h in St'át'imcets[1]

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This study provides a comprehensive description and analysis of the behavior and distribution of *h* in St'át'imcets. *h* is phonemic and functions as a hiatus-breaker. *h* alternates with *a* in ways that are rare and peculiar to St'át'imcets. A morpheme-final *a* that is not stressed, when followed by another vowel, changes to *h*; when the vowel *a* is stressed, *h* is epenthesized. Morphemes with a final vowel other than *a* are always expanded with *h* (van Eijk 1987: 26). This study goes beyond van Eijk (1987; 1997) in several respects. First, it argues in *h* and *a* alternations, *h* is underlying. Second, it provides an Optimality Theory analysis of the behavior of *h* in hiatus contexts. Third, it argues that loanwords which would potentially surface as monomoraic are always expanded with *h* so that they meet the bimoraic minimal word requirement. Last, it concludes that *h* is the default epenthetic segment.

1 Introduction

The goal of this study is to provide a detailed description and analysis of the distribution and behaviour of *h* in St'át'imcets. In addition to being phonemic /h/, also functions as a hiatus-breaker (van Eijk 1987, 1997; Davis in prep.) Similar to *most* languages, St'át'imcets does not tolerate hiatus and epenthesis of *h* is one of the hiatus resolution strategies employed. The literature is replete with cross-linguistic and language specific studies on how languages resolve hiatus (Rosenthal 1994, Casali 1997, Roberts-Kohno 1997, Kawahara 2002, Kitto & de Lacy to appear); the most commonly reported hiatus breakers are the oral glides [j, w] and the glottal stop [ʔ] (Tamil, Christdas 1988; Illokano, Hayes & Ibad 1988; Dutch, Booij 1995; Czech, Rubach 2000). The use of *h* as a hiatus-breaker in St'át'micets is unique and interesting in its own right.

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Further, in hiatus contexts, *h* alternates with the vowel *a*, in ways that are rare and peculiar to St'át'imcets; a morpheme final unstressed *a*, changes to *h*, when followed by another vowel or when the vowel *á* is stressed, *h* is epenthesized. Also, morphemes with a final vowel other than *a* are always expanded with *h*, regardless of the stress, (van Eijk 1987: 26). As an illustration, consider the following examples, which show the above patterns[2].

1(a)	slemál**a** sləmál**a** bottle	(b)	slemál**ai** sləmál**aɦ=i** bottle- 3PL.POSS their bottle
2(a)	lek^{w}**á** lək^{w}**á** crucifix	(b)	tilek^{w}**áa** ti=lək^{w}**áɦ=a** DET=crucifix= EXIS the crucifix
3(a)	k̓ápi ~~k̓ápi~~ coffee	(b)	tik̓ápi**a** ti=k̓ápi**ɦ=a** DET=coffee=EXIS the coffee
4(a)	k^{w}as**ú** k^{w}as**ú** pig	(b)	tik^{w}as**úa** ti=k^{w}as**úɦ=a** DET=pig=EXIS the pig

Van Eijk (1987) notes such patterns in the language, but points out that "a detailed description ... falls beyond the scope of this introduction" (pp. 6-7). The aim of this study then, is to complement previous studies by providing an in-depth description and analysis of *h* in St'át'imcets. I will argue that *h* is used as an epenthetic segment that interacts with the phonotactics and stress pattern of the language to determine its distribution and behavior in word-final position and in hiatus contexts.

2 Background

This section provides an overview of the St'át'imcets consonant and vowel inventory, and the stress pattern.

[2] The data is organized as follows: The first line is the underlying representation, given in phonemic transcription, the second is the phonetic or surface form, the third is the morpheme-by-morpheme gloss and the last line is the gloss.

2.1 Overview of St'át'imcets segmental inventory.

2.1.1 The Consonants

Characteristic of Salish languages, St'át'micets has a large phonemic inventory: 44 consonant phonemes and 8 vowels. The consonants are further subdivided into: 22 obstruents and 22 resonants.

