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A Study of English Loanwords in Mirpuri Pahari Language

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The present study examines the syllable phonotactics of English loanwords in Mirpur Pahari (MP henceforth) and offers a comprehensive analysis of the phonotactics within the OT framework. The data is based on productions derived from monolingual MP speakers. The study will explore whether the adaptation patterns conform to the native MP phonology or we need another grammar to account for these adaptation patterns. The findings suggest the participants show strict adherence to the constraint hierarchy of the native MP phonology in loanword adaptation patterns.

Key words: *OT, Syllable, Mirpur Pahari (MP), Constraint Hierarchy*

1. Introduction and Background

The syllable is the basic unit of a language which has been taken into consideration widely in *OT* to understand language typology cross-linguistically. Every language may have different permissible syllable structures which are allowed in all word positions in one language but may be restricted to certain word positions in other languages. In phonology, the restriction of possible sound sequences and syllable structures is called syllable phonotactics. For instance, when English loanwords with an onset cluster are borrowed into Turkish, the onset cluster is broken up by inserting an epenthetic vowel between the consonants to conform to the native Turkish phonology (e.g. /treɪn/ → [t**i**rɛn] '*train*') (Beel & Fedler, 2013). Similarly, in Fijian a single onset segment followed by a single vowel i.e. CV is permitted. Thus, when Fijian borrows English words with syllable type CVC such as *'bus'*, it avoids a coda consonant by a word-final epenthesis as in bas**i,** to make the word conform to the native phonology (Kenstowicz, 2007).

To analyse whether the observed adaptation patterns in *ML conform to the native MP phonology or violates*, I adopt Optimality Theory (Prince and Smolensky, 1993/2004) as a framework. To my knowledge, there is no prior study which has modelled adaptation of

loanwords at syllable level in general, and more specifically in MP. In the realm of loanword phonology, many phonological studies have captured phonological variation at a segmental level cross-linguistically using OT (see also Yip, 1993; Katayama, 1998; Jacobs and Gussenhoven, 2000; Ito and Mester,1995, 1999; Davidson& Noyer,1996; Broselow 2004; Kenstowicz& Atiwong, 2006: inter alia). Thus, an important question posed in this paper is whether a formalisation of the MP grammar in OT accounts for adaptation patterns in *ML* speakers in MP loanwords or not.

MP is an underrepresented variety of Pahari spoken in Mirpur which is located in Azad Jammu & Kashmir AJK, henceforth, as it is popularly called, is a self-governing administrative division of Pakistan. There has been very limited research on MP at the segmental level (see Tabassum, 1996; Karnai, 2007; Khan, 2012) in general. However, to my knowledge there is no research done as such which explores the loanword adaptation patterns in MP monolingual speakers at syllable level.

1.1. Syllable Phonotactics in MP

1a. Onset Phonotactics in MP

[PP]	**[MP]**	**gloss**
[praːʈ]	[pə.raːʈ]	big plate
[slaː.ta]	[sə.laː.ta]	grinding stone
[plə̃ŋg]	[pə.lə̃ŋg]	bed
[trə̃nd]	[tə.rə̃nd]	bunch of people
[stə.bra]	[sə.təb.ra]	whole family

1b. Coda Phonotactics in MP

[MP]	**gloss**
[ʧə̃mp]	a specific part of meat
[sũnd]	nutmeg
[kənd]	back bone
[pənd]	bundle
[pʰə̃nt]	stick

In MP, an onset position can contain any segment from the consonantal inventory except the velar-nasal (sonorant) /ŋ/ which cannot occur in a word-initial position. Tabassum (1996) reports the presence of onset consonant clusters in MP. Tabassum's paper is not about syllable phonotactics, but some examples he mentions, such as [kʰə.kɽi] 'melon', [to.kri] 'basket' imply the presence of onset clusters in MP. He still holds his position that

MP exhibits onset clusters (personal communication, June 2016). However, I argue that MP does not contain complex onset clusters in any word position. This can be seen by comparison with Poonch Pahari (PP), in which cognate words are said to have onset clusters (Khan 2012). For example, [d̪əraːtɪ] '*sickle*' in MP is pronounced as [d̪raːtɪ] in PP (as shown in data *1a*), with no epenthesis between the consonants /d̪ / and /r/ in the word-initial position.

