Interdisciplinary Journal of Linguistics
Volume [15] 2022, pp. 29-48

AN OT ACCOUNT OF VOICING ASSIMILATION IN MISING

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Abstract

Mising *is an Eastern Tani[1] language of the Tibeto-Burman language family spoken by approximately 680,424 people in 5 districts of Assam and by 7,412 people in Siang and Namsai districts of Arunachal Pradesh. Tani group had previously been categorized by Bradley (1997) as 'Miric' i.e., Adi–Galo–Mishing–Nishi-Tagin and by Matisoff (2003) as Abor–Miri–Dafla as a branch of Sino-Tibetan languages. This paper discusses aspects of voicing assimilation in* Mising. *One of the most common phonological process, assimilation and its subtypes are often controlled and positional. Like some other types of assimilation, voicing assimilation shows positional controlling. In most cases, the value of the feature [voice] spreads from onset to coda which makes voicing assimilation onset-controlled, rather than coda-controlled. This paper is divided into three parts – firstly, a comprehensive description of voicing assimilation is presented; secondly, a language-specific case of voicing assimilation in Mising and thirdly, an Optimality-theoretic analysis of this pattern.*

Keywords: Onset-controlling, Laryngeal Neutralization, Word-final Devoicing, Spreading, Delinking.

1.1. Assimilation as a Phonological Process

Among all kinds of phonological processes, assimilation processes are perfectly natural consequences of normal speech production which either ease the articulation or perception. The advantage of presence of assimilated segments is that they result in smoother, more effortless transitions from one sound to another and also facilitate the task of speaking.

Some of the phonological processes may affect the whole sound segment, therefore, termed as *whole-segment process* while some others affect only one or more features[2] within a segment, therefore, termed as *modification-type processes*. Modification-type processes include types such as *co-occurrence: assimilation*

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– neighboring sounds become similar (for example, English in- + possible = impossible, *dissimilation*(for example, Latin 'rare' became Italian 'rado') and *vowel harmony* (for example, in Turkish, words can have all front vowels as in [iplerin] 'rope.gen.pl' or all back vowels as in [gündür] 'it is day'), *coarticulation* processes involve change in the place of articulation such as *secondary articulation*(for example, in English 'shoe', [ʃ] is labialized to be pronounced as [ʃʷu] and *nasal release* (for example, in Mundari, voiced bilabial dental plosives have nasal release [bᵐ, dⁿ] in word-final position) etc, *laryngeal:* debuccalisation where a consonant loses its place of articulation and becomes a glottal stop (for example, /tep/ 'to cut' becomes [teʔ] in Paite) and *aspiration* (for example, English word-initial stressed /p, t, k/ becomes [pʰ, tʰ, kʰ] as in [pʰɪn] 'pin', [tʰɪn] 'tin', [kʰæʧ])*syllable-based– vowel insertion* (for example, /skul/ 'school' is pronounced in many languages as [iskul])and *vowel deletion*(for example, in Hindi, /təbəla/ is pronounced as [təbla] 'musical instrument'), *articulatory – gemination* – a consonant is doubled in the pronunciation (for example hatta 'stubbornness' and satta 'power' in Punjabi), and *degemination*- two similar neighboring consonants are reduced to one single consonant (for example the word 'immature' is pronounced with a single /m/ in English).

1.1.1. Parameters of Assimilation

Among many other descriptions of parameters of assimilation, one interesting classification is presented in Yu Cho (1999). She has presented a detailed analysis of the assimilation phenomena of Korean, Japanese and Sanskrit, among other languages and discussed six possible universal parameters of assimilation which are mentioned below. These parameters vary and uniquely combine in language-specific ways for each assimilatory process.

Site of Spreading: This parameter is determined by the representation given in Feature Geometry. It can take any feature or any class node as its value in the feature geometry. Any node whether terminal or non-terminal can be a site i.e. a single feature or a class node may spread.

Specification on Target or Trigger: It is not enough to characterize a rule of assimilation as Spread F. In some cases, only a subset of potential targets is actual target. For instance, in Sanskrit only nasals are targeted, /n/ -Retroflexion, even though

stops and fricatives are potential targets and only fricatives are triggers. In some languages, the most common types of target specification in place assimilation is Coda-Target. In languages such as Korean, Sanskrit and Catalan, there is a condition that only coda consonants are actual targets.

Locality Conditions: All phonological rules are subject only to positive, prosodically expressed locality conditions. Rules can refer only to the target and the trigger. As a consequence, locality conditions that determine the segment class which may or may not interrupt between the target and the trigger can be eliminated.