Figure 1 Consonant segments in St'át'imcets

	Labial	Dental	Lateral	Dental-Palatal		Velar		Uvular		Laryngeal	
				Dent.	Pal.	Unr.	R	Unr.	R	Unr.	R.
Obstruents											
Plos.	P	t			c ç	k	k^w	q	q^w		
	p′		ƛ’	c’		k′	k'^w	q′	q'^w		
Fric.			ɬ		s ş	x	x^w	χ	$χ^w$		
Resonants											
Nasal	m	n									
	m′	n′									
Liqu.			l ļ								
			l′ ļ′								
Glides				z	y	ɣ		ʕ	$ʕ^w$	h	w
				z′	y	ɣ′		ʕ′	$ʕ'^w$	ʔ	w′

(Adopted from van Eijk 1997:2)

Figure 2. Vowels of St'át'micets

	Front	Back
High	i ị	u ụ
Mid	ə ə̣	
Low	a ạ	

(Adapted from van Eijk 1997: 2)

The laryngeals *h* and ʔ are phonemic in the language. Van Eijk (1997) classifies *h* and ʔ as resonants on the basis of their distribution in St'át'imcets. They do not occur in the following positions, just as other resonants, do not: C-C and C- #. This means that *h* and ʔ cannot occur between obstruents to form clusters of the form Consonant Resonant Consonant (*CRC). Further, a consonant plus resonant sequence are not allowed to form a cluster at the end of the word (*CR#).

Although *h* and ʔ show similar distributional patterns with other resonants, they stand apart in several respects. Unlike other resonants which cannot occur in word-initial position, the glottal stop ʔ frequently occurs in this position, and *h* only rarely occurs in this position. Further, *h* and ʔ are the only

voiceless resonants. However, van Eijk (1997) points out that *h* does allow a voiced variant [ɦ] in inter-vocalic position.[3]

2.2 Vowels

Vowels never occur word-initially, in St'át'imcets and because of this there are no vowel-initial prefixes, roots, full words, or proclitics. However, vowels occur initially in suffixes and enclitics.

2.3 Stress

Stress is phonemic in the language (van Eijk 1987, 1997). In polysyllabic words, one vowel has a dynamic stress. In both roots and root-suffix combinations, assignment of the stress follows two basic tendencies; first, in words with at least one vowel (a ạ i į or u u̱) the stress falls on the first of these vowels, whether that vowel is preceded by a schwa (ə ə̱) or not. Typical of Salish languages, there is preference for stress to fall on full vowels (see, eg., Matthewson 1994, Roberts and Shaw 1994, Davis in prep.). Second, in words with schwas only, the stress falls on the first schwa.

3 The data

In this section, I present data which shows the distribution and behavior of *h* in St'át'imcets. I begin by showing words which have an underlying *h* in word-initial position.

3.1 Underlying *h*

There are relatively few roots that are *h* initial; for example, there are few roots that are listed in van Eijk's (1987) dictionary. The examples below show roots with underlying *h*.

5a. hál'
hál'
appear

b. hámsaʔ
hámsaʔ
to roast berry leaves

[3] In terms of features developed in the literature this would mean that only [ɦ] qualifies to be called a resonant, considering that the distinctive features suggested are: [+sonorant] and [-consonant] (see, e.g., Chomsky and Halle 1968; Halle and Clements 1983; Parker 1994).

c. huza?
húza?
to get ready

d. hawint
háwint
rat

(van Eijk 1987)

3.2 *h* and *a* alternations

The data in this section is of two types: data that involves bare roots that end with the unstressed vowel *a;* data which shows that when a vowel-initial suffix is added to the root the root-final *a* changes to *h.* Van Eijk (1987, 1997) mentions these alternations between *a* and *h* but does not account for the alternation.

First, consider the example involving a bare root (6a). I assume that the underlying root structure is *h*-final, given that most Salish languages prefer consonant-final roots.

6(a) amh
?áma
good

(b) *?ámh

Allowing the *h* to surface in root-final position would violate the phonotactics of the language which prohibit a consonant and *h* cluster from being word-final (6b).

Adding a vowel-initial suffix brings out a different surface form of the root; the root surfaces with the *h* in root-final position. However, since there is a suffix, *h* is root-final but not word-final. Consider the examples (7a-c) below.

7(a) iámha sáma?
?i=?ámh=a šáma?
DET.PL=good=EXIS white.person
the good white people/guys

(b) *?iámaa sáma?
?i=?áma=a šáma?
DET.PL=good=EXIS white.person

Allowing *h* to surface in root-final position when a vowel initial suffix is added is a hiatus resolution strategy—avoidance of heterosyllabic VV sequences.

Alternatively, having the vowel *a* in root-final position would create hiatus, and trying to resolve hiatus by epenthesizing *h* produces unacceptable forms. This is illustrated in (7c) below.