In terms of coda phonotactics, in MP any consonant can occur in the coda position i.e. word-finally, except /pʰ, ɦ, j/. However, MP only allows complex coda in the word-final position, and both consonants at the coda position; in addition to being homorganic, it must also be in a certain combination, i.e. (voiced) nasal and obstruent. This can be seen in *1b* where coda clusters are allowed only in the word-final position with certain combinations where C1 of the (coda) cluster is a nasal (m, n, ŋ), and C2 is an obstruent (stop, fricative) except /b/. Also note that many words in the MP vocabulary originated from Urdu or Punjabi. These lexical items are not easy to separate from MP vocabulary because they have been part of MP for decades. For instance, the Urdu word /d̪ərd̪ / '*pain*' is also a part of the MP vocabulary (that is, an established loanword). To be a part of MP vocabulary this word undergoes a process of nativisation and is thus pronounced differently from its counterpart in Urdu. Since, the word /d̪ərd̪ / '*pain*' contains an illicit coda cluster (i.e. /rd̪ /), therefore, it undergoes an adaptation process, i.e. an epenthetic vowel/ə/ is inserted which makes it [d̪ərəd̪] '*pain*' in MP.

1.2. Analysis of native MP Syllable Phonotactics within OT

The overall discussion (in section 1.1) shows the following generalisations for syllable phonotactics in MP:

> 2a. Onset clusters are not allowed in word-initial position
>
> 2b. Coda clusters are not allowed in word-final position except the homorganic clusters with certain combination (i.e. nasal+ obstruent).

We can formalise the generalisations drawn in 2a &2b within OT by adopting the following constraints for syllable phonotactics:

> 3) *COMPLEX^{ONSET}: syllables must not have more than one segment in the onset (Prince & Smolensky 1993/2004)
> 4) *COMPLEX^{CODA}: syllables must not have more than one segment in the coda (Prince & Smolensky 1993/2004).
> 5)*COMPLEX $_{[PLACE\text{-}ONS]}$: This constraint requires that onset consonant clusters appearing in the word-initial position should be place-linked (Shafi, 2017).

6) *COMPLEX [PLACE-CODA]: This constraint requires that coda consonant clusters appearing in the word-final position should be place-linked (Shafi, 2017).
7) DEP: It prohibits epenthesis (McCarthy &Prince 1995, 1999).
8) MAX: This prohibits deletion (McCarthy & Prince1995, 1999).
9) IDENT [PLACE] I/O: This is a family of constraints, one for each distinctive feature, which prohibits changing feature values (McCarthy Prince1995, 1999).

As mentioned in 2a, onset consonant clusters are not allowed in word-initial position in MP. In OT terms, the winning candidate (10a) in tableau (10) satisfies the *COMPLEX^{ONSET}, *COMPLEX [PLACE-ONS] and MAX constraints but violates the faithfulness constraint DEP due to epenthesis, which yields the following ranking as shown in 10.

(10) *COMPLEX ^{ONSET}, *COMPLEX [PLACE-ONS], MAX>>DEP

/d̪raːti/	*COMPLEX ^{ONSET}	*COMPLEX[PLACE-ONS]	MAX	DEP
a.→[d̪ə.raː.ti]				*
b. [d̪raː.ti]	*W	*W		L
c. [raː.ti]			*W	L

In tableau (10), the losing candidate *10b* is eliminated due to violation of *COMPLEX ^{ONSET} and *COMPLEX [PLACE-ONS] because it contains an onset cluster. Candidate *10c* is ruled out due to violation of MAX because it deletes the first consonant of the complex onset in the word-initial position. Note that we have assumed that there is an onset cluster in the input because we know that Poonch Pahari (PP) displays onset clusters in onset position, including in this lexical item (see *1a*). The output [d̪ ə.raː.ti] is the optimal realisation of input /d̪ raː.ti/ in MP because it does not contain an onset consonant cluster.

Now, turning to coda phonotactics, MP allows a consonant cluster in word-final position, but only if the two consonants are homorganic and are of a certain combination (i.e. nasal +

obstruent). A surface homorganic coda cluster will involve a violation of COMPLEX^{CODA} as shown below in tableau (11), but not of *COMPLEX $_{[PLACE-CODA]}$.

(11) {MAX, IDENT $_{[PLACE]}$, *COMPLEX $_{[PLACE-CODA]}$}>> {DEP, *COMPLEX^{CODA}}

/pə̃nd/	MAX	IDENT$_{[PLACE]}$	*COMPLEX $_{[PLACE- CODA]}$	DEP	*COMPLEX^{CODA}
a.→[pə̃nd]					*
b. [pə̃nd̪]		*	*		*
c. [pə̃d̪]	*W	* W			L

