Sibilant harmony in Tuvan roots

Внутрикорневая гармония свистящих в тувинском языке

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This paper suggests that the Tuvan language of south Siberia exhibits a type of phonological long distance consonant agreement known as sibilant harmony. Thus, if two sibilant fricatives within a Tuvan word root are separated only by a vowel with no intervening consonants, these sibilants can only be both [+anterior] or both [-anterior], but not a mixture of both. An autosegmental tier analysis is offered that describes this phenomenon in Tuvan as a morpheme structure constraint that functions only within word roots, rather than a syllable structure constraint, and a historical process is proposed for this phenomenon.

Keywords: Tuvan language, long distance consonant agreement, sibilant harmony, autosegmental tiers, anteriority, root-affix distinction

В статье обсуждается наличие в тувинском языке фонологической дистантной ассимиляции согласных, называемой гармонией свистящих. Если в тувинском языке два фрикативных свистящих в корне слова разделены только гласным и между ними нет согласного, эти свистящие могут быть или оба переднеязычными, или оба непереднеязычными. Анализ автосегментных уровней показывает, что гармония свистящих в тувинском языке ограничена морфемной, а не слоговой структурой и встречается только в корнях, но не в аффиксах. Предлагается диахроническое объяснение этого феномена.

Ключевые слова: тувинский язык, дистантная ассимиляция согласных, гармония свистящих, автосегментные уровни

1. Introduction

Consonant harmony has been defined as “phonological assimilation or dissimilation between consonants that are not

necessarily adjacent in the surface phonological string and where, crucially, other intervening vocalic or consonant segments do not interact with the harmony in any way" [Shaw 1991: 125]. An alternative descriptive term for this phonological process is long distance consonant agreement, abbreviated as LDCA [Rose & Walker 2004].

Among the different kinds of LDCA, a particularly interesting type is sibilant agreement. Even though Poser [2004: 1] calls this "a relatively rare type of harmony" (maybe because consonant harmony in general is rarer cross-linguistically than vowel harmony), it has in fact been documented in a fair number of languages belonging to different families, such as Athabaskan, Bantu, Basque, Mayan, Omotic, and Uto-Aztecan (for a full listing of specific languages and references, see [Rose & Walker 2004: 481]).

In this paper I suggest that the Tuvan language of south Siberia (Turkic family) should be added to the list of languages that exhibit sibilant harmony. I begin in section 2 by describing the co-occurrence constraint in Tuvan words on sibilants that have different values for the feature of anteriority. Then, in section 3, I offer a formal autosegmental representation of this pattern, describing Tuvan sibilant harmony as a morpheme structure constraint limited to roots. I deal with potential objections to this analysis in section 4 and conclude the paper in section 5.

2. The distribution of Tuvan sibilants

To provide a context for the rest of the discussion, a brief description of some of the basic phonological features of the Tuvan language is given below. The Soviet-era grammar of the Tuvan language [Исхаков, Пальмбах 1961] describes the standard Tuvan vowel inventory as having 24 phonemic vowels that contrast by the segmental features of height, backness and rounding and are divided into three series — short, long, and pharyngealized.[1]

[1] The pharyngealized vowel series has also been described by Harrison [2001] as suprasegmentally high tone vowels.

There is a robust vowel harmony system. Of greater relevance to the present discussion is the Tuvan consonant inventory, given in Table 1 below. The syllable structure is (C)V(CC).

Table 1: Tuvan consonant phonemes

	Labial	**Coronal**	**Dorsal**
Stop	p b	t d	k g
Nasal	m	n	ŋ
Fricative		s š	x
Affricate		č	
Trill		r	
Lateral		l	
Approximant		y	

The consonants that are of primary interest to us in this paper are the sibilants. There are three sibilant phonemes in the Tuvan language: the fricatives /s/ and /š/ and the affricate /č/. Their voiced allophones — [z], [ž] and [dž] — occur intervocalically and following sonorants but are not independent phonemes. The structure of words that contain more than one sibilant exhibits a co-occurrence constraint characterized by two asymmetries: one asymmetry holds between monomorphemic words (roots) and multimorphemic words, the other between fricatives and affricates.