(c)	*ʔi=ʔáma*h*=*a*	šáma?
	DET.PL=good=EXIS	white.person

More evidence that the alternation between *a* and *h* is a hiatus resolution strategy comes from contexts in which a consonant initial-suffix is added to a root with an unstressed final *a* such as [ʔáma] 'good'. In this context, it is the root-final vowel *a* that surfaces and not *h*. Consider the examples below:

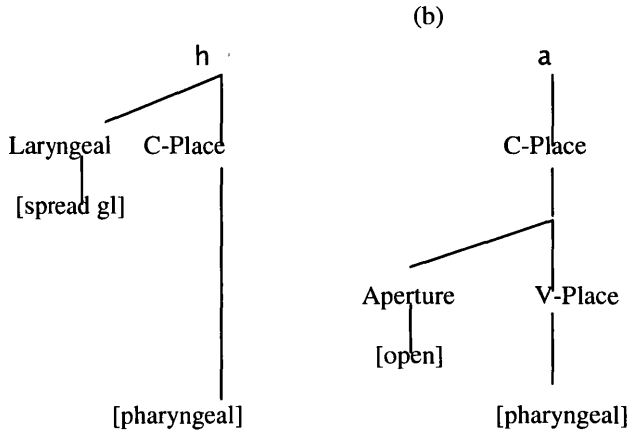
8(a) Amak'áwiʔ!
ʔam*a*=k'á=wiʔ
good=APPAR=EMPH
It was good!

(b) *ʔam*h*=k'á=wiʔ
good=APPAR=EMPH

It is unacceptable to have *h* in this context, as there is no potential hiatus to avoid—hence, there is no motivation for the underlying *h* to surface.

It is interesting to note that *h* only alternates with *a*, and not with any other vowel. I argue that [h] alternates with the vowel *a,* because these two differ on the basis of a single laryngeal feature; [a] is [+voice] and *h* is [-voice]. The voiced [ɦ] is allophonic and is a result of assimilation of voicing from the neighboring segments. Both [h] and [a] are produced at the pharyngeal place of articulation (McCarthy 1994, 1989, Hayward and Hayward 1989, Lombardi 2002). The features for *h* and *a* are shown below.

Figure 2. Feature structure of [h] and [a].



h does not alternate with other vowels since the other vowels are produced at different places of articulation; coronal (i) and labial (u) (see, e.g., Clements and Hume 1995).

3.3 Epenthetic *h:* á _ V

This section looks at data involving a polysyllabic root that ends with a stressed *á*. This is the complement of the context where the root-final vowel *á* is unstressed. When a vowel-initial suffix is attached to a root ending with a stressed *á*, the root-final vowel surfaces as a stressed *á,* and in hiatus contexts, *h* is epenthesized. First, consider the examples involving a bare root with a stressed *á*, in which I assume that the root-final vowel *á* is underlying.

9(a) ɬenkay**á**
ɬʌnkay***á***
cast iron pot

(b) *ɬʌnkáy***h**

Changing the root final vowel into *h* is unacceptable (9b). First, it would violate the phonotactics of the language. Second, it would alter the stress pattern of the root in cases where the stress is underlying, particularly in borrowings; the stress would have to move to some other vowel, given that it is a universal fact that *h* cannot be stressed.

When a vowel-initial suffix is added, *h* is epenthesized, as shown in (10a) below.

10(a) ti4enkay*á***a**

ti=4ʌnkay*á* ɦ=**a**
DET=cast iron pot=EXIS
The cast iron pot

(b) ti4enkay*á***a**

*ti=4ʌnkay*á*=**a**
DET=cast iron pot=EXIS

If *h* is not epenthesized, hiatus will arise, a situation that the language does not tolerate (10b).

3.3 Epenthetic *h*: V_V and V́_V

In this section I look at data involving any vowel other than unstressed *a* or stressed *á* in morpheme-final position. These vowels will be simply referred to as V to distinguish them from stressed *á* and unstressed *a*. First, I look at data involving a stressed root-final vowel, and then data involving an unstressed root-final vowel.

3.3.1 Epenthetic *h:* V́_V

When a vowel-initial suffix is attached to a polysyllabic root which ends with a stressed vowel other than *a*, *h* is epenthesized to resolve hiatus. First, consider examples involving bare roots.

11(a) k^{w}as**ú**
k^{w}aš**ú**
pig

(b) *k^{w}á**šh**

Changing the root-final vowel into *h,* results in forms that violate the phonotactic constraints of the language. Further, it distorts the lexical stress of the word as stress would have to shift to a vowel since [ɦ] cannot be stressed.