In tableau (*11*), the winning candidate *11a* violates the low-ranked constraint *COMPLEX^{CODA} by allowing an homorganic coda cluster in word-final position. The losing candidate *11b* is harmonically bounded by the winning candidate *11a* under the constraint *COMPLEX^{CODA}. Therefore, no constraint is favouring the loser over the winner, and thus no ranking can be formulated here. The winning candidate *11a* has one violation (i.e. *COMPLEX^{CODA}) whereas the losing candidate *11b* has the same violation plus also a violation of *COMPLEX $_{[PLACE-CODA]}$. The violations of *COMPLEX $_{[PLACE-CODA]}$ for *11b* are a subset of the violations of *COMPLEX^{CODA} and thus no ordering of the constraints can be proven; the losing candidate *11b* can never win over the winner *11a* under any constraint ranking (McCarthy, 2008). The losing candidate *11c* violates MAX, IDENT $_{[PLACE]}$ to satisfy low-ranked constraint *COMPLEX^{CODA}. The constraint ranking between DEP and *COMPLEX $_{[PLACE-CODA]}$ is not yet clear from this example. Therefore, we will consider another context where a word has a non-homorganic coda consonant cluster in the input. It shows the following ranking as shown below in *12*.

(12){MAX, IDENT $_{[PLACE],}$*COMPLEX $_{[PLACE-CODA]}$}>> {DEP,*COMPLEX^{CODA}}

/d̪ərd̪/	MAX	IDENT [PLACE]	*COMPLEX [PLACE-	DEP	*COMPLEX^{CODA}
a.→[d̪ə.rəd̪]				*	
b. [d̪ərd̪]			*W	L	*
c. [d̪ər]	*W			L	
d. [d̪ə̃d]	*W	*W		L	
e. [də̃]	**W	*W		L	

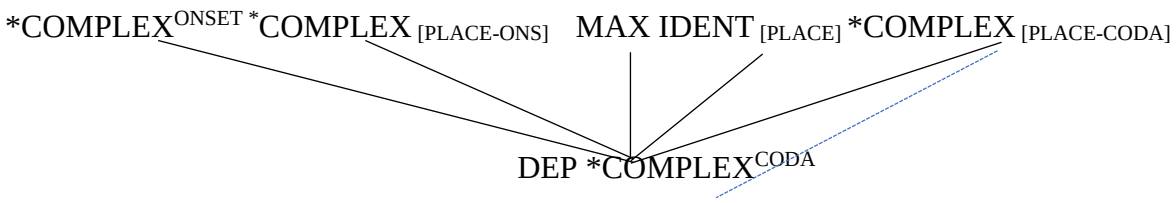
Now, an overall ranking of syllable phonotactics in MP can be seen in tableau (13) below.

(13) {*COMPLEX^{ONSET}, *COMPLEX $_{[PLACE-ONS]}$, MAX, IDENT $_{[PLACE]}$, *COMPLEX $_{[PLACE-CODA]}$}>> {DEP, *COMPLEX^{CODA}}

/ʈrə̃nd/	*COMPLEX ^{ONSET}	*COMPLEX $_{[PLACE-ONS]}$	MAX	IDENT$_{[PLACE]}$	*COMPLEX$_{[PLACE-CODA]}$	DEP	*COMPLEX^{CODA}
a.→[ʈə.rə̃nd]						*	*
b. [ʈrə̃nd]	*W	*W				L	*
c. [ʈə.rə̃n]			*W			*	L
d. [ʈrə̃nɖ]	*W	*W		*W	*W	L	*
e. [ʈrə̃n]	*W	*W	*W			L	L
f. [ʈrə̃.nə]	*W	*W	*W			*	L
g. [trə̃.nə]	*W		*W	*W		*	L
h. [ʈə.rə̃.nə]			*W			**	L
i. [trə̃]	*W		**W	*W		L	L
j. [ʈə̃nɖ]			*W	*W	*W	L	*

In the tableau (13), the winning candidate *13a* shows that *COMPLEX^{ONSET}, *COMPLEX $_{[PLACE-ONS]}$, MAX, IDENT $_{[PLACE]}$,*COMPLEX $_{[PLACE-CODA]}$ are higher ranked constraints whereas DEP and *COMPLEX^{CODA} are lower ranked constraints. The constraint ranking in tableau *13* conforms to the generalisations of MP syllable phonotactics as shown in *2a&2b*; no consonant clusters are allowed except homorganic coda clusters. To avoid illicit consonant clusters at syllable margins (i.e. onset and coda positions), an epenthetic vowel is inserted to break up any consonant clusters in the input, and this violates DEP. Similarly, the presence of homorganic coda clusters in word-final position violates COMPLEX^{CODA} which is however a lower ranked constraint. The ranking in tableau (*13*) accounts for the above rankings regarding onset and coda phonotactics. We can show an overall ranking of syllable phonotactics in MP in a Hasse diagram in (14).

