes allow probing into the grammatical knowledge of speakers in ways that native data alone do not. It is a crucial task for linguistic theory to determine whether the patterns arising from these processes reflect phonetic or phonological representations, and in either case, what kind of information is employed in the foreign and native languages.

Proponents of the phonetic approximation stance argue that phonetic details play a central role in loanword adaptation. Speakers map foreign sounds onto the phonetically closest sounds in their native language. In his seminal work, Silverman (1992) distinguished two levels of adaptation, one of which involves phonological computation. In the first level, the input consists of an acoustic signal, which speakers parse into segmental-sized chunks without any access to their phonological representation in the source language. In the second level, the phonotactics of the borrowing language apply in order to repair any illicit syllabic or prosodic structure. Along the same lines, Steriade (2001) and Kenstowicz (2003; 2005) argue for perceptual similarity, combined with other grammatical constraints that address the phonotactics of the borrowing language.

In a recent study on the adaptation of French vowels into Moroccan Arabic, Kenstowicz & Louriz (2009) argue that the process whereby French back, mid, and low vowels introduce pharyngealization (also termed "emphasis") to adjacent coronal consonants is better analyzed in terms of auditory salience and similarity rather than as contrastive phonological features of the borrowing language (cf. Zellou 2011 for an alternative view on this topic). They contend that the adapters generally map the French vowels onto the closest vowels in the auditory (acoustic) space of the borrowing language. For instance, words such as *pompe* [pɔ̃p] 'pump' and *bon* [bɔ̃] 'voucher' are adapted to high vowels, yielding [lbumba] and [llbun], respectively. In contrast, words containing coronal consonants keep their vowels unchanged and turn the plain coronals into emphatics (e.g. *moquette* [mokɛt] → [mokɛtˁ] 'carpet', *morceau* [mɔχso] → [morˁsˁo] 'piece').

The strongest version of the phonetic approximation stance is promoted by Peperkamp & Dupoux (2003) and Peperkamp (2005: 347) who claim that "all loanword adaptations are phonetically minimal transformations that apply in perception". That is, all non-native sound properties are mapped onto the phonetically closest sounds in the native language through a phonetic (perceptual) decoder. One piece of evidence for this hypothesis comes from the adaptation of word-final /n/ in Japanese (Peperkamp et al. 2008): While English words like *pen* and *walkman* are adapted with a moraic nasal consonant, French words like *parisienne* 'Parisia (F)' and *terrine* 'pâté, terrine' resort to u-epenthesis in the final position,

leading to [parijennu] and [terīnu], respectively. This asymmetry, the authors argue, is due to "fine phonetic differences between English and French word-final [n]", to which Japanese listeners are sensitive.

Most approaches to loanword adaptations are phonetically-based, relying on the nature of the input from the source languages, which is claimed to consist exclusively of surface forms. In contrast to these approaches, it has been proposed that many adaptation processes reflect the speakers' phonological competence, combined where appropriate with their knowledge of the source language. For instance, it has been argued that vowel epenthesis in loanwords obeys the phonological rules of the borrowing language. Rose & Demuth (2006) have shown that the quality of the epenthetic vowel used in Sesotho for English and Afrikaans loanwords is generally predictable on the basis of the feature specifications of the input vowel to its left. In most cases, such epenthesis consists of copying the input vowel (e.g. [fʊtbɔl] > [fʊtubɔlɔ] 'football'; [knɪp] > [kinipi] 'pocket knife'), except when the source vowel is /a/, which triggers the epenthesis of /ɪ/, since it is phonologically underspecified for place (e.g. [pɑtʀuwn] > [pɑtɪrunɪ] 'pattern/cartridge'; [ædrɛs] > [ɑtɪrɛsɛ] 'address').[1]

Further evidence for the phonological approach to loanword adaptation processes comes from French, which adapts English words like *hold up* and *hard rock* as [oldɔp] and [aʁdʁɔk], respectively. According to Paradis & LaCharité (2001), the failure to adapt the laryngeal consonant /h/ is due to the non-availability of the pharyngeal node in the phonology of French. The nature of the French uvular rhotic does not challenge this alleged *Non-Availability Hypothesis*. Although the French rhotic can be realized as a uvular fricative [ʁ], phonologically, it behaves as a coronal sonorant, which patterns with /l/ in complex onsets.