When a vowel initial suffix is added to such a root (12a), *h* is epenthesized to resolve hiatus. A form that allows hiatus to go unresolved would be unacceptable. Consider examples (12a & b) below.

12(a) ʔik^{w}as**úa**4c'ʔa
ʔi=k^{w}aš**ú-ɦa**4c'ʔ=a
DET.PL=pig-flesh=EXIS
pig flesh/ bacon

(b) *ʔi=k^{w}ašú-a$\frac{1}{2}$c'ʔ=a
DET.PL=pig-flesh=EXIS

If a consonant initial-suffix is added to a root with a stressed vowel other than *a* (eg., [k^{w}ašú] 'pig') *h* is not epenthesized (13a). The fact that *h* is not epenthesized confirms the observation that *h* is epenthesized to resolve hiatus.

13(a) tik^{w}ašušwa
ti=k^{w}ašú-šw=a
DET. pig-2.SG.POSS=EXIS
your pig

(b) *ti=k^{w}ašú*h*-šw=a
DET. pig-2.SG.POSS=EXIS

Any attempt to epenthesize [ɦ] is unacceptable as there is no motivation for such a phonological process (13b).

3.3.2 Epenthetic *h*: V_V

The data in this section involves any unstressed root-final vowel other than *a*. When a vowel initial suffix is added to such roots, the resultant hiatus is resolved through the epenthesis of *h*. First, consider the examples involving bare roots. In the example, I assume that the root-final vowel is underlying. Consider the following examples.

14(a) kápi
kápi
coffee

(b) *káph

Trying to change the final vowel *i* into *h* results in unacceptable form (14b). Despite the lexical stress pattern of the word being maintained, the form is unacceptable as it does not conform to the phonotactics of the language.

When a vowel initial suffix is added to such roots, *h* is epenthesized to resolve hiatus (16a-b).

15(a) tikápia
ti=kápi=*h*a
coffee

(b) *tikápia
ti=kápi=a
DET=coffee=EXIS
the coffee

Not epenthesizing *h* results in an unacceptable form since hiatus will be unresolved (15b).

When a consonant-initial suffix is added to the same root, *h* is not epenthesized. Consider the following examples.

16(a) láti? lti kapi**ɬ**ká**ɬ**a
láti? l=ti=kapi-**ɬ**ká**ɬ**-a
DEIC PREP=DET-coffee-1.PL.POSS=EXIS
In our coffee.

(b) *láti? l=ti=kap**h**-**ɬ**ká**ɬ**-a
DEIC PREP=DET-káp**h**-1.PL.POSS=EXIS

Any attempt to epenthesize [ɦ] is unacceptable (16b). There is no motivation for epenthesizing [ɦ] since there is no hiatus that needs to be resolved.

3.2 Consonant-final roots

If a root is consonant-final, and a suffix that is vowel initial is added, *h* is not epenthesized.

17(a) tsítx^{w}
čitx^{w}
house

(b) titsítx^{w}**a**
ti=čitx^{w}=**a**
DET-house-EXIS
the house

(c) *ti=čitx^{w}*ɦ*=**a**
DET=mountain=EXIS

18(a) sq^{w}é**m**
šq^{w}ə́**m**
mountain

(b) tisq^{w}é**m**a
ti=šq^{w}ə́**m**=a
DET=mountain=EXIS
the mountain

(c) *ti=šqwə́m*h*=**a**
DET=mountain=EXIS

In the examples, there is no reason for epenthesizing *h;* hence, the unacceptability of the forms in which *h* is epenthesized (17c & 18c).

3.4 Loanwords that end in *h*

St'át'imcets has loanwords which end in *h* yet such words do not end in *h* in the donor language. A distinctive characteristic shared by most of these words is that they are monosyllabic. Van Eijk (1987) lists some of these words in the dictionary but does not account for them. The English surface forms of these words are given as the underlying forms in St'át'imcets. Consider the following examples[4].

19(a) tí:
tíh
tea

(b) kár
káh
key

I argue that without *h*, these words would potentially surface as monomoraic. I further, argue that these words are expanded by *h* to meet the bimoraic minimality requirement. In addition, the expansion of the words with *h* helps them become consonant final, since this is the preferred root structure (van Eijik 1987, 1997; Matthewson 1994, Roberts and Shaw 1994).