(14) Hasse diagram of syllable phonotactics in MP:



As illustrated in the Hasse diagram 14, the markedness constraints *COMPLEX^{ONSET} *COMPLEX $_{[PLACE\text{-}ONS]}$ dominate faithfulness constraint DEP to ensure onset cluster are prohibited in MP at the word initial position. In terms of coda phonotactics, MP allows homorganic coda clusters and thus *COMPLEX $_{[PLACE\text{-}CODA]}$ remain dominant over faithfulness constraint DEP and markedness constraint *COMPLEX^{CODA}.

After illustrating the syllable phonotactics of native MP phonology, the next section presents the crux of this paper by answering the question posed earlier whether *ML* speakers conform to the constraint ranking of syllable phonotactics of native MP phonology (as illustrated in 14) or show another grammar to account for the loanword adaptation patterns.

2. MP Loanword data

To better understand the MP loanword adaptation patterns, a corpus of MP loanwords comprised of 1219 loanwords is built based on the researcher's intuitions as a native speaker and checked through informal elicitation of grammaticality judgments with other native *ML* speakers with low or almost no exposure to English. The MP loanword corpus data fulfil the Poplack's (2017) diagnostic criterion for established loanwords due to which out of 1219 English loanwords a subset of 869 tokens were chosen as established loanwords for the phonological analysis. One of the aims of this research is to analyse the syllable structure of English loanwords, focusing on consonant clusters in word/syllable-initial position (i.e. onset consonant clusters, hereafter) and word-final position (coda consonant clusters, hereafter) in the loanword corpus data. In total, 466 source words (in English) from the 869 established loanword items contained consonant clusters at syllable margins. The excluded loanwords had no consonant clusters at syllable margins, which is the selection criterion for syllable analysis.

2.1 Syllable phonotactics of English loanwords in ML

The pronunciation of English loanwords depends on the amount of exposure to the source language (English) for an MP speaker. Here we will investigate how syllable phonotactics of MP operate in English loanwords produced by MP speakers who are classified as monolinguals (*ML), i.e.* who have little or no exposure to English. The focus of analysis here is on consonant clusters in word-initial and final position in MP loanwords. It is also

important to mention that only adaptation at the phonotactic (syllable) level is focused here rather than the segmental alterations.

15) Onset consonant cluster in ML

Input (English)	***ML***	**gloss**
15a Onset consonant clusters in word-initial position with an epenthetic vowel /ɪ/. (07/269)		
/tjuːb/	[tuːb]	tube
/mjuː.zɪk/	[mɪ.juː.zək]	music
/bluː/	[bɪl.juː]	Blue
15b Onset consonant clusters in word-initial position with an epenthetic vowel /ə/ (262/269).		
/plɒt/	[pə.laːt]	plot
/blɒk/	[bə.laːk]	block
/brænd/	[bə.rand]	brand
/krɪs.təl/	[kə.rɪs.təl]	question
/krɒ.kri/	[kə.rak.ri]	crockery
/glɑːs/	[gə.laːs]	glass
/flaɪt/	[fə.læːt]	flight
/θrəʊt	[t̪ʰə.raːt]	threat
/skʊəl/	[əs. kuːl]	school
/smal/	[əs.maːl]	smell
/spreɪ/	[səp.reː]	spray
/steɪ.ʃən/	[əs.teː.ʃən]	station
/spaɪ.si/	[əs. pæː.si]	spicy
/træk.tər/	[tə.ræk.tər]	tractor
/trɒ.li/	[tə.raː.li]	trolley
/draɪvər/	[də.ræː.vər]	driver

The data in 15a&15b show the following generalisation regarding the onset phonotactics in *ML* as follows:

16) Onset consonant clusters are prohibited in the word-initial position. This requirement is met via the process of epenthesis.

There are two types of epenthetic vowels used by *ML*; one is context-dependent, and the other is a context-free, default vowel. There are 7 out of 269 items in the word-initial position in *ML* where /ɪ/ is used as an epenthetic vowel (see *15a*) to break up an obstruent or nasal /m, n/ + glide /j/ consonant cluster. Elsewhere, there are 262 out of 269 items where the schwa /ə/ is used as a default vowel as shown in *15b*. An epenthetic vowel breaks up the onset cluster

as in [d̲ræːvər]$_{ML}$ '*driver*', [t̲ra:li]$_{ML}$ '*trolley*' in order to conform to the native MP phonology in *ML*.