Bilingualism has also been used to argue for a phonological analysis. It has been claimed that bilingual speakers play a central role in the adaptation of loanwords, as they have access to the phonological representations of both source and borrowing languages. In this regard, Paradis & LaCharité (2001: 272) contend that "bilingual Arabic speakers who adapt French loanwords classify the French rhotic as coronal, despite the fact that Arabic has a phonemic uvular /ʁ/ in its inventory of gutturals."

Following the same reasoning, I will argue in the next section that it is the phonological rather than the phonetic representation that determines how the French *r* in loanwords is interpreted in Tashlhiyt Berber. However, I will contend that the mediation of bilinguals in the adaptation process is unnecessary and that monolingual speakers are able to adapt the French rhotic consonant directly from source forms (i.e. on-line adaptation) as a coronal tap. Relying on previous work on the structure of verbal roots in Berber (Lahrouchi 2009; 2010), I will show that Berber phonology provides speakers with enough evidence to analyze the French rhotic as a sonorant.

3 The adaptation of the French rhotic into Berber

Before addressing the core issue of the paper, it is necessary to provide an overview of the phonetic and phonological properties of the French rhotic, as well as the phonemic system of the borrowing language, along with some basic phonological features in order to allow for a better understanding of the analysis.

3.1 Outline of the phonetics and phonology of French r

The rhotic consonant is one of the most variable segments in Modern varieties of French, with many free and contextual variants, most of which have been largely studied (cf. Tranel 1987; Fougeron & Smith 1993; Walker 2001; Russell Webb 2002; 2009, among

[1] The reader is referred to the original work for further details and analysis, especially with regard to the contribution of consonants to the feature copied onto the epenthetic site. Similar patterns are found in Fula (Paradis 1996), and Shona (Uffmann 2001; 2007), among others (see also Boersma & Hamann 2009 on vowel epenthesis in English loanwords into Korean).

others). Traditionally, three free variants have been reported in the literature, namely the uvular fricative [ʁ], the uvular trill [ʀ] and the apical trill [r], all of which broadly reflect dialectal variation on the French territory.

Nowadays, most speakers produce a uvular fricative, typically voiced in onset position (2a) and devoiced when adjacent to voiceless obstruent (2b). In coda position, *r* is often realized as a uvular approximant with a relatively "wider aperture at the point of oral constriction", according to Russell Webb (2009: 88), while it varies from approximant to fricative in intervocalic position.

(2) Voiced vs. voiceless variants of *r*

	Orthography	*Phonetic form*	
a.	rideau	ʁido	'curtain'
	râteau	ʁato	'rake'
	drapeau	dʁapo	'flag'
	bras	bʁa	'hand'
b.	train	tχɛ̃	'train'
	fromage	fχomaʒ	'cheese'
	arc	aχk	'arch'
	archive	aχʃiv	'archive'

Despite its phonetic realization as a fricative, the French rhotic exhibits the same distribution as the lateral /l/. Both consonants occur in the immediate vicinity of a vowel, either as the second member of a complex onset (3a) or as the first member of a complex coda (3b).

(3) r / l distribution

	Orthography	*phonetic form*	
a.	gras	gʁa	'fat, fatty'
	glas	gla	'toll'
	prix	pχi	'price'
	pli	pli	'fold'
b.	courte	kuχt	'short (F)'
	moult	mult	'many'
	orgue	ɔʁg	'organ'
	algue	alg	'seaweed'

These distributional properties are of paramount importance in the adaptation of the French rhotic in Tashlhiyt Berber, as we will see subsequently.

3.2 Background on Berber phonology

Berber is an Afroasiatic language, spoken in large parts of North Africa, mainly in Morocco and Algeria, and to a lesser extent in Niger, Mali, Libya, Egypt, Tunisia and Burkina Faso. Three main varieties are found in Morocco: Tashlhiyt is spoken in Southern Morocco; Tamazight is spoken in the Middle Atlas, and Tarifit is spoken in Northern Morocco. Unless otherwise specified, all Berber data used in this paper refer to the Tashlhiyt variety, of which I am a native speaker. The adaptation of loanwords in Tamazight and Tarifit proceeds along similar paths as in Tashlhiyt, except for a few phonetic and phonological differences, irrelevant for the purpose of the present work.