A further look at each of these examples supports the bimoraic minimality position. The other potential strategies (attested in other languages) that could be employed to ensure that each of these words surfaces as bimoraic would be to have a long vowel (19a), or r-final (19b), just as in the donor language—English. However, this is not acceptable in St'át'imcets. Long vowels and r-final words are unattested in the language. Consider the examples below with long vowels.

20 (a) *tí:
tea

(b) *ka:
car

An alternative strategy that could be employed for the word 'car' would be to pronounce it with a consonant final [r] as some rhotic varieties of English do.

[4] In the examples, what is given as the underlying form would be the English output form.

21 *kar
car

This is not acceptable because *r* is not permitted in the language. Actually, *r* is neither phonemic nor allophonic in the language (figure 1).The use of *r* would violate the phonotactics of the language. Further evidence that *r* is avoided comes from the English loanword 'rope', which is pronounced as [lóp], (Henry Davis personal communication). The fact that [kár] 'car' does not surface as *[kál] but surfaces with *h,* suggests that the use of *h* is a general strategy that applies across the board to all words that would be sub-minimal. [kah] would be sub-minimal if it surfaced with a short vowel *[ka], so that *r* is avoided (21) and a long vowel (20b).

Polysyllabic words which are *r* final in the donor language support the position that *h* is used to expand words to minimal size. Consider an example which in the donor language ends with *r* but not in St'át'imcets.

22a. pákupa
pánkupa
vancouver

b. *pánkupah

Any attempt to add *h* to the polysyllabic word results in an unacceptable form (22b). This demonstrates that there is no motivation for having *h* in the word. This then, is evidence that in the word [káh] 'car', *h* was needed to satisfy minimality.

In monosyllabic loanwords *h* serves two purposes; it ensures that the borrowed words conform to the bimoraic minimal size requirement and that they also have the preferred root structure—they are consonant-final. A deeper look at other borrowings in the language supports the position that bimoraicity is an *absolute* requirement while consonant-final is just a preference. This means that making the words consonant-final is not the primary motivation for using *h;* rather it is making the words bimoraic. Consider the following borrowings which are polysyllabic and end with a vowel. Trying to add *h* produces unacceptable forms.

23(a) kə́pi
kə́pi
coffee

(b) *kə́piɦ

24(a) kekní
kəkní salmon
koknee salmon

(b) *kekniɦ

25(a) píya
píya
beer

(b) *píyaɦ

The above words do not end in *h*, presumably, because they are underlyingly bimoraic, and there is no motivation for expanding them with *h*. If it was an absolute requirement that words must end in a consonant, then the borrowed words/roots would be re-phonologized to conform to this language requirement. However, this is not the case—strongly suggesting that it is a preference for roots to be consonant final but not a requirement. This is borne out by the fact that in the language there are no roots that are monomoraic, yet there are some words that are vowel-final. This, then, would suggest that the greater motivation for expanding the roots with *h*, in examples such as, *tih*, 'tea'; *kah* 'car' is to meet minimality requirements rather than being consonant-final. Better still, a form that meets the minimality requirements and is consonant-final is much more preferred.

The question to ask then is why *h* is chosen as the default epenthetic consonant in St'át'micets. This question is pertinent in view of the fact that cross-linguistically the most common and claimed to be the unmarked epenthetic consonant is argued to be a glottal stop (Ortmann 1989, Rubach 2002, Lombardi 2002). My conjecture is that a default consonant in any language must either not be phonemic in the language, or must have limited distribution. In these languages, for example, the glottal stop is not phonemic and it is *the* default epenthetic segment: (German, Wiese 1966; Tamil, Christdas 1988; Czech, Kučera 1961, Spencer 1996, Rubach 2002). In a similar vein, *h* is the consonant with the most restricted phonemic distribution in St'át'imcets, hence, its use as the default epenthetic consonant. The limited distribution of *h* in St'át'micets is an issue touched on in section (3.2).

4 Analysis

In my analysis I adopt Optimality Theory (Prince and Smolensky 1993; OT). As mentioned earlier, I posit two underlying forms; first, for words which surface with the final-vowel *a*, I assume that the underlying segment is *h*. I have argued that *h* does not surface in roots due to the phonotactic constraints of the language; if *h* surfaced in word-final position it would violate the phonotactic constraint which prohibits a sequence of a consonant and resonant being in morpheme-final position (van Eijk 1997). The constraint that I propose is as follows:

25. *CR#
A Consonant and a Resonant sequence cannot be morpheme-final.