17) Coda Phonotactics of MP Loanwords in *ML*

Input (English)	***ML***	**gloss**
17a homorganic coda cluster: nasal+ obstruent		
/kæmp/	[kæmp]	camp
/peɪnt/	[pẽːnt]	paint
/paʊnd/	[põnd]	pound
/bentʃ/	[bæ̃ntʃ]	bench
/tʃeɪndʒ/	[tʃæ̃ndʒ]	change
/bæŋk/	[bæ̃ŋk]	bank
/trʌst/	[tə.raː.sət]	trust
/prɪnt/	[pə.rɪnt]	print
17b /s/or lateral+ obstruent		
/ɹəʊst/	[roː.sət]	roast
/fəʊld/	[foː. ləd]	fold
17c Non-homorganic coda clusters with an epenthetic vowel		
/help/	[hæː.ləp]	help
/mɪlk/	[miː.lək]	milk
/sɪlk /	[siː.lək]	silk
/self/	[sæː.ləf]	self
/gʌlf/	[gəːləf]	gulf
/sɒlv/	[saːləv]	solve
/steɪ.ʃən/	[sə.ˈteːʃən]	station
/fɪlm/	[fiː.ləm]	film
/mɑːsk/	[mɑː.sək]	mask
/sɪ.lekt/	[sə.læː.kət]	select
/bɒks/	[bak.sə]	box
/ʃɪft/	[ʃɪː.fət]	shift
/gɪft/	[giː.fət]	gift
/bəlb/	[bə.ləb]	bulb

Recall the coda phonotactics generalisations in MP in which only an homorganic coda cluster with the combination of 'nasal + obstruent' is legitimate (see *1b*). Now, if we analyse the loanword data in *ML*, we see that the examples shown in *17a* typically respect the MP coda phonotactics, so far. The data in *17b* indicates that even if a source word consonant cluster partially respects the core principle of coda phonotactics operative in MP, that is, to be homorganic, yet there is a difference in the coda cluster combination (not a nasal +

obstruent); therefore, *ML* break up the coda cluster with an epenthetic vowel as in [roːsət] '*roast*'. Similarly, *ML* do not tolerate a non-homorganic coda cluster which is also broken up by an epenthetic vowel [mɑːsək] '*mask*' (as shown in 17c). Based on these observations of coda phonotactics drawn in *17*, the following generalisation can be made:

> *18) ML* do not allow non-homorganic coda clusters in word-final position. This requirement is enforced by the insertion of an epenthetic vowel /ə/ as in [miːlək] '*milk*' [siːlək] '*silk*' or [mɑːsək] '*mask*'.

So far then, there is an influence of the native (MP) syllable phonotactics on loanwords produced by *ML*. The next section shows adaptation patterns related to syllable structure in MP loanwords produced by *ML* within the OT framework.

2.2 Syllable Phonotactics in ML: OT analysis

The OT analysis will show the extent to which loanwords produced by *ML* conform to the phonotactic constraints of the borrowing language (MP) and thus to the native MP phonology. Note that for the OT analysis of loanwords in *ML*, I use the same constraints as for MP (see 3-9 in *section 1.2*).

The generalisation in (16) shows a ban on onset consonant clusters in the word-initial position. This is achieved by inserting an epenthetic vowel between the consonants forming the cluster in the source word. Note that here the input assumed for *ML* is the native-like pronunciation of the source word (i.e. English). According to 'Richness of the base' (ROTB) principle, different inputs should not affect the ability of the algorithm to demonstrate the overall ranking of the language (Prince & Smolensky, 1993; 2004). ROTB posits that systematic differences between languages arise solely from different constraint rankings, not from different inputs. In principle therefore, this entails that whether an input is native-like (e.g. English pronunciation) or non-native-like (e.g. Pakistani English); it does not affect the ability to show an overall ranking and supporting arguments for the language.

In OT terms, the ban on the onset clusters which do not share the place of articulation in word-initial position suggests the dominance of the markedness constraints *COMPLEX $_{[PLACE\text{-}ONS]}$ and COMPLEX ^{ONSET} over the faithfulness constraint DEP in *ML*. Since no deletion occurs to avoid an onset cluster, no ranking argument can be shown among *COMPLEX $_{[PLACE\text{-}ONS]}$, COMPLEX ^{ONSET} and MAX. In addition, in this example no violation of IDENT $_{[PLACE]}$ occurs in the optimal candidate. The ranking argument in this context can be seen below in tableau (19).