Tashlhiyt is a relatively well-documented variety. Its phonemic system, extensively studied in previous works, contains three vowels /i, a, u/, 33 consonants, and two semi-consonants /j, w/ (cf. Dell & Elmedlaoui 2002; Ridouane 2008; 2016; Lahrouchi & Kern 2018, among others). The consonants are listed in Table 1.

Table 1: Tashlhiyt Berber consonant inventory.

	Labial	Dental	Alveolar	Palatal	Velar	Uvular	Pharyngeal	Laryngeal
Stop	b	t d tˤ dˤ			k g kʷ gʷ	q qʷ		
Fricative	f		s z sˤ zˤ	ʃ ʒ ʃˤ ʒˤ		χ ʁ χʷ ʁʷ	ħ ʕ	h
Tap			ɾ ɾˤ					
Lateral			l lˤ					
Nasal	m		n					
Approximant	w			j				

All consonants have geminate counterparts, except for /ʕ/ and /h/, which are always singletons (within the native vocabulary). Of interest is the behavior of the rhotic consonants. Gemination of the coronal tap results in a trill, similar to the Spanish *perro* 'dog' vs. *pero* 'but', whereas the gemination of the voiced uvular /ʁ/ may lead to a voiceless stop (e.g. *ʁr* 'read-aorist'/*aqqra* 'read.IPFV', *nʁ* 'kill-aorist'/*nqqa* 'kill.IPFV'). The distribution of geminates in Berber is commonly described as highly marked, since they occur in intervocalic as well as in initial and final positions (Ridouane 2007; Lahrouchi 2017, among others). Table 1 also displays pharyngealized coronals and labialized dorsals, contrasted with their plain counterparts.

As evident in Table 1, Berber contrasts the coronal tap /ɾ/ with the uvular fricative /ʁ/ (e.g. Berber: *ɾar* 'to give back'/*ʁar* 'to be dry', *ɾz* 'to break'/*ʁz* 'to dig'). In contrast, French has only one phonemic rhotic, with three free variants (see section 3.1). The French rhotic also occurs in complementary distribution with the voiceless uvular [χ] such as in *travail* [tχavaj] 'work' and *frein* [fχɛ̃] 'brake' while in Berber both [χ] and [ʁ] are phonemic (e.g. *χlu* 'destroy'/*ʁlu* 'be expensive'). These phonemic differences impact the adaptation of the French rhotic into Berber, as shown below.

3.3 Adaptive strategies from French to Berber

The phonetic approximation approach predicts that Berber speakers should adapt French words like *bureau* [byʁo] 'office' and *rideau* [ʁido] 'curtain' without changing the uvular fricative, since it is part of the phonemic inventory of their native phonology. The allophonic variant [χ], found in words like *frein* [fχɛ̃] 'brake' and *carte* [kaχt] 'card', should likewise remain unchanged, as Berber has a phonemic /χ/. Loanwords of the type shown in (4) clearly contradict this prediction.

(4)

	French	*Tashlhiyt Berber*	
a.	bʁigadje	bɾgadi	'brigadier'
	ɛ̃fiʁmje	a-fɾmli	'nurse'
	sɛʁvis	s-sɾbis	'service, row'
	byʁo	l-biɾu	'office'
	pɛʁmisjɔ̃	bɾmsjun	'permission'
	fɛʁm	l-fiɾma	'farm'
	komisaʁja	l-kumisaɾija	'police station'
	tɛ̃bʁ	t-tanbɾ	'stamp'
	sɛʁʒɑ̃	ʃˤɑɾˤʒˤɑn	'sergeant'
	kapoʁal	kɑbɾˤɑn	'corporal'

b.	elɛktχisite	t-tɾisinti	‘electricity’
	putχ	l-budɾa	‘beam’
	tχɛ̃	t-tɾan	‘train’
	fχɑ̃s	fɾˤɑnsˤɑ	‘France’
	sɛχtifika	s-sɾtafika	‘certificate’
	fχigo	l-fɾigu	‘fridge’
	fχomaʒ	l-fɾˤmɑʒˤ	‘cheese’
	fuχʃɛt	l-fɾˤʃetˤɑ	‘fork’
	kaχtɔ̃	l-kɑɾˤtˤon	‘cardboard’
	kχwasɑ̃	kɾˤwɑssˤɑ	‘croissant’

These data were gathered partly from spontaneous speech and interviews of three native speakers of Tashlhiyt Berber, who also speak Moroccan Arabic. They were also taken from various written sources (cf. Bensoukas et al. 2017; and the *World Loanword Database* edited by Haspelmath & Tadmor, available at https://wold.clld.org/language/6).