Relative Order Between Spreading And Redundancy Rules: UG provides a context-free default rule for every distinctive feature. Context free redundancy rules do not change feature specifications and they apply at all stages of a derivation. It is possible for phonological rules to interact with redundancy rules. If language specific phonological rules apply at the initial stage for a given feature then phonological rules can distinguish between marked specifications and the absence of specifications for that feature. If rules apply at the fully specified stage, then phonological rules can distinguish between + and – specifications for that feature. This parameter plays a role in distinguishing two types of assimilation rules. In one rule, only distinctively specified features constitute a set of triggering features and in another rule, redundant features also participate in spreading. For example, in Sanskrit, internal voicing *sandhi* is triggered only by voiced obstruents whereas, in external *sandhi,* any voiced segment can trigger voicing.

Directionality: In this parameter, a rule can take one of the following three values for the directionality – a) no specification of direction : /n/ - Lateralization in Korean, Icelandic and Irish b) left to right: Sanskrit /n/ - Retroflexion, Oscan and Umbrian Nasalization, Japanese VA and c) right to left: Ukrainian VA. Rules with zero value are referred to as mirror image i.e. a feature may spread in the either direction. This is when a marked feature specification spreads regardless of the linear order. In Sanskrit /n/- retroflexion, a fricative on the left triggers 'retroflexion' on the nasal to the right. This is an example of the left to right value. Ukrainian Voicing Assimilation is case of right to left value.

Domain of Assimilation Rules: All phonological rules including assimilation rules have to be assigned to some appropriate domains. Assigning proper rules concerns the entire framework

of phonology. It involves the interaction of assimilation rules with other rules and with other components of grammar. It is difficult to determine the organization of phonology even in a single language.

1.2. Voicing Assimilation

Voicing assimilation is a phonological process by which one sound changes the voicing of another sound due to the influence of its phonological environment. It occurs when the voicing of the assimilator is transferred to a voiceless segment. The shift in the opposite direction is referred to as devoicing. This happens when a voiced sound becomes voiceless in a particular phonological environment. In a certain environment, the voicing or devoicing of a segment can be observed. The change is a result of sound assimilation with an adjacent sound of opposite voicing, but it can also occur at word final position or in contact with a specific segment. For instance, the English suffix - s is pronounced [s] when it is followed by a voiceless phoneme as in the word /kæts/ 'cats' and [z] when it is followed by a voiced phoneme such as /dogz/ 'dogs'. This type of assimilation comes under progressive assimilation, where the second consonant assimilates to the first, whereas regressive assimilation goes in the opposite direction, as it can be seen in /hæftu/ 'have to'. If a consonant is voiced and another consonant is voiceless then the voiced consonant often has no voicing. For example, /big kap/ → [bikkap] 'big cup'.

1.3. Parameters of Voicing Assimilation

Cross-linguistically, assimilation is typically unidirectional (voicing assimilation is no exception, too). For example, nasals assimilate in terms of place of articulation to the following consonant and not to the preceding consonant, thus exhibiting a regressive pattern. This is probably due to the fact that distinctive preconsonantal position is more difficult to perceive than the prevocalic position. Steriade (1999) presents an account for the essentially regressive voicing assimilation in an intervocalic cluster where voicing spreads from the last consonant in the cluster leftwards. Bakovic (2005) gives an explanation for English word-final progressive assimilation that the typical assimilatory direction in a word-final cluster is revered. Distinctive word-final postconsonantal place is more difficult to perceive than postvocalic place. He also states that English shows progressive assimilation as distinctive preconsonantal place is more difficult to perceive than the prevocalic place. Apart for the segmental positioning, the other

issue arising from directionality of assimilation is their morphological affiliation. Beckman (1998) states that affix segments often assimilate to root or stem segments and also explains that it may be due to the psychological prominence of root/stem over affix.

Patterns of VA and final devoicing are based on two interactive parameters. First is 'devoicing' (basically a substitution of a voiceless consonant for a voiced consonant) which has three values – 1) coda devoicing, 2) cluster devoicing and 3) no devoicing. Their effects are observable in some languages when they are coalesced with assimilation. Devoicing is formalized as delinking of feature [voice]. The second parameter for voicing assimilation is the 'spreading' which is viewed as the association of two unassociated nodes. Spreading basically determines whether there is assimilation or not. Spreading has just two minimal values, '+'for spreading and '–' for no spreading. When spreading takes the negative value, or when contextually no spreading is possible, the surface effect results is devoicing.

(1) Interaction of two parameters

Devoicing	**Spreading**	
'+'	**'-'**	
Coda- devoicing	Dutch, Catalan	German
Cluster-devoicing	Serbo-Croatian	
Kirghiz		
No-devoicing	Ukrainian, Santee	
Kannada		

To summarize, devoicing is viewed a 'delinking' and assimilation is viewed as 'spreading'. These two parameters are interactive and are capable of generating six different typologies concerning VA. In other words, voicing alterations of this parametric theory predicts that languages can be classified into six types, all of which are attested in languages as shown in (1) above.