Thus, if a Tuvan root contains two sibilant fricatives that are separated from each other by a vowel, we find that the sibilants are always either both alveolar or both palatoalveolar. That is, they always have the same value for the feature of anteriority, either both [+anter] or both [- anter]. It is never the case that one is alveolar while the other is palatoalveolar. Take the following common Tuvan roots, for example:

(1)

Both sibilants [+anter]	**Both sibilants [-anter]**
a. *ses* ‘eight’	e. *šiš* ‘sharp stick’
b. *saaskan* ‘crow’	f. *šažïn* ‘religion’
c. *Azas* ‘Lake Azas’	g. *šüžü-* 'to sniff, whimper'
d. *sös* ‘word’	h. *šaažï* ‘corporal punishment’

This contrasts with the lack of a sibilant co-occurrence constraint in languages such as Russian and French, which do not exhibit any restriction on mixed sibilants, i.e., those that do not share a value for [anter]. The following example shows a few common roots in these languages with mixed sibilant fricatives (single underlining indicates [+anter], double underlining indicates [-anter]):

(2) a. French: ***s****a****ch****et* [saše] ‘bag, packet’, ***ch****au****ss****-er* [šose] ‘to put on (such as footwear)’

b. Russian: ***ж****е****с****ток-ий* [žəstɔkij] ‘cruel’ , ***с****у****ш****-а* [sušə] ‘dry land’[2]

In Tuvan, root-internal mixed sibilant fricatives occur only in recent borrowings from Russian, such as:

(3) a. ***S****a****š****a* ‘Sasha (proper name)’
b. *fa****š****ï****s*** ‘Fascist, Nazi’
c. ***š****o****s****se* ‘highway’

However, mixed sibilant fricatives are permitted to co-occur in a root if there is at least one intervening consonant between them.

[2] English, on the other hand, has suspiciously few words with root-internal mixed sibilant fricatives, e. g., **s**a**sh**, **s**a**sh**ay, **s**u**sh**i, and some of these are of recent foreign origin. It may therefore have a co-occurrence constraint similar to that proposed for Tuvan.

(4) a. *šagzïra-l* ‘fatigue’
b. *šulbus* ‘witch, demon’
c. *sagiš* ‘thought’
d. *sarbaškïn* ‘monkey’

When we look beyond the word root, we see that mixed sibilants occur freely across morpheme boundaries, even if the sibilants are directly adjacent to each other. There is no phonotactic preference for same sibilants (5a-c) over mixed sibilants (5d-g) across morpheme bounds.

(5)

Same sibilant	**Mixed sibilants**
a. *körgüs-sün* ‘let him/her show	d. *düš-sün* ‘let it fall’
b. *daŋza-zï* ‘his/her pipe’	e. *iš-sïg* ‘smokelike
c. *dužaa-ž-ïr* ‘to meet together’	f. *kiži-zi* ‘his/her person’
	g. *ša-zï* ‘its border, edge’

There is also at least one affix with mixed sibilants, /*-sIš*/ (meaning something like ‘possessing immediately recognizable taste qualities’):

(6) a. *ažïk-siš* ‘immediately recognizable as bitter’
b. *süt-süš* ‘immediately recognizable (by taste) as milk’

The affricate /č/ is not affected by this co-occurrence restriction in Tuvan. It can combine with either alveolar /s/ or palatoalveolar /š/ even in roots, as seen in the following examples:

(7)

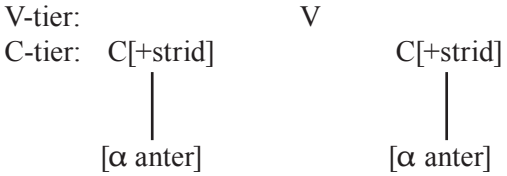
č V s	**č V š**
a. *čes* ‘copper’	e. *češ-tin-er* ‘to untie onself’
b. *čoos* ‘coin’	f. *čïïš* ‘gathering’
c. *čas* ‘spring’	g. *čaš* ‘infant’
d. *ečis* ‘goal, end’	h. *ïnčaš* ‘later’

3. Tuvan sibilant harmony as a morpheme structure constraint

Given the above linguistic pattern, I propose that in Tuvan, sibilant harmony is a morpheme structure constraint (MSC) limited to roots. The phonetic motivation for sibilant harmony is that "[m]orphemes containing combinations of consonants that are more prone to interact in a speech error would be excluded from the lexicon", as suggested by Rose & Walker [2004: 489] in relation to LDCA in general.

It is fairly straightforward to formalize the relationship between these sibilants using an autosegmental approach that places consonants on a separate tier from vowels, where the sibilants can 'see' each other. Thus, sibilants that are identical for [anterior] tolerate each other's immediate company while non-identical sibilants refuse to have such close contact with each other.

(8)



An autosegmental analysis is especially apt for a language such as Tuvan, which has independent evidence for a separate C-tier and V-tier in its vowel harmony system (see chapter 4 of [Harrison 2001] for details). Intervening consonants are non-transparent and block the sibilants from seeing each other, which is why mixed sibilants can co-occur in the sample words in (4) above. Crucially, since there do not seem to be any transparent consonants regardless of their articulator, it must mean that in Tuvan the C-tier is not further subdivided into place tiers as proposed by some linguists to explain articulator dissimilation in Arabic roots, for example, [Shaw 1991; Pierrehumbert 1993].