(19) COMPLEX ^{ONSET}, *COMPLEX $_{[PLACE-ONS]}$, MAX, IDENT $_{[PLACE]}$>>DEP

/ trɒ.li/	*COMPLEX ^{ONSET}	*COMPLEX $_{[PLACE-}$	MAX	IDENT $_{[PLACE]}$	DEP
a.→ [tə.rɑː.li]					*
b. [t̪rɑː.li]	*W	*W		* W	L
c. [trɑː.li]	*W				L
d. [rɑː.li]			* W		L

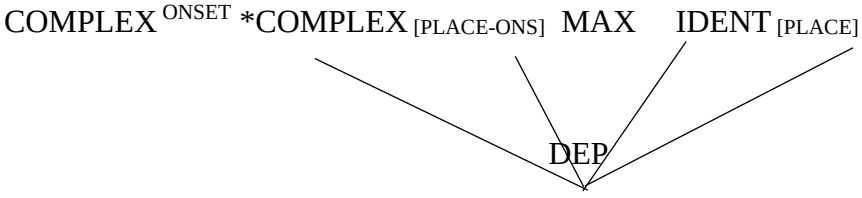
The tableau (*19*) shows that the winning candidate *19a* violates a low ranked constraint DEP. The losing candidate *19b* satisfies DEP but it violates high ranked constraints COMPLEX ^{ONSET}, *COMPLEX $_{[PLACE-ONSET]}$ and IDENT $_{[PLACE]}$. The losing candidate *19c* obeys DEP but at the cost of violating the high ranked constraint *COMPLEX^{ONSET}. Note that the losing candidate *19*c complies with the constraint *COMPLEX $_{[PLACE-ONSET]}$. The losing constraint *19d* violates MAX to obey a DEP constraint. Since we know that onset clusters are not allowed in the word-initial position, I assume that the same generalisation applies in the word-medial position. Thus, if a potential onset cluster appears in the word-medial position, the first consonant of the cluster will in fact be syllabified in the coda position of the preceding syllable and the second consonant of the sequence will be syllabified in the onset position of the following syllable (e.g. /krɒ.kri/$_{Eng}$→[kə.rɑk.ri]$_{ML}$ '*crockery*'). The constraint ranking for this word is shown below in tableau (20).

(20) COMPLEX ^{ONSET}, *COMPLEX $_{[PLACE-ONS]}$, MAX, IDENT $_{[PLACE]}$>>DEP

/krɒ.kri /	*COMPLEX ^{ONSET}	*COMPLEX $_{[PLACE-ONS]}$	MAX	IDENT $_{[PLACE]}$	DEP
a.→[kə.rɑk.ri]					*
b. [krɑ.kri]	** W	**W			L
c. [kɑ.kɻi]	*W	*W	* W	*W	L
d. [kɑ.kri]	*W	*W	* W		L

The tableau (20) shows that the winning candidate violates the low ranked constraint DEP. The candidate *20b* obeys DEP but at the cost of high ranked COMPLEX ^{ONSET} and *COMPLEX $_{[PLACE-ONS]}$. Similarly, losing candidates 20*c* and 20*d* obey low ranked constraint, i.e. DEP but they violate COMPLEX ^{ONSET}, *COMPLEX $_{[PLACE-ONS]}$, MAX (*20c,d*) and IDENT $_{[PLACE]}$ (*20*c). Based on the ranking arguments shown above in tableaux (19 & 20), it can be safely generalised that *ML* do not allow onset consonant clusters in word-initial and medial positions. This indicates that in loanwords *ML* conform to the native MP phonology by adhering to the same constraint ranking for onset phonotactics as in MP which is shown below in the Hasse diagram in (21).

(21) Hasse diagram: onset phonotactics in *ML*:



Now moving on to a coda phonotactics, we find that *ML* allow only homorganic coda clusters as shown above in (17). For instance, in the word [kæmp] '*camp*', the coda cluster is allowed because both consonants /m/ and /p/ are bilabial and share the same place of articulation. Thus, in terms of OT, the winning candidate *22a* (in below) obeys *COMPLEX $_{[PLACE-CODA]}$

by violating *COMPLEX ^{CODA}. Therefore, in this context (i.e. presence of homorganic coda cluster), a harmonic bounding effect is expected in the OT analysis. A constraint ranking of homorganic coda clusters in the word-final position is shown below in tableau (22).

22) {MAX, IDENT $_{[PLACE]}$, *COMPLEX $_{[PLACE-CODA]}$}>> {DEP, *COMPLEX ^{CODA}}

/kæmp/	MAX	IDENT$_{[PLACE]}$	*COMPLEX$_{[PLACE-}$	DEP	*COMPLEX ^{CODA}
a. →[kæmp]					*
b. [kæ.məs]		*W		*	L
c. [kæm]	*W				L
d. [kæ.mə]	*W			*	L
e. [kæ.sə]	*W	*W		*	L
f. [kæms]		*	*		*