1.4. Typology of Voicing Assimilation

Voicing assimilation has been known to be relatively free in choosing its propagating value. A detailed discussion is presented below based on four different types devised in recent times by phonologists. According to Anderson (1979), clusters of obstruents which are heterogeneous in voicing are made homogeneous either by spreading both [+voice] and [-voice]

directionally or by spreading one preferred value of the feature. He divided assimilation into three types:

(2) Anderson's (1979) VA typology
   a. Progressive assimilation as in English
   b. Regressive assimilation as in Russian
   c. Bi-directional assimilation as in Swedish

Mascaro's (1987) typology suggests reduction of language-specific operations in voicing neutralization and voicing assimilation and proposes that a set of apparently unrelated surface properties should be derived from the interplay of a few parameters. The two basic language particular operations are 'reduction' (it is the loss of phonological structure) and 'spreading' (the association of two unassociated nodes). Lombardi's (1999) typology offers a more coherent classification of voicing assimilation and a categorization of five types of languages exhibiting voicing assimilation.

(3) Lombardi's (1999) VA typology
   a. Syllable-final neutralization as in German
   b. Voice unrestricted as in English, Kannada, Tulu
   c. No voicing in obstruents as in Maori, Ainu
   d. Voicing assimilation in obstruent clusters with word-final neutralization as in Dutch, Catalan, Sanskrit and Polish
   e. Voicing assimilation in obstruent clusters with word-final voicing contrast as in Yiddish, Romanian and Serbo-Croatian

In this paper/chapter, the manifestations of these typological characteristics of voicing assimilation in Mising language, will be studied.

1.5. The Mising Language

Mising is an Eastern Tani language of the Tibeto-Burman language family spoken is Assam (Lakhimpur, Dhemaji, Sibsagar, Majuli, Dibrugarh districts) and Arunachal Pradesh (Siang district). The closest relative of Mising is the Adi community, both ethnically and linguistically while, Hrusso (Aka), Nyshi (Dafla), Gallong and Mishimis are regarded as distantly related to Mising (Taid 1987). Misings are a close cognate of the Adis (Miɲoŋ and Pa:dam dialects) while Apatani, Bokar, Nyshi, Bungi, Tagin, Yano, Hill Miri and Galo of the Western Tani group and Damu, Bori and Milang of the Eastern Tani group (Post 2007, Pegu 2010).

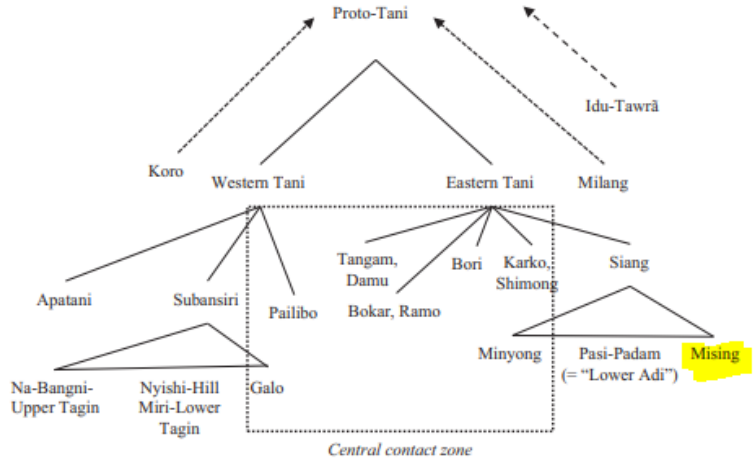


Figure 1: Placement of Mising within the Tani Group (Sun, 1993: 297)

Mising language has some major social dialects including Pagro, Delu, Oyan, Dambug (or, Dambuk), Mo:ying, Sa:yang, Somua and Samuguria. The first 6 dialects have been mentioned in Taid (1995) while Prasad (1991) mentions all 8 of them.