The examples in (4) are grouped into two classes depending on the phonetic nature of the French rhotic. They involve many adaptation strategies, the most prevalent of which are discussed here. First, the French rhotic is systematically adapted as a coronal tap in Berber, regardless of whether it is phonetically realized as voiced [ʁ] (4a) or voiceless uvular [χ] (4b). This fact alone is sufficient to refute the phonetic approximation hypothesis, as it shows that phonetic details and perceptual similarity are not the key constraints governing the adaptation of loanwords in Berber.

Second, some input vowels are deleted in the adapted forms, resulting in consonant clusters, which are widely attested in Tashlhiyt Berber: For instance, the form meaning ‘brigadier’ and ‘croissant’ are realized as [bɾgadi] and [kɾˤwɑssˤɑ], respectively.

Third, the initial consonant in the adapted forms stands for the Arabic definite article /l-/, which Berber systematically embeds in the adapted noun, without necessarily denoting definiteness (cf. Guerssel 1987; 1992; Ouhalla 2005; Lahrouchi 2013 on definiteness in Berber). It surfaces as a geminate by assimilation with the following coronal consonant.

It is a well-established fact that the French rhotic behaves like a sonorant: it patterns with the lateral consonant /l/ in complex onsets. It also occurs in the immediate vicinity of vowels (pre- and post-vocalic positions). In light of such arguments, Paradis & LaCharité (2001) claim that bilinguals play a key role in the adaptation of the French rhotic to a coronal tap, since they have access to the phonology of both source and target languages. Accordingly, bilingual speakers identify this consonant as a sonorant, despite its phonetic nature. Further evidence for this hypothesis is provided by Arabic loanwords in French. The authors discuss several examples where the Arabic uvulars /ʁ/ and /χ/ are adapted in French as velar stops (5a), and suggest that this is due to the non-availability of the pharyngeal node in the phonology of French. Meanwhile, the Arabic coronal tap /ɾ/ is systematically interpreted as a uvular in French (5b).

(5)

	Arabic	*French*	
a.	maʁɾib	ma**g**ʁɛb	‘Maghreb’
	ʁazal	**g**azɛl	‘gazelle’
	χalifa	**k**alif	‘calif’
	ʃajχ	ʃɛ**k**	‘Sheikh’
	ʁarrafa	**k**aʁaf	‘water pitcher’

b.	hɾisa	aʁisa	'harissa'
	ɾibatˤ	ʁaba	'Rabat'
	ʕaɾab	aʁab	'Arab'
	sˤaħɾa	sa_aʁa	'Sahara'
	baɾˤudˤ	baʁud	'saltpeter, last stand'

Needless to say, the phonetic approximation approach explains neither the data in (5) nor those in (4). In both cases, it wrongly predicts that the uvular fricative will remain unchanged, regardless of the direction of borrowing.[2]

Paradis & LaCharité (2001) are correct in saying that phonotactics affect the adaptation process. However, bilinguals should not be assigned a key role in the process. Taking their analysis a few steps further, I argue that speakers of Tashlhiyt Berber can select the coronal tap rather than the uvular fricative due to the phonotactics of their own language as well.

3.4 Evidence for the role of phonotactics

3.4.1 Monolingual speakers

Let us consider the following data, collected from Berber monolinguals living in France.