Since affixes are never affected by sibilant harmony, it is not possible to directly observe whether there is a directionality to sibilant harmony in Tuvan. According to Rose & Walker [2004: 482], "[a]lthough sibilant agreement is most commonly regressive .... regressive directionality is not a fixed property". One piece of indirect evidence that might have bearing on this is the etymology of the Tuvan word *šažïn* 'religion', which has its origin in the Sanskrit word *śasana* 'instruction, teaching'. The immediate historical reflex of the Tuvan word is found in old Tukic inscriptions as *šazïn*, with mixed sibilants [Наделяев и др. 1969: 521]

(9) Sanskrit → Old Turkic → Tuvan
śasana *šaz̲ïn* *ša<u>ž</u>̲ïn*

Thus, originally the second sibilant in the word was alveolar [z] but became palatoalveolar [ž] in Tuvan. If this pattern can be extrapolated to other words (to confirm this we would of course need much more diachronic data of this sort, which at this stage of research is unavailable), it would indicate that in Tuvan this process was one of progressive assimilation (Tuvan vowel harmony is likewise progressive).

4. Potential objections to treating Tuvan sibilant harmony as a MSC

Several possible objections exist to interpreting the Tuvan data as I have done above. These are examined below.

4.1. The primary possible objection to the above analysis is that the environment in which Tuvan sibilant harmony operates may not be the morpheme, but rather the syllable. The mixed sibilant co-occurrence restriction should then be treated as a syllable structure constraint (SSC), not a morpheme structure constraint (MSC). This analysis would be more in line with Optimality Theory and its Richness of the Base hypothesis, according to which there

are no limitations to the form of underlying representations and therefore no such thing as a MSC [Kager 1999: 20].

A few tests that distinguish a MSC from a SSC are proposed by Davis [1991: 52–53] in his discussion of English voiced obstruent clusters in morpheme-final versus syllable-final position, but these tests are not fully conclusive for the Tuvan data. The first test is as follows: if monomorphemic syllables with a restricted element (such as mixed sibilants) do not occur in a language, while bimorphemic syllables with this element do occur, this indicates that the constraint is dependent on morpheme structure. This is exactly what we see in Tuvan by comparing words such as the monomorphemic *šiš* 'sharp stick' (exhibiting sibilant harmony) with the bimorphemic *i.zi-š* 'having gotten hot' (mixed sibilants), in which the second syllable of the word consists of two morphemes and fails to exhibit sibilant harmony.[3]

The second test stipulates that if the co-occurrence constraint holds between two sounds when they are in the same syllable but not when they are in different syllables, then its domain is the syllable. According to this test, comparing *šiš* 'sharp stick' (monosyllabic root exhibiting sibilant harmony) with *šul.bus* 'demon, witch' (polysyllabic root with no sibilant harmony) indicates that the Tuvan constraint is a SSC. However, it seems that Davis' [1991] formulation of this test makes it more suited for the specific type of phonological data he was working with than for the type of data we are dealing with in Tuvan. It is completely unclear why syllable boundaries would in any way affect the spreading of the [anter] feature if the SSC analysis were correct. As has already been mentioned above, a better explanation for the fact that mixed sibilants are licensed in a polysyllabic root like *šulbus* is that the spread of anteriority is blocked by intervening consonants. This analysis predicts that polysyllabic roots should never have

[3] Ideally, the contrasting words should both be monosyllables, but no bimorphemic monosyllables with mixed sibilants could be found in Tuvan.

adjacent mixed sibilants across the syllable break: since there are no intervening consonants if the sibilants are adjacent, there can be nothing to block the feature spread in this case. This is exactly what we find in Tuvan. There are roots with geminate sibilants (example 10), but none with adjacent mixed sibilants.

(10) *aš.šak* 'old man'
čas.sï- 'to seek affection'

Adjacent mixed sibilants are always found only across a morpheme break, as already shown in (5d-e) above.

Thus, there is insufficient evidence to convince us that in Tuvan the mixed sibilant co-occurrence constraint is based on syllable structure as opposed to morpheme structure.

4.2. Several other potential objections exist to explaining the Tuvan sibilant distribution as being produced by a phonological process of root-internal sibilant harmony as opposed to merely by chance. A weighty objection is that the sibilant harmony analysis is based primarily on an argument from silence, i.e., our inability to find any roots with mixed sibilant fricatives that are adjacent on the C-tier. It is somewhat awkward for our proposal that we do not see any alternations produced by this harmony process outside the root, and that borrowed Russian roots are not subject to this process either. Also, given Rose & Walker's [2004: 481–482] assertion that languages that exhibit sibilant agreement do so equally for fricatives and affricates, we would expect that under this analysis, the palatoalveolar affricate /č/ would resist being tier-adjacent to alveolar /s/, but as we saw above, /č/ freely co-occurs with /s/ in roots.