The two words that I am aware of which have *h* as underlying and surfaces in morpheme-final position, are *meylih* 'married' and *k'íh* 'to put on one's lap'. In these words, *h* respects the phonotactis of the language. The constraint *CR# is undominanted; any candidate that violates it will not be the optimal candidate.

In instances where the root-final *á* is stressed, or in roots with any other root-final vowel other than *a*, I have assumed that the root-final vowel is underlying. The constraint that militates against being unfaithful to any underlying segment, consonant or vowel, is IDENT.

26. IDENT:
Correspondent segments have identical values for feature [F]
(Kager 1995:250)

However, I need a more precise constraint; a constraint that militates against being unfaithful to an underlying *h* or vowel. First, the constraint that militates against being unfaithful to an underlying *h:*

27. IDENT h.
If an input segment is a *h*, then its output correspondent is a *h*.

In instances I have proposed that the underlying segment is a vowel, the constraint that requires faithfulness to that underlying vowel is:

28. IDENT V
If an input segment is a V, then its output correspondent is a V.

This is an undominated constraint, and any candidate that violates this constraint will not be optimal.

The motivation for the epenthesis of *h*, and its alternation with *a* is to resolve hiatus by providing an onset to the onsetless syllable. Further, St'át'micets does not allow onsetless syllables, even in non-hiatus contexts. The relevant constraint that militates against having syllables without onsets is:

29. ONSET
*$[_{\sigma}$ V
Syllables must have onsets

This again is an undominanted constraint, since any candidate that violates it would not be optimal.

The language prefers to break hiatus through epenthesis. The constraint which militates against epenthesis in general is DEP:

30. DEP
Every element of S_2 has a correspondence in S_1.
(McCarthy and Prince 1995:264)

St'át'imcets prefers to epenthesize *h*, and the relevant constraint is:

31. DEP [h]
Output *h* has an input *h*

Since the language prefers to resolve hiatus through epenthesis, there is need for a constraint that militates against the epenthesis of any other constraint other than *h*. The symbol I adopt for any other consonant is β. The relevant constraint that militates against the epenthesis of any other consonant other than *h* is:

32. DEP [β]
An output consonant β has an input consonant β.

In order to account for the fact that there is preference to stress full vowels I will employ Prince and Smolensky (1993) prominent scales. Prince and Smolensky (1993) identify two prominence scales; one with respect to the prominence of different syllable positions, and the other with respect to the prominence of the individual segment. I adopt the prominence scale pertaining to individual segments. Prominence here refers to stress. The constraint that militates against making prominent a segment that is less sonorous than resonant in St'át'imcets is as follows:

33. *PeakProm/C >>*PeakProm/ə>>*Peak/i a u

Full vowels make the best nucleus, followed by a schwa and followed by the obstruents, resonants, liquids, nasals. It is universally accepted that schwa is less sonorous than a full vowel (Kenstowicz 2004).
The constraint *PeakProm/C is undomainanted. Since words that have schwas only surface with stressed schwa, it shows that this constraint *PeakProm/ə is violable.

Stress is both lexical and can move according to the stress rules of the language (2.3). I propose a general constraint, STRESS FAITH.

34. STRESS FAITH
The output form has to be faithful to the input lexical stress or the rules of stress shift.

The following constraints are undominanted in the language, as any candidate(s) that violate any one of these constraints will be less harmonic:

35. *CR#, ONSET, DEP [β], *PeakProm/C STRESS FAITH, IDENT V.

These constraints cannot be crucially ranked amongst themselves.

The constraints IDENT h and DEP [h] are ranked below those given in 35. A candidate can violate either or both constraints and still be the optimal candidate. However, crucial ranking between IDENT *h* and DEP [h] is not possible, given that a candidate that violates both DEP [h] and IDENT h fares badly compared with the one that only violates IDENT *h*. This suggests that the latter candidate is harmonically bounded by the latter, and crucial ranking in such cases is not possible. The two constraints are given in 36, below:

36. DEP [h], IDENT *h*

The ranking that obtains in the language is as follows:

37. *CR#, ONSET, DEP [β]; *PeakProm/C STRESS FAITH, IDENT V >> DEP [h], IDENT *h*

First, I will show how these constraints work in bare roots, that is, words without suffixes and prefixes. Next, I demonstrate how the analysis works in derived environments, particularly in hiatus contexts.