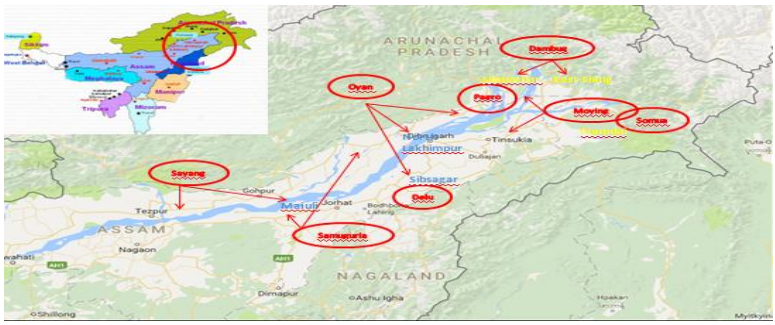


Figure 2. Distribution of regional dialects of Mising (Patgiri, 2020)

Despite being mutually intelligible, the dialects of Mising differ from each other in phonology, morphology, morpho-phonology, morpho-syntax and lexical levels (Pegu 2010). Pagro is regionally concentrated in Dhemaji district of Upper Assam which also has the highest number of speakers. Delu speakers are largely found in the Sibsagar district and Oyan speakers are found in Sibsagar as well as in North Lakhimpur and Dhemaji districts. Dambug, on the other hand, having less number of speakers are mainly the inhabitants of Silapathar sub-division of

Dhemaji and in East Siang district in Arunachal Pradesh. Majority of Mo:ying dialect speakers reside in Tinsukia district and Jonai sub-division of Dhemaji district and Sa:yang speakers reside in Majuli and Sonitpur districts. Somua speakers have traditionally been living in Namsai district of Arunachal Pradesh and Samuguria speakers are found in Golaghat and North Lakhimpur in Assam.

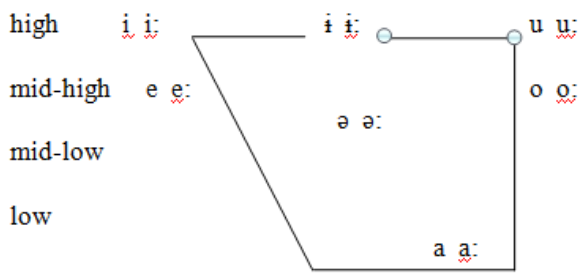
Mising has 15 consonants including 8 obstruents and 7 sonorants. Voicing is contrastive and aspiration is absent. It has not retained any Proto-*Tani* (PT) labio-dental fricative and alveolo-palatal consonant except the palatal nasal /ɲ/. Also, the PT glottal stop is absent in Mising. The language exploits three places of articulation for plosives and four for nasals.

	Labial	**Alveolar**	**Palatal**	**Velar**
Plosives	p, b		t, d	k, g
Nasals	m	n	ɲ	ŋ
Fricatives		s, z		
Trill/Tap		ɾ		
Lat. Approximant		l		
Approximant			j	

(4) Consonants in Mising (Taid 1987, Pegu 2010)

There are some phonotactic restrictions of Mising segments. For example, the palatal nasal /ɲ/ occurs only in word-initial and word-medial positions but never word-finally; the lateral /l/ occur in the word-final position rarely; /s/ and /z/ both occur in word-initial and medial positions freely, but /s/ occurs in word-final position only in onomatopoeic word while /z/ never occurs word-finally; the palatal approximant /j/ can occur in all three positions. The quality of the only rhotic which is a alveolar tap /ɾ/ has many idiolectal/dialectal variations. In Mising, cconsonant clusters cannot have more than two elements and all such clusters occur only word-medially. Hence, clusters are always syllabified as constituents of two adjacent syllables (as coda and onset, respectively) in Mising.

Mising has seven vowel phonemes and phonemic length distinction. Therefore, in seven vocalic places the language uses fourteen vowels in total. The vowels, however, lack nasality. The high central vowel /ɨ/ and central vowel /ə/ are characteristic segments attested in PT also. However, distinctive vowel length is not present in PT. And like many other Tani languages, Mising has preserved the PT seven vowel inventory.



(5) Vowels in Mising (Taid 1987, Pegu 2010)

There are no significant segmental restrictions on Mising vowels. Apparently, all the vowels can occupy any position within a word. Each vowel can form minimal pair with its corresponding long vowel (Patgiri, 2017).

1.5.1. Voicing Assimilation in Mising

In Mising, adjacent obstruents agree in terms of voicing - voiced obstruents become voiceless. Within a heterosyllabic obstruent cluster, a voiceless obstruent triggers assimilation to the unmarked value for [voice] in the voiced coda of the preceding syllable as seen in both (6) and (7) below. This can apparently be viewed as coda devoicing too, but these are phonologically conditioned.