(6)

	French	*Berber*	
i. #_	ʁwɑ̃	ɾuwa	'Rouen'
	ʁazwaʁ	rrˤezˤwɑn	'razor'
	ʁɥɛj	ɾwaj	'Rueil'
	ʁadjo	rradju	'radio'
	ʁuʒ	rruʒ	'red, red wine'
	ʁeʒim	rriʒim	'diet'
ii. _#	nɑ̃tɛʁ	nɑntˤɛɾˤ	'Nanterre'
	anjɛʁ	anjɛɾˤ	'Asnières'
	plasvɔltɛʁ	blˤɑsˤbuntiɾ	'Voltaire square'
	gaʁdynɔʁ	gaɾdinoɾˤ	'North station'
	desɛʁ	ddisiɾ	'dessert, fruits'
	kaχtdəseʒuʁ	kɑrˤtˤsiʒur	'residence permit'
iii. V_V	peʁifeʁik	lpiɾifiɾik	'ringroad'
	tuʁɛfɛl	ttuɾifil	'the Eiffel Tower'
	nymeʁo	nnimiɾu	'number'
	ekyʁi	lkuɾi	'riding stable'
	sekyʁite	ssikuɾiti	'security, safety officers'
	asyʁɑ̃s	lɑsˤoɾˤɑnsˤ	'insurance'
iv. #C_	bʁokoli	lbɾokoli	'broccoli'
	bʁavo	bɾavu	'cheer'
	tχɑ̃kil	tɾankil	'calm'
	tχamwe	tˤɾˤɑmwaj	'tramway'
	tχavopyblik	tˤɾˤɑboblik	'public works'
	fχɑ̃s	fɾˤɑnsˤɑ	'France'

[2] One may argue that the adaptation of the French rhotic into North African languages involves historical considerations. Martinet (1969) suggested that the apical rhotic [r] was introduced at the time of the French occupation by speakers who predominantly used this variant; a fact which would explain its selection in loanwords instead of the uvular variant [ʁ]. However, according to Morsly (1983), the latter variant, taught at school as the standard realization of the French rhotic, has since then replaced the apical realization.

v. …C_	ɑ̃bʁeaʒ	lambɾjaʒ	‘cutch’
	tɛ̃bʁ	ttanbɾ	‘stamp’
	adʁɛs	ladɾis	‘the address’
	metχo	metˁɾˁo	‘subway’
	etχɑ̃ʒe	etˁɾˁanʒi	‘foreigner’
	matχikyl	matɾikul	‘registration number’
vi. …_C	aʁʒɑ̃	lɑɾˁʒa	‘money’
	kuʁbəvwa	kɾbubba	‘Courbevoie’
	ebɛʁʒəmɑ̃	ebeɾʒma	‘housing’
	gaʁdynɔʁ	gaɾdinoɾˁ	‘North station’
	pɛʁmisjɔ̃	bɾmsjun	‘permission’
	kyχkyma	lkoɾˁkoma	‘turmeric’

These data were elicited from two uneducated native speakers of Berber, who arrived in France in the early 1970’s and settled in the Parisian region. They were 65 and 72 years old when they were interviewed in 2017. In addition to data gathered from their spontaneous speech, they were given a list of items, mainly place names and proper names, which they often use when speaking Berber inside their community in France. They were told each item in French and they were asked to pronounce it in Berber.

The data are sorted into six classes, depending on whether the rhotic is word-initial (6i), word-final (6ii), intervocalic (6iii), part of a word-initial (6iv) or word-medial complex onsets (6v), or part of a heterosyllabic cluster (6vi). They clearly show that the French rhotic is systematically adapted in Berber as a coronal tap (or as a trill when geminated), regardless not only of its phonetic nature but also of its position within the word and the syllable.

The data also challenge the idea according to which orthography may influence the adaptation process, as the source and the borrowing languages do not use the same alphabet (cf. Vendelin & Peperkamp 2006; Hamann & Colombo 2017 on the role of orthography in loanword adaptation). On top of that, Berber owes much of its vitality to millennia of oral tradition, with little to no influence of written sources. The Tifinagh alphabet, officially introduced at school in the last two decades in Morocco, is rarely used by Berber speakers, let alone illiterates whose data are central to the analysis advocated here.

One may well ask how Berber speakers interpret the French uvular systematically as a coronal although they do not have access to the phonology of the source language. One possible explanation lies in their native phonology, which may allow them to identify the French rhotic as the analogue of the coronal tap in their native language. The next subsection addresses the phonotactics of Tashlhiyt Berber roots, which come into play in the adaptation of the French rhotic.