In tableau (22), candidate *22a* is the winner; it violates *COMPLEX ^{CODA} yet maintains a homorganic coda cluster in word-final position. The candidate *22b* is faithful to *COMPLEX ^{CODA} but at the expense of changing the place feature of the final coda consonant from bilabial /p/ to alveolar /s/ and by inserting an epenthetic vowel, thus, causing a violation of DEP and IDENT$_{[PLACE]}$. Similarly, the candidate *22c* obeys *COMPLEX ^{CODA} but violates a high ranked constraint MAX. The losing candidate *22d* violates the high ranked constraints MAX and IDENT $_{[PLACE]}$ to satisfy a low ranked constraint, i.e. *COMPLEX ^{CODA}. Likewise, the losing candidate *22*e obeys *COMPLEX ^{CODA} at the cost of high ranked constraints MAX, IDENT $_{[PLACE]}$. It also violates DEP. Lastly, the losing candidate *22f* shows no constraint ranking because of harmonic bounding by the more general constraint, i.e. *COMPLEX ^{CODA} of the more specific constraint, i.e. *COMPLEX $_{[PLACE-CODA]}$. Since *COMPLEX $_{[PLACE-CODA]}$ is not violated in the winning candidate *22a*, this suggests that it is a high ranked constraint. Note that tableau (*22*) does not yet provide a ranking argument between *COMPLEX $_{[PLACE-CODA]}$ and DEP; this will be shown in the next tableau (23). If a non-homorganic coda cluster appears in the source form in word-final position, then an epenthetic vowel /ə/ is inserted to break up the coda cluster (as shown in 23c). For instance, in the words [mi:l**ə**k] $_{ML}$ '*milk*' or [si:l**ə**k] $_{ML}$ '*silk*' the consonants /l/ and /k/ are non-homorganic (i.e. alveolar and velar), therefore, an epenthetic

vowel is inserted to break up the potential coda cluster. The constraint ranking in this context is shown below in tableau (23).

(23).{MAX, IDENT$_{[PLACE]}$, *COMPLEX$_{[PLACE-CODA]}$}>>{DEP,*COMPLEX ^{CODA}}

/mɪlk/	MAX	IDENT$_{[PLACE]}$	*COMPLEX$_{[PLACE-}$	DEP	*COMPLEX ^{CODA}
a. →[miː. lək]				**	
b. [mɪlk]			*W	L	*
c. [mɪl]	*W			L	
d. [nɪl]	*W	*W		L	

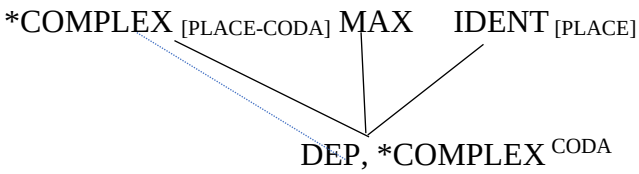
The tableau (23) shows that the winning candidate *23a* violates the DEP constraint. The losing candidate *23b* is faithful to the DEP constraint but at the cost of allowing a non-homorganic coda cluster in word-final position and thus violates *COMPLEX $_{[PLACE-CODA]}$, as well as *COMPLEX^{CODA}. The losing candidate *23c* obeys DEP at the cost of deletion of the coda consonant and thus violates the MAX constraint which is a high ranked constraint. The losing candidate *23d* is faithful to DEP but at the cost of high ranked constraints MAX and IDENT $_{[PLACE]}$.

In another word, such as 'roast' (see *17b*), the coda cluster is homorganic, because /s/ and /t/ both belong to the same place of articulation i.e. alveolar, but is still broken up by *ML*. In native MP phonology, we do not have any evidence for this type of combination, which is homorganic but does not match the preferred native MP combination of nasal + obstruent. This shows us a case where the native phonological rules as applied to loanwords allow us to clarify the specifics of the native phonology. That is, why, despite [st] being homorganic does *ML* break this cluster with an epenthetic vowel (e.g. /ɹəʊst/→[roːsət]). Since we know that MP allows coda clusters with certain conditions: first, only homorganic coda clusters are allowed, and second, the coda cluster must appear in a certain combination of consonant types, i.e. nasal + obstruent. Therefore, in order to conform to the native MP phonology, *ML* do not allow a coda cluster [st] in the word 'roast' thus, insertion of an epenthetic vowel i.e. [ro: sət]$_{ML}$ '*roast*' takes place. Since /st/ partially fulfils the native MP coda condition, i.e. to be homorganic but it violates the certain combination, i.e. nasal + obstruent. In terms of OT,

the production of word [roast] violates the high ranked markedness constraint *COMPLEX [PLACE-CODA], therefore, it is not considered as an optimal candidate in *ML*. The 'roast' example shows that the correct definition and implementation of *COMPLEX [PLACE-CODA] is that it allows maximum one place feature in the coda (rather than allowing more than one place feature so long as it is the same place of articulation). This in turn implies that in MP nasal consonants don't have a separate place feature of their own and can thus appear in a coda with another consonant and not violate the *COMPLEX [PLACE-CODA].