(6) Gerund forms

a.	/ib+pan/	[*i**p**pan*]	‘sleeping away’
b.	/tub+tir/	[*tu**p**tir*]	‘breaking forcefully’
c.	/ib + sum/	[*i**p**sum*]	‘after everyone sleeps’
d.	/tad + pum/	[*ta**t**pum*]	‘hearing something’
e.	/sud + tum/	[*su**t**tum*]	‘prohibiting some act’
f.	/sig+kab/	[*si**k**kab*]	‘closing door’
g.	/dug+pan/	[*du**k**pan*]	‘running away’

It can be seen that the underlying voiced obstruents /b/, /d/ and /g/ are devoiced and voiceless /p/, /t/, /k/ and /s/ in the following syllable have an influence for this agreement in terms of [voice] feature. Therefore, Mising exhibits the Type 1 assimilation pattern where the coda consonant as in /tub/, /tad/, /dug/ is devoiced followed by regressive assimilation. Devoicing can also be seen as delinking of the laryngeal specification.

Interestingly, only voiceless obstruents can be the triggers for [-voice]. Sonorants do not participate as trigger or target in voicing assimilation in the language.

(7) Infinitive forms

a.	/jub + tiŋ/	[*ju**p**tiŋ*]	'to have slept enough'
b.	/jub + ko/	[*ju**p**ko*]	'to place to sleep'
c.	/jub + so/	[*ju**p**so*]	'to sleep less'
d.	/ad + po/	[*a**t**po*]	'to be good to write'
e.	/ad + sɛd /	[*a**t**sɛd*]	'to add to what is already written'
f.	/ad + kin/	[*a**t**kin*]	'to know how to write'
g.	/dug + po/	[*du**k**po*]	'to run ahead'
h.	/dug + sod/	[*du**k**sod*]	'to snap a rope while running'
i.	/kopag + to/	[*kopa**k**to*]	'to sell it'
j.	/dompag + to/	[*dompa**k**to*]	'to ask someone to beat someone'

Mising exhibits assimilation which operates across syllable and morpheme boundaries. Hence, it is both heterosyllabic and tautomorphemic. No example of tautosyllabic voicing assimilation resulting in geminates or homogenously voiced obstruent cluster is found. The voicing of a word-final obstruent is neutralized as it always occupies the coda position making way for phrasal voicing assimilation. On the other hand, medial obstruents undergo devoicing only when they are in the coda position. In Mising language, coda-devoicing can also be viewed to be independent of voicing assimilation: a voiced coda gets devoiced regardless of whether or not there is assimilation. Some examples can be seen in the alternations such as /kopa**g**/ ~ /kopa**k**/ 'banana', /poro**g**/ ~ /poro**k**/ 'chicken', /tala**b**/ ~ /tala**p**/ 'onion', /taba**d**/ ~ /taba**t**/ 'sugercane' etc. [3]

1.5.2. Findings

Based on the parameters of voicing assimilation, the patterns of voicing assimilation in Mising can be summarized n the following way.

(8) Basic assumptions

Site:	Laryngeal node
Target:	Voiced obstruent in coda position
Trigger:	Voiceless obstruent in onset position
Locality:	Skeletal adjacency

Directionality: Regressive
Domain of spreading: Across syllable boundary
Markedness: Unmarked [-voice] plays a role

On the other hand, (9), (10), (11) and (12) below present the typological features of Mising VA based on the four prominent typologies proposed by Anderson, Mascaro, Yu Cho and Lombardi.

(9) Anderson's (1979) typology
Direction: Regressive assimilation

(10) Mascaro's (1987) typology
Reduction: deletion of associating to [+voice]
Spreading: spreading of [-voice] instead of [+voice]
Voicing affects: final devoicing

(11) Yu Cho's (1990) typology
Coda delinking and [voice] spreading: coda devoicing precedes voicing assimilation.

(12) Lombardi's (1999) typology
Voicing assimilation in obstruent clusters with word-final neutralization.

These are some features of the heterosyllabic regressive voicing assimilation in Mising. Interestingly, no other *Tani* language has been reported so far in the literature to have any of these features exhibiting voicing assimilation. Therefore, it becomes necessary to identify if any genetically unrelated contact language shows such characteristics so as to find any evidence of a really diffused feature.

1.6. Voicing Assimilation: An OT Account

Lombardi (1996) proposed a set of interacting constraints within Optimality Theory (Prince and Smolensky 1993) that account for patterns of obstruent devoicing and assimilation phenomena. Rankings of these violable constraints result in patterns which are primarily regressive in the direction for voicing assimilation. However, there are cases of progressive voicing assimilation too, like in Yiddish.

This paper/chapter argues that the constraints of Lombardi (1996) make a correct prediction: that voicing assimilation will always be regressive at least in Mising unless additional constraints are active involving additional restrictions to special circumstances. It is a general observation concerning cross-linguistic patterns of VA that many languages have regressive voicing assimilation in all clusters.