3.4.2 The obstruent-sonorant pattern in Tashlhiyt Berber roots

In a relatively recent study (Lahrouchi 2010), it has been shown that the segmental composition of verbal consonantal roots in Tashlhiyt Berber obeys structural and distributional constraints, the foremost being:

(7) Each root contains at least one sonorant, immediately preceded by an obstruent.

The examples in (8) illustrate this constraint. They are grouped into four sets, where O stands for an obstruent and S for a sonorant.

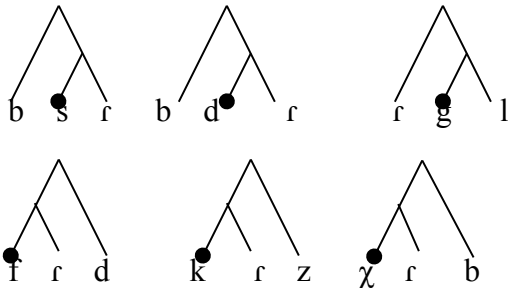
(8)

√*OOS*		√*OSO*	
gzm	‘cut’	fɾd	‘nibble’
bsɾ	‘spread out’	kɾz	‘plough’
bdɾ	‘mention’	χɾb	‘scratch’
kʃm	‘enter’	smd	‘add’
kbu	‘pierce’	ħlb	‘eat (liquid food)’
√*SOS*		√*OSS*	
mgɾ	‘reap’	knu	‘lean’
lkm	‘arrive’	bɾi	‘scratch’
nkɾ	‘stand up’	χmɾ	‘ferment’
ɾgl	‘knock’	ʁml	‘mold’
ntl	‘hide’	gɾu	‘pick up’

Of the roots listed in the aforementioned study, 73% belong to these classes. 82% of them contain at least one sonorant preceded by an obstruent. Counterexamples include roots that are entirely made of obstruents (e.g. *bdg* ‘be wet’, *bzg* ‘swell’, *zdʁ* ‘inhabit’), and roots where the only sonorant occurs in the initial position (e.g. *ɾkz* ‘dance’, *lqʒ* ‘crush’, *ɾqs* ‘jump’).

Based on this type of constraints, Lahrouchi (2010) has proposed that Tashlhiyt Berber triconsonantal roots display a binary-branching head-complement structure, where the obstruent is the *head* and the following sonorant its *complement*. This structure is hierarchical, rendered by means of a tree diagram analogous to those that represent syllabic and syntactic constituencies. The roots represented in (9) illustrate the proposal (the head position is indicated by the dot at the end of the branch).

(9)



The head and the complement share the same node in the tree. The remaining segment, linked to a higher node, is an adjunct that occurs to the left or the right of the head-complement pair.

Biconsonantal roots are no exception to this trend. Half of them are of the form obstruent-sonorant (e.g. *fl* ‘leave’, *gn* ‘sleep’, *gl* ‘bust’). Those displaying the reverse order (sonorant-obstruent) do not exceed 25%, and behave as underlying triconsonantals (cf. Iazzi 1991; Lahrouchi 2008; 2009; 2010, among others).

One piece of evidence in favor of this analysis is provided in the imperfective stem: only roots containing an obstruent-sonorant cluster, that is, a head-complement structure, undergo gemination in the imperfective. Moreover, the segment which is geminated is the one which occurs in the head position. This allows one to distinguish between roots geminating the medial consonant (10a) and those geminating the initial one (10b). Roots lacking the head-complement structure resort to tt-prefixation in the imperfective (cf. Dell & Elmedlaoui 1985; 1988; 2002 for an alternative analysis).

(10)

	√	*Imperfective*	
a.	kʃm	kʃʃm	‘enter’
	bsɾ	bssɾ	‘spread out’
	bdɾ	bddɾ	‘mention’
	kbu	kbbu	‘pierce’
b.	fɾd	ffɾd	‘nibble’
	kɾz	kkɾz	‘plough’
	χɾb	χχɾb	‘scratch’
	ħlb	ħħlb	‘eat (liquid food)’

The careful reader will have noticed that branching onsets in French exhibit a similar pattern:[3] they are composed precisely of an obstruent followed by a sonorant. I contend that Berber speakers, monolinguals included, employ this phonotactic patterning and adapt the French rhotic as a sonorant, that is, as a coronal tap. This is not to say, however, that the obstruent-sonorant clusters behave as complex onsets in Berber. Word-initial complex clusters are much less restricted in this language than they are in languages with genuine complex onsets. While French requires that word-initial clusters have a rising sonority profile (leaving aside sC-sequences), Berber imposes no sonority restriction on their distribution. As shown in the examples below, Berber exhibits not only #CC sequences of rising sonority (11a) but also their mirror image (11b), as well as those which have a sonority plateau (11c).