Nevertheless, there are several considerations that mitigate the significance of these facts. First of all, similar root-only constraints have been documented cross-linguistically. Even though Rose & Walker [2004: 476] state that "[e]very language we have examined that has long-distance alternations also appears

to have root structure constraints for the same features", the converse is not true. It is not the case that every language that has root structure constraints also has long-distance alternations that produce similar phonological patterns across morpheme boundaries. In fact, Rose & Walker explicitly affirm that "languages may develop consonant agreement only within roots" [Ibid.: 497]. As an example, they offer Chaha laryngeal harmony. In Chaha, "there is no direct evidence that the [laryngeal consonant] agreement ever occurred outside the root" [Ibid.: 489]. If LDCA constraints such as those that produce laryngeal harmony in other languages can be limited to roots, there is no a priori reason that sibilant harmony in Tuvan could not be likewise limited in its functioning.

Secondly, a diachronic perspective can help explain the source of root-internal sibilant harmony. Rose & Walker affirm a diachronic explanation of morpheme-structure constraints by assuming that "MSCs originated via the effect of sound changes on roots, as appears to be the case for many languages in which consonant agreement is synchronically root-bound" [Ibid.: 477]. Rose & Walker seem to be saying that cross-linguistically, the phonological process of LDCA starts out in the root, then is extended to affixes over time. They also mention the alternative, more traditional explanation of MSCs: "they are the remnant of once active sound changes that originally encompassed alternations" [Ibid.: 477]. In the Tuvan case, the process could have looked something like the following: speakers of proto-Tuvan had a productive sibilant harmony rule that affected how sibilants in concatenated morphemes were outputted. These concatenated multimorphemic units were later reanalyzed as monomorphemic units (roots). Eventually, the sibilant harmony constraint stopped operating, or became lower ranked in the language's constraint hierarchy, so that it fails to apply to multimorphemic words in contemporary Tuvan (possibly due to a higher ranking of an input-output faithfulness constraint on the feature of anteriority).

Finally, the fact that the affricate /č/ behaves differently than the fricatives /s/ and /š/ may be explained by the suggestion that /č/ is unmarked for the feature [anterior] in Tuvan. According to this analysis, even though *č* is phonetically realized as palatoalveolar, it is underspecified for anteriority on the underlying level, which allows it to freely interact with both [+anter] and [-anter] sibilants. As Shaw [1991: 136] predicts, "only those features that are uniquely or distinctively specified for consonants ... participate in consonant harmony". An external argument in favor of this analysis of /č/ in Tuvan comes from head-rhyme poetry. In this system of versification, alliteration between consonants at the beginning of paired verse lines is allowed only when these consonants differ by no more than a single distinctive feature [Voinov 2010]. Since *č* already differs from *s* by the feature of [continuant], these two segments should not be able to alliterate with each other if they also differ by [anterior], since this would violate single feature rhyme. But *č* does alliterate with both *š* and *s* (examples 11, 12 below), which supports the analysis that *č* is simply unmarked for the feature of anteriority.

(11) *č//š* *Čaygï xovu čovurtaan deg čügle šileer —*
Šartïlaalar ïnda doylap turarï ol.

'The summer steppe merely rustles, as though groaning —
It is the sound of feasting locusts'
[Мижит 2006: 13; translation mine)

(12) *č//s* *Častïŋ ïrï, čalap kaanïŋ čaynïŋ soonda*
Sagïššïraan šarïg bürü xölzey beerge

'O song of spring, when the melancholy yellow leaf begins to fret
After the summer that you invited'
[Мижит 2006: 5; translation mine)

5.0 Conclusion

In this brief paper, I have argued for the existence of root-internal sibilant harmony in the Tuvan language based on an autosegmental representation in which sibilant fricatives "see" their neighbor's feature of anteriority on the consonantal tier. Tuvan sibilant harmony has been shown to be a morpheme structure constraint rather than a syllable structure constraint, with a diachronic process proposed as the reason for why sibilant harmony does not produce alternations across morpheme boundaries in contemporary Tuvan. The restriction of sibilant harmony to fricatives and not affricates in Tuvan has been explained as due to a lack of marking for the feature of anteriority on the sibilant affricate /č/. It would interesting to develop this research further and see whether similar sibilant harmony can be found in other Turkic languages besides Tuvan.

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