Prior to Lombardi, Mester and Ito (1989) also proposed a way to deal with patterns of regressive voicing assimilation and referred to both values of the feature [±voice], with a privative [voice] feature. They suggested that voicing assimilation should be treated as a combination of neutralization and spreading. Due to the interactive combination, we get both uniformly voiced and uniformly voiceless clusters without need for a [-voice] feature to spread. And here comes the need to invoke the constraint AGREE. Basically, AGREE (voice) says nothing about the direction in which assimilation should occur and thus progressive assimilation is also possible so as to satisfy this constraint in a much similar manner regressive assimilation does. The suggestion by Mester and Ito (1989) was considered by subsequent authors such as Cho (1990) and Lombardi (1996, 1999).However, there arises a problem in this analysis as it predicts that, all other things being equal, assimilation will always co-occur with word-final devoicing, as word-final consonants are in coda position within the final syllable. This is a cross-linguistic generalization. But interestingly, both Cho and Lombardi have given empirical evidences from languages with voicing assimilation but without word-final devoicing of coda consonants. In languages such as Polish, Dutch, Catalan and Sanskrit, VA in obstruent clusters align with word-final neutralization. On the other hand, in languages such as Yiddish, Romanian and Serbo-Croatian, VA aligns with word-final faithfulness. Lombardi (1991, 1995) proposes 'a special additional licensing possibility at word-edge'. The treatment, however, needs to be carefully selected because languages like Yiddish have a more complex grammar than languages like Polish. However, this additional complexity results from purely internal theoretical considerations and does not seem to reflect any true generalization about the naturalness of the two patterns.

Following these initial assumptions, Lombardi (1996) proposed a set of constraints within Optimality Theory which smartly account for these patterns of obstruent voicing assimilation and devoicing.

(13) Lombardi's core OT constraints for VA

a. IDENTONSET(LARYNGEAL) (IDONSLAR): Onsets should be faithful to underlying laryngeal specification
b. IDENT(LARYNGEAL) (IDLAR): Consonants should be faithful to underlying laryngeal specification
c. *LAR: Laryngeal features are prohibited
d. AGREE: Obstruent clusters should agree in voicing

The markedness constraint AGREE which requires output obstruent clusters to agree in voicing on the surface is often in conflict with the faithfulness constraints IDONSLAR and IDLAR which prefer underlying specifications to remain the same. However, not all the faithfulness constraints have same position within the ranking - the hierarchical relationship between IDONSLAR and IDLAR has the result that it is usually more important to be faithful to onset laryngeal specification than to coda (or elsewhere) specification. This is partly because coda is a phonologically weak position. The only assimilation pattern that can satisfy AGREE will be the one where onsets stay the same and codas assimilate to them, since it will always be worse to change the onset than to change the coda.

Lombardi (1996) analyzes a hypothetical example for the mapping of /pikben/ → [pigben] and shows differential treatment of VA patterns across languages. This assimilation will take place in all obstruent clusters, as all obstruent clusters are subject to the proposed constraints. However, the AGREE constraint demands that voicing agreement is inherently non-directional.

Input: /pikben/	AGREE	IDONSLAR	IDLAR
a. pikben	*!		
b. ☞pigben			*
c. pikpen		*!	*

(14) Direction of VA (Lombardi, 1996: 3)

In tableau (14) above, candidate (a) [pikben] violates AGREE because it has an obstruent cluster that does not agree in voicing. On the other hand, obstruent clusters in candidate (b) and (c) agree in voicing and therefore, satisfy AGREE. While candidate (c) tries to satisfy AGREE, it has become unfaithful to the onset's laryngeal specification, violating both IDONSLAR and IDLAR. To get the desired output [pigben], a ranking AGREE » IDONSLAR » IDLAR is observed. The constraints listed in (13) are instrumental to analyze VA patterns cross-linguistically. However, we may have to invoke other constraints too, to analyze language-specific requirements arising from other morphological and phonological restrictions. The core phonological constraints in (13) will only produce regressive voicing assimilation. The same constraints are also useful to analyze the neutralization and feature spreading typologies.

For patterns exhibiting both word-final devoicing and VA, another constraint *LAR is invoked to account for the lack of

[voice] which is a laryngeal feature. Tableau (15) below explains the interaction of all these four constraints for the mapping of /pikben/ → [pigben].

Input: /pikben/	**AGREE**	**IDONSLAR**	***LAR**	**IDLAR**
a. pikben	*!		*	
b. ☞pigben			**	*
c. pikpen		*!		*

(15) VA and word-final devoicing

As seen in (15) above, satisfying the markedness constraint *Lar by leaving the coda voiceless is not possible for a hetero-voiced obstruent cluster. For languages with VA, it is more important to satisfy AGREE and then IDONSLAR than to satisfy *LAR. Therefore, the result is an obstruent cluster that agrees for [voice] with the ranking AGREE » IDONSLAR » *LAR » IDLAR. Devoicing is basically the result of *LAR » IDLAR as the former requires that there should be no laryngeal specification for segments while IDLAR requires that underlying laryngeal specification must not be changed.