(11)

a.	OS	
	kɾu	‘rent’
	bɾi	‘scratch’
	gnu	‘sew’
	dlu	‘cover’
	sli	‘touch’
b.	SO	
	ɾku	‘be dirty’
	ɾbu	‘carry on the back’
	ngi	‘overflow’
	ldi	‘pull’
	lsan	‘they wore’
c.	OO	
	kti	‘remember’
	bdu	‘begin’
	bgu	‘drill’
	fsi	‘untie, melt’
	sti	‘pick out’’

Apart from a few restrictions (a significant instance of which to be discussed below), any CC combination is possible in word initial position in Berber, regardless of the relative sonority of the consonants. According to Dell & Elmedlaoui’s syllabic model (1985; 1988; 2002), prevocalic clusters of the type in (11) are systematically parsed as heterosyllabic: The first consonant stands as a syllable on its own while the second one is syllabified in the onset position (cf. Lahrouchi 2001: 103; 2018a; Ridouane, Hermes & Hallé 2014).

[3] The obstruent-sonorant pattern has also been reported in Bella Coola. Bagemihl (1991: 559) noted that in this Salishan language, the continuative is formed by reduplicating the obstruent-sonorant cluster (e.g. *tl’k*^{w} → *tltl’k* ‘swallow’, *kwn* → *k*^{w}*uk*^{w}*n* ‘take’).

I conclude that the obstruent-sonorant pattern is active at the phonological level of both Tashlhiyt Berber and French. While in the latter language it is used at the syllabic level in order to define the sonority profile of complex onsets, in Tashlhiyt Berber it underlies the organization of consonantal roots in the lexicon, assigning them a binary-branching head-complement structure, which does not necessarily correspond to their syllabic structure.

One may argue that the obstruent-sonorant pattern is valid only in verbal roots. The mechanism I propose to account for the interpretation of the French rhotic as a sonorant would then be a generalization from a pattern which applies in a subset of the lexicon. However, the notion of the root in Berber is a complex issue still under debate. Most scholars agree that the lexicon of this language consists mainly of *acategorial* roots which are entirely composed of consonants, ordered inalterably and bearing a general meaning (cf. Basset 1929; Cantineau 1950; Galand 1988; Chaker 1990; Taïfi 1990; Boumalk 1996; Lahrouchi 2018b). Associated with vowels to specific templates, they allow for the derivation of words of different categories: For instance, *askrz* 'plow', *amkraz* 'plowman', and *tajrza* 'plowing' share the triconsonantal root √*krz*. Likewise, *gru* 'to pick up', *agraw* 'assembly' and *amgraw* 'picker' share the root √*grw*. In contrast, roots which contain vowels and consonants alike almost systematically correspond to nouns: e.g. *udm* 'face', *ikzin* 'pup', and *aman* 'water' (cf. Moktadir 1989; Dell & Elmedlaoui 1991; 1992; Dell & Jebbour 1991; Bensoukas 2001; 2018).[4]

If the analysis advocated here is correct, then the hypothesis according to which bilinguals must phonologically adapt loanwords before monolinguals can appropriate them (Paradis & LaCharité 2001: 258) becomes unnecessary. It is sufficient to say that Berber speakers select the coronal tap in French loanwords instead of the uvular fricative based on their native phonology, where many co-occurrence restrictions can be analyzed in terms of sonority-sensitive dependency relations between the most sonorous segment in a specific domain and its neighboring segments. More specifically, they identify any French rhotic preceded by an obstruent as a sonorant, just like they do in their own language when distinguishing between verbs which resort to root-internal gemination and those which involve a geminated prefix. Then, they consistently generalize the adaptation to all other contexts where the French rhotic appears, including word-initial, medial and final position (e.g. ʁido 'curtain', byʁo 'office', baʁ 'bar'), as well as in heterosyllabic clusters (e.g. aχk 'arch', aʁdwaz 'slate-gray').