Tableau 1

/ lekwá /	*CR#	STRESS FAITH	*Peak Prom/ə	*PeakProm/C	IDENT V
a. lə́k^{w}**h**	*!	*	*		*
b. ☞ lə.k^{w}**á**					
c. lə.k^{w}**h́**	*!			*	*

Candidate (a) in which a stressed *á* surfaces as *h*, violates the constraint *CR#. The candidate also violates STRESS FAITH as the stress shifts to the schwa. In the process it also violates the constraint *Peak Prom/ə. It also violates the constraint DENT/V, by changing the underlying vowel into *h*. Candidate (b), which is the fully faithful candidate, is the optimal Candidate. It violates none of the proposed constraints. Candidate (c) violates *CR#. In addition, it violates*PeakProm/C by stressing *h*, in an attempt to be faithful to the lexical stress pattern of the word. This candidate also violates IDENT V.

Tableau 2 shows that it is important to be faithful to an underlying consonant final *h*.

Tableau 2

/ ʔamh /	*CR#	STRESS FAITH	IDENT V	IDENT *h*
a. ʔá.m**h**	*!			
b. ☞ ʔá.m**a**				*
c. ʔa.m**á**		*!		*

In tableau 2, candidate (a) which is the fully faithful candidate violates the undominated constraint *CR#. Candidate (b) violates the constraint IDENT *h*, and in the process satisfies the higher ranked constraint *CR#. Candidate (c), violates the constraint FAITH
STRESS by stressing the wrong vowel.

Tableau 3

/ k^{w}a.sú /	*CR#	STRESS FAITH	IDENT V
a. k^{w}á.s**h**	*!	*	*
b. ☞ k^{w}a.sú			
c. k^{w}á.s**u**		*!	

In tableau 3, candidate (a) in which the final vowel has been replaced by *h*, violates the constraint *Ch#, STRESS FAITH, IDENT V. Candidate (b) which is the fully faithful candidate, is the optimal candidate , and violates none of the given constraints. Candidate (c) in which the vowel *a* is stressed violates the constraint STRESS FAITH.

Tableau 4

/ kápi /	*CR#	STRESS FAITH	IDENT V
a. káp**h**	*!		*
b. ☞ ká.p**i**			
c. ka.pí		*!	

In tableau 4, candidate (a) in which the final vowel is replaced with *h* violates two crucial constraints *CR# and IDENT V. Candidate (b) which is the fully faithful candidate violates none of the given constraints. Candidate (c) violates the constraint STRESS FAITH; *i* is stressed instead of *a*.

Tableau 5

/ ti-ʔam***h-a***	ONSET	STRESS FAITH	*Peak Prom/C	DEP [β]	IDENT *h*	DEP[h]
a. ti.ʔá.m***a.a***	*!				*	
b.☞ti.ʔá.m***ha***						
c. ti.ʔá.ma.***ha***					*!	*
d. ti.ʔá.ma.***ʔa***				*!	*	
e. ti.ʔá.ma.***ya***				*!	*	
f. ti.ʔa.m***h***á		*!				
g. ti.ʔa.m***h́.a***	*!		*			

In tableau 5, candidate (a) violates the constraint ONSET, by not resolving hiatus which is created by changing *h* into *a,* it also violates the constraint IDENT *h*. Candidate (b) violates none of the constraints given above. Candidate (c) which changes *h* into the vowel *a,* and epenthesizes *h*, to resolve hiatus violates the constraints IDENT *h* and DEP[h]. Candidate (d), which changes *h* into *a,* and resolves hiatus by epenthesizing a glottal stop, violates the constraints DEP [β] and IDENT *h*. Candidate (e) which changes *h* into *a* and epenthesizes a glide violates the constraints DEP [β] and IDENT *h*. Candidate (f) in which the stress is moved to the final vowel violates the constraint STRESS FAITH. Candidate (g) in which the final syllable is onset less violates the constraint ONSET. Also it violates *Peak Prom/O/L/N/G since stress is on *h*.