1.3.1. Voicing Assimilation in Mising: An OT Account

Regressive assimilation is mostly triggered by the onset and onset voicing can never be altered. Therefore, the faithfulness constraint IDENT ONSET(voice) takes the highest precedence in the constraint hierarchy along with AGREE(voice) and then together rank above IDENT(voice) to conspire in favor of assimilation to the onset voicing (Lombardi, 1996: 5). To account for the word-final devoicing and onset-controlled VA in Mising, the same set of OT constraints is considered as defined in (13) above. However, the constraints must be redefined as from the entire set of laryngeal features, only the [voice] feature is considered here to account for VA patterns in Mising.

a. IDONS(voice): Onsets should be faithful to underlying specification for [voice]

b. IDENT(voice): Consonants should be faithful to underlying specification for [voice]

c. *LAR: Laryngeal features are prohibited
d. AGREE(voice): Obstruent clusters should agree in voicing

(16) OT constraints operative for VA in Mising
In the tableau (17) below, four candidates have been generated to understand the nature of interaction among the conflicting constraints of (16).

Input: /sig + kab/'closing door'	**AGREE (voice)**	**IDONS (voice)**	***LAR**	**ID (voice)**
a. sig + kab	*!		*	
b. sig + gab		*	*	*
c. sik + gab	*!	*		**
d. ☞sik + kab		*!		*

(17) VA in Mising: AGREE (voice) » IDONS (voice) » *LAR » ID (voice)

As evident from the analysis in (17) above, the mapping of /sig + kab/ → [sik + kab] 'closing door' involves interaction among the conflicting set of constraints and the last candidate is selected as output because it incurs the less number and less serious violations.

1.4. Conclusion

Like many languages, Mising also requires obstruent clusters to agree in voicing which are then subject to regressive voicing assimilation. In fact, typical cluster voicing assimilation cross-linguistically is always regressive, as discussed in the previous sections. Thus the set of core constraints allow us to capture the generalization that voicing agreement in obstruent clusters is motivated by the same constraint, AGREE, regardless of the direction; but the correct prediction is made for that of regressive assimilation. The set of core OT constraints is also capable of presenting a preliminary analysis of the VA pattern in Mising.

Endnotes

[1] Tani refers to a compact cluster of Tibeto-Burman languages situated at the eastern end of the Himalayas, in a primarily mountainous area skirted on four sides by Bhutan, Tibet, Burma and the Brahmaputra River in Assam (Post, 2015: 322).

[2] Features are units smaller than the segments. Each sound segment is composed of numerous features in much the same

way like an atomic structure (an atom contains neutron, electron and proton). The features, termed also as distinctive features, should distinguish every phoneme in a phoneme inventory, and they should do so with a minimum number of features. Thus, consonants can be distinguished from vowels with the feature [±syllabic]. For example, English /p/ and /b/ differ in one respect only: /p/ is voiceless and /b/ is voiced. In all other respects, they are same: they both are bilabials, plosives and oral consonants. Again, /p/ and /g/ differ in two respects: there is a contrast of voicing as well as place of articulation - /p/ is voiceless and bilabial while /g/ is voiced and velar. All phonological representations of sounds and all processes affecting sounds can be stated in terms of distinctive features.

[3] In English, the underlying morpheme for negative prefix is /in-/. It is essentially a bound morpheme.

[4] During the development of Assamese from Indo-Aryan roots, /səm- + milən = səmmilən/ has become [xɔnmilɔn] and , /səm- + man = səmman/ has become [xɔnman]

[5] As opposed to the erstwhile SPE representations within the generative framework, Feature Geometry is a theoretical assumption which states that certain features behave similarly while undergoing phonological processes and therefore, can be grouped into various bundles.

[6] The values for the Parameter of Locality Condition can be taken from any node in the prosodic structure i.e. a node in the feature geometry, a skeletal slot, a mora, a syllable, a word etc. The locations in which Locality Conditions hold are different from the site of assimilation. The site of spreading is related to what features are assimilated whereas Locality Conditions are stated in terms of the site in which the target and the trigger are scanned. For example, In English coronal assimilation is accomplished through a rule that spreads the coronal node of /θ, r, t/ onto an immediately preceding coronal segment. Here, the spreading node is the coronal node but the site of Locality Conditions is the Skeletal Slot. Another consequence of the Locality Conditions is the blocking or neutral segments as it cannot be referred to as formal objects in the representation. But the blocking behavior of some segments is a clue to a particular locality condition. For example In Sanskrit, coronal consonants block the /n/- retroflexion since the rule is conditioned by Coronal Adjacency; i.e., a feature cannot spread across an intervening coronal node.