The idea that a specific mapping driven by a specific context can be generalized to other contexts is not new. One can date it back to the neo-Bloomfieldian principle of "once a phoneme, always a phoneme", which states that if two sounds contrast in at least one minimal pair, they are declared as phonemes and analyzed as such even in neutralizing environments. This also echoes McCarthy's (2005) free-ride approach in morphophonemic learning. The author showed that once learners of Sanskrit have discovered that some surface [eː]s are derived by coalescence from underlying /ai/s (e.g. /tava indra/ → [taveːndra] 'for you, Indra (voc.)'), they are able to derive from underlying /ai/s all surface [eː]s, including those for which they have no relevant alternation data. Along the same lines, Lloret & Pons-Moll (2016) argue that despite a limited number of alternations supporting the epenthetic nature of schwa before word-initial sC clusters in Catalan (e.g. [əspeɾá] 'to expect' ~ [pɾospeɾá] 'to prosper'), learners extend the pattern to all other words which lack these alternations (e.g. [əscálə] 'stairs', [əspɔ́t] 'spot').

[4] If the acategorial roots of the type just discussed are considered as the unmarked case, then the pattern we argue to be at work in French loanwords is the default pattern for Berber roots. Regardless this issue, the obstruent-sonorant pattern remains valid in at least one type of Berber roots. One can reasonably assume that once speakers have learnt this pattern, they are able to mobilize it beyond the verbal category for the sake of loanword adaptation.

3.4.3 Further evidence: The distribution of /ʁ/ and /χ/ in Berber

Another piece of evidence in favor of the phonologically-driven adaptation of the French rhotic as a sonorant lies in the distribution of the uvular fricatives /ʁ/ and /χ/ in Berber. Unlike /ɾ/, /ʁ/ and /χ/ do not occur after an obstruent, hence no *bʁ, *fʁ, *bχ, *kχ, *tχ or any other similar cluster in any position within the word (cf. El Mountassir 2003; Lahrouchi 2010 for relevant data), except for a few forms, most of which often contain a morphological boundary between the obstruent and the uvular fricative. This is shown in the examples in (12), where prefixed t- stands for feminine and second person marker, while suffixed -ʁ marks first singular person.

(12) Contexts where /χ/ and /ʁ/ can be preceded by an obstruent

i. Across morpheme boundaries

t-ʁza	'she dug a hole'
t-χsi	'it (F) was switched off'
t-ʁus	'it/she is clean'
t-ʁama-t	'you remained'
xɾb-ʁ	'I scratched'
ħɾg-ʁ	'I burnt'

ii. Stem-internal position

adʁaɾ	'piece of skin'
asʁaɾ	'wood'
sʁ	'buy!'
zdʁ	'live!'

Based on the phonotactics underlying the distribution of rhotic consonants in Berber, native speakers interpret any French rhotic preceded by an obstruent as a sonorant. They know from their own phonology that among /χ/, /ʁ/ and /ɾ/, only the latter can appear after an obstruent.

4 Conclusion

In this paper, it has been argued that the adaptation of the French rhotic into Berber is determined by phonological rather than phonetic factors. Building on Paradis & LaCharité's phonological analysis, it has been shown that even monolingual speakers who do not have access to the phonology of the source language are able to adapt the French rhotic as a coronal tap. Relying on their native phonology, in which sonorants play a central role in the organization of segmental content in verbal roots, speakers identify the French uvular as a sonorant, which patterns with /l/ in complex onsets. In addition to this, they know that among /χ/, /ʁ/ and /ɾ/, all three available in their language, only the coronal tap can follow an obstruent in the same root.

The literature on loanwords abounds with studies which discuss phonetic and phonological approaches to adaptation strategies. As it has been shown in this paper, phonetic similarity wrongly predicts that the French uvular, be it voiced [ʁ] or unvoiced [χ], will remain unchanged in Berber, since it has phonemic /ʁ/ and /χ/. The analysis proposed here clearly advocates for phonological similarity between phonemic categories in L1 and L2.

Abbreviations

IPF = Imperfective, F = Feminine

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Competing Interests

The author has no competing interests to declare.

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