Tableau 6

/tilekwáa/	ONSET	STRESS FAITH	*Peak Prom /C	DEP [β]	*Peak Prom /ə	IDENT V	DEP [h]
a. ti. lə.k^{w}**á.a**	*!						
b.☞ti.lə.k^{w}**á.ɦa**							*
c. ti. lə.k^{w}**á.ʔa**				*!			
d. ti.k lə.k^{w}**á.ya**				*!			
e. ti. lə́.k^{w}**ɦa**		*!			*	*	
f. ti. lə.k^{w}**á ɦ.a**	*!						
g.ti.lə.k^{w}**ɦ ́.a**	*!		*			*	

In tableau 6, candidate (a) violates an undominated constraint, ONSET. It also violates the least ranked constraint IDENT *h*. Candidate (b), which is the optimal candidate, violates the lowly ranked constraints DEP[h]. *h* is epenthesized to respect the higher ranked constraint which requires hiatus to be resolved by providing an onset to the second vowel in sequence. Candidate (c) violates the constraint DEP[β] by epenthezising a glottal stop in hiatus context. Candidate (d), which epenthesizes a glide *y*, violates a highly ranked constraint, DEP[β] and is therefore less harmonic. Candidate (e) which has stress on schwa violates the constraint STRESS FAITH and *Peak Prom/ə. It also violates the constraint IDENT V. Candidate (f) violates the constraint ONSET, since the final syllable lacks an onset. Candidate (g) violates the constraint ONSET, the final syllable lacks an onset. It also violates the constraint *PeakProm/C, *h* receives prominence. Last, the candidate violates the constraint IDENT V, the underlying vowel *á* is changed into *h*.

Tableau 7

/ tik^{w}asu*a*/	ONSET	STRESS FAITH	*Peak Prom/C	DEP [β]	IDENT V	DEP [h]
a. ti.k^{w}a.sú.*a*	*!					
b☞ti.k^{w}a.sú.ɦ*a*						*
c. ti.k^{w}a.sú.ʔ*a*				*!		
d. ti.k^{w}a.sú.y*a*				*!		
e. ti.k^{w}á.sh*a*		*!			*	
f. ti.k^{w}a.súɦ.*a*	*!					*
g. ti.k^{w}a.sh́.*a*	*!		*		*	

In tableau 7, candidate (a) which is the fully faithful candidate violates an undominanted constraint, ONSET, hiatus has not been resolved. Candidate (b), which is the optimal candidate, has hiatus resolved by epenthesizing *h,* violating the constraint DEP [h]. It is better to be unfaithful by epenthesizing *h* than retaining hiatus. In candidate (c) the correct hiatus resolution strategy is applied; epenthesis, but a 'wrong' epenthetic segment is used—a glottal stop. The candidate is therefore less harmonic, since it violates a highly ranked constraint DEP [β]. Similarly, candidate (d) resolves hiatus with the wrong epenthetic segment—a glide, and violates the highly ranked constraint, DEP [β]. Candidate (e), which has resolved hiatus by changing the vowel *u* into *h* is less harmonic, in that it violates the constraint FAITH STRESS by moving the stress from where it is predicted to be. It also violates the constraint IDENT V. Candidate (f) violates ONSET, since the final syllable is onset-less. Candidate (g) fares very badly, it violates the constraint ONSET and also the constraint *PeakProm/C since, *h* is a peak and is stressed. The candidate also violates the constraint IDENT V.

Tableau 8

/tikapia/	ONSET	FAITH STRESS	*Peak Prom/C	DEP [β]	IDENT V	DEP [h]
a. ti.ká.pi.a	*!					
b☞ti.ká.pi.ɦa						*
c. ti.ká.pi.ʔa				*!		
d. ti.ká.pi.ya				*!		
e. ti.ká.pɦa					*!	
f. ti.ka.pɦ ́.a	*!		*		*	

Candidate (a) violates the constraint ONSET by allowing hiatus to go unresolved. Candidate (b) is the optimal candidate. Hiatus is resolved through epenthesis of *h,* while violating the lowest ranked constraint DEP [h] in order to satisfy the higher ranked constraint ONSET. Candidate (c) violates the constraint DEP [β], because hiatus is resolved through epenthesis of a glottal stop. Similarly, candidate (d) in which hiatus is resolved through epenthesis of glide is less harmonic; the strategy of epenthesis is right but the glide is unacceptable. Candidate (e), in which the vowel *i* is replaced by *h,* violates the constraint IDENT V. This candidate helps show that when a vowel is underlying, it is crucial to be faithful to it. Candidate (f) violates the highly ranked constraints ONSET, *PeakProm / and IDENT V.

5 Conclusion

h in St'át'imcets is phonemic and has limited distribution. *h* appears in very few words in word-initial position, and rarely in word-final position. There are two hiatus resolution strategies involving *h:* the alternation between *a* and *h,* and the epenthesis of *h.* Loanwords that would potentially be monomoraic are expanded by *h.* In conclusion, *h* is the default epenthetic consonant in St'át'imcets; it is employed in resolving hiatus, and expands words that would fall short of the minimality requirement.

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