[7] Voiced + voiceless → voiceless + voiceless (Regressive assimilation) b, d, g + p, t, k → p, t, k + p, t, k

[8] For instance, a language which has a rule of word final or syllable final devoicing, then it can be considered as a feature changing insertion or a delinking rule.

[9] Universal Devoicing is not a parameter but a universal rule that is imposed on all languages such as English, Swedish etc.

[10] The reduction parameter takes three values: no operation, deassociation, and deletion. Spreading has two values: '+' and '-'.

[11] Deletion involves erasing the voice specification, whereas deassociation results in a floating autosegment to be re-associated either by a rule or convention. The difference between deletion and deassociation is that a deassociated feature can be reassociated while a deleted feature is not recoverable.

[12] The data had been initially collected during a short field trip from 18 - 20 April, 2017 in *Morituni* and *Randhonisuk* villages in the *Majuli* district of Assam. A week-long data verification program was conducted in Tezpur University during 5 - 11 May, 2017 with two native speakers. Subsequently, part of the data presented here appeared in Patgiri (2017) and Patgiri (2020). Comments from the conference participants influenced part of the analysis immensely.

[13] Proper assessment of the current number of speaker for each dialect has not been done yet and we plan to undertake this project in the near future.

[14] /ŋ/ is a distinct phoneme in the language, but forms no cluster where it is the first member and no geminate structure. It may occur as the second member of the cluster with sonorants and voiced /b/, /d/, /g/, /m/, /n/, /l/ and /r/.

[15] For example, /kinam/ 'to be sick' vs. /ki:nam/ 'to pull' and /kenam/ 'to take a bite' vs. /ke:nam/ 'to hook' etc.

[16] Most of the *Tani* languages are synthetic and agglutinating to varying degrees. These languages allow nouns and adjectives to have disyllabic or longer compounds. Mising is no exception. Mising also allows serial verb constructions which have complex morphological structure to behave as expansive predicate words.

[17] Coda-devoicing precedes and feeds voicing assimilation.

[18] In Dutch, only voiced obstruents trigger [+voice] spreading while Catalan, both voiced obstruents and sonorants trigger [+voice] spreading. Turkish coda-devoicing rule affects only stops and affricates fed by voicing assimilation.

[19] However, the language also exhibits some patterns of nasal place assimilation where sonorants do take part. We are yet to determine the interactive nature of voicing assimilation and nasal assimilation in *Mising*.

[20] In some of the *Mising* dialects, the high-mid rounded [o] is pronounced little lower and resembles the low-mid rounded [ɔ]. However, a detailed analysis of the vowel system of *Mising* is outside the scope of the present study.

[21] Coda-devoicing can also be viewed as neutralization is a delinking of the laryngeal specification.

[22] Dutch and Catalan also show similar patterns.

[23] Dutch, Catalan, Polish and Sanskrit also show similar patterns.

[24] In Yiddish [a Germanic language spoken in Central Europe by the Jews], progressive assimilation appears only in specific morphological situations. Although Yiddish normally has regressive voicing assimilation, progressive assimilation may occur in verbal additive formation with the reflexive /zikh/. In such cases, following a voiceless obstruent, the voiced fricative /z/ may devoice to [s] as in /hert**z**ikh/ → [hert**s**ikh] 'what's new?' The resultant cluster agrees in voicing like all other Yiddish obstruent clusters. But rather than onset voicing taking priority, as in all other cases, preserving the voicing of this particular morpheme seems to take a back seat to faithfulness to the voicing of the verb it is attached to (Lombardi, 1999).

[25] In many cases, the apparent spread of voicelessness can be regarded as a result of neutralization.

[26] An additional mechanism to account for the entire range of languages with VA pattern is needed. A corpus of subsequent works has devised different ways to deal with these varied typological characteristics of VA.

[27] When those constraints are the only ones that are ranked as higher, only regressive assimilation is possible, as this avoids IDONSLAR violations. Both regressive and progressive directions of assimilation are prompted by the same AGREE constraint, and this is especially significant in languages like Dutch and Polish. These languages have general regressive assimilation, but also certain limited cases of progressive assimilation. Thus, while various factors may

influence the direction of assimilation, the single surface generalization that clusters must agree in voicing is captured by a single constraint.

Abbreviations

VA: Voicing Assimilation; WFD: Word-Final Devoicing; VH: Vowel Harmony; PT: Proto-*Tani*; UR: Underlying Representation; SR: Surface Representation; UG: Universal Grammar; OT: Optimality Theory.

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