Together tableaux 22-23 capture the generalisations related to coda phonotactics in *ML* and can be shown in a Hasse diagram as in (24):

(24) Hasse diagram: coda phonotactics of MP loanwords in *ML*:



The above Hasse diagram (24) matches the constraint ranking for the coda phonotactics of native MP phonology. The blue dotted line in the above diagram (24) shows harmonic bounding.

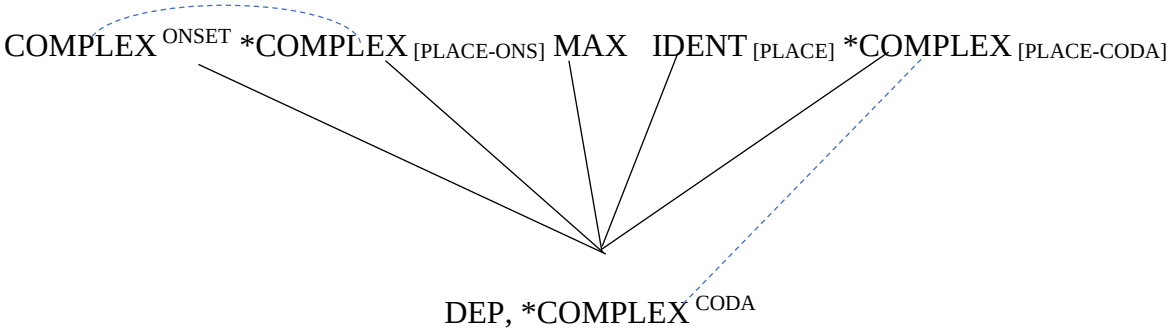
The tableau (25) presents an overall constraint ranking of syllable phonotactics of MP loanwords in *ML*.

(25) *COMPLEX^{ONSET}, *COMPLEX $_{[PLACE\text{-}ONS]}$, MAX, IDENT $_{[PLACE]}$, *COMPLEX $_{[PLACE\text{-}CODA]}$ >> {DEP, *COMPLEX ^{CODA}}

/prɪnt/	*COMPLEX ^{ONSET}	*COMPLEX $_{[PLACE\text{-}ONS]}$	MAX	IDENT$_{[PLACE]}$	*COMPLEX $_{[PLACE\text{-}CODA]}$	DEP	*COMPLEX^{CODA}
a.→[pə.rɪnt]						*	*
b. [prɪnt]	*W	*W				L	*
c. [prɪn̪t]	*W	*W		* W	*W	L	*
d. [prɪ.nət]	*W	*W				*	L
e. [prɪt̪]	*W	*W	*W	* W		L	L
f. [brɪ]	*W	*W	**W	* W		L	L
g. [bə.rɪ.nə]			*W	* W		**	L
h. [pə.rɪnt̪]				*	*	*	*

The overall constraint ranking for the syllable phonotactics in *ML* (as illustrated in tableau *25*) can be drawn in a Hasse diagram as in (26).

(26) Hasse diagram of loanwords by *ML*:



The Hasse diagram (26) in above gives us an overall constraint ranking of syllable phonotactics for the loanword patterns shown in the corpus data for *ML*. This constraint ranking exactly matches the ranking for native MP syllable phonotactics (as shown in 14). This suggests *ML* conform strictly to the native MP Phonology.

Conclusion

Loanword adaptation patterns in ML show that consonant clusters are not allowed in all word positions except the word final position (coda) provided that if both consonants at coda position share the same place of articulation, this paper has provided an extensive constraint-based analysis of the phonotactics of MP and loanword adaptation patterns in *ML*. In the attempt to show the behaviour of complex margins with respect to markedness and faithfulness constraints, the paper demonstrates that the adherence of MP to markedness constraints dominates by violating a well-known process, i.e., epenthesis. The paper has well-established the concrete evidence concerning ML's preference for onset simplification and coda simplification in a certain environment and thus establishes that native grammar operates in syllable phonotactics in loanword adaptation patterns which is as follows:

Syllable phonotactics: MP = *ML*

*COMPLEX $^{\text{ONSET}}$, *COMPLEX $_{[\text{PLACE-ONS}]}$, MAX, IDENT $_{[\text{PLACE}]}$, *COMPLEX $_{[\text{PLACE-CODA}]}$>> {DEP, *COMPLEX $^{\text{CODA}}$}

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