Phonotactic restrictions across prosodic domains

Typological Generalization: Any segment or structure that is marked in onsets (or codas) is also marked word-initially (or word-finally), utterance-initially (or utterance-finally), and so on.

That is, for each segment that a language can ban in e.g. (all) onsets, another language can ban that segment only in word-initial, or utterance-initial, onsets.

Theoretical Proposal: Restrictions on onsets and codas are not strictly syllable phenomena, but rather general prosodic domain phenomena.2

The idea that some phenomenon can occur in different domains in different languages is a familiar one:

- Lindblom (1978): Final lengthening occurs at the ends of various constituents (in speech and music).
- Selkirk (1986): Chi Mw:m has “a word stress-like system operating on a phrasal domain.” (381)

I claim that prosodic restrictions on (initial) onsets and (final) codas can also hold in different domains in different languages.

The plan:

- Show cross-linguistic evidence that there are parallels between restrictions on initial onsets in different prosodic domains.
- Propose an Optimality Theory (Prince and Smolensky, 1993) constraint schema that formalizes the parallels among onset restrictions.
- Look at the factorial typology predicted by these constraints.
- Show cross-linguistic evidence that supports the extension of this proposal beyond marked onsets to all onset and coda restrictions.

1 Thanks to Michael Becker, Shigeto Kawahara, John McCarthy, Joe Pater, Lisa Selkirk, Matt Wolf, the audience at HUMBRUM 2006, and the UMass Phonology Reading Group for many helpful suggestions and discussions.

2 There are many sources of phonotactic restrictions, and many phonetically-based constraints on word edges and other positions (e.g. Licensing by Cue restrictions) which are distinct from the phonotactic patterns and constraints discussed here. This paper focuses exclusively on prosodically-based restrictions on onsets and codas at the edges of syllables, words, and other prosodic domains.

1. Restricted domain-initial onsets

The big idea: Anything that’s a bad syllable onset is also bad as a word-initial, utterance-initial, etc. onset.

1.1. Restrictions on syllable onsets

This discussion will focus on three marked onsets: ɣ, ?, h

(1) ɣ codas: not onsets4

Doyayo (Waering and Waering, 1986)
Lower Grand Valley Dani (Bromley, 1961)
Mixe (Van Haitma and Van Haitma, 1976: 16)
Mongolian (Poppe, 1970)
Mundang (Elders, 2000)

Mixe: m, n, and ɣ are contrastive in medial and final codas
Only m and n can appear in onsets.

(2) Mixe

<table>
<thead>
<tr>
<th>a.</th>
<th>mʊm</th>
<th>‘somewhere’</th>
</tr>
</thead>
<tbody>
<tr>
<td>tʊŋ</td>
<td>‘he worked’</td>
<td></td>
</tr>
<tr>
<td>wɪŋ</td>
<td>‘they are skittish’</td>
<td></td>
</tr>
<tr>
<td>niŋ</td>
<td>‘also’</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b.</th>
<th>maŋ</th>
<th>‘he grabs it’</th>
</tr>
</thead>
<tbody>
<tr>
<td>cɪŋ</td>
<td>‘mature pine tree’</td>
<td></td>
</tr>
<tr>
<td>*ŋiŋ</td>
<td>‘are small’</td>
<td></td>
</tr>
</tbody>
</table>

Similarly, languages can ban ? and h in onsets but license them in codas.

(3) a. ? codas: not onsets

Balantak (Broselow, 2003: 187, Busenitz and Busenitz, 1991)
Chamicuro, Tiri(y) (Parker, 2001: 362)
Finnish (Branch, 1987: 597)
Many Top End Australian languages: Gamar, Guwinigu, Jawoyn, Manggaray, Ngalakan, Ngandi, Rembarrnga, Wagiman, Warray, Yolngu

(4) b. h codas: not onsets

Chamicuro (Parker, 2001)
Macushi (Abbott, 1991)
Wiyot (Teeter, 1964)

---

4 Throughout this paper, languages will be described as lacking some segment x in a particular prosodic position if x is completely absent from the position; or if c appears in that position only in non-native words, or only in interjections, ideophones, or function words; or if there is a productive process of dropping x from that position.
1.2. Corresponding restrictions on word-initial onsets

Languages can have word-initial restrictions which parallel each of these restrictions on marked onsets.

Languages can also ban \( g \), \( z \), and \( h \) in only word-initial position, while licensing them in medial onsets.\(^4\)

(4) \( g \) medial onsets: not word-initial

<table>
<thead>
<tr>
<th>Language (Ref.)</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhumij (Ramaswami, 1992)</td>
<td>Selkup (Helmerski, 1988b: 554)</td>
</tr>
<tr>
<td>Ewondo (Abeba, 1969)</td>
<td>S. Sierra Miwok (Broadbent, 1964)</td>
</tr>
<tr>
<td>Gadaba (Bhaskararao, 1998: 328)</td>
<td>Sri Lankan Portuguese Creole (Hume)</td>
</tr>
<tr>
<td>Ghye (Samarin, 1966)</td>
<td>and Tserdanelis, 2002: 4</td>
</tr>
<tr>
<td>Jjo (Williamson, 1969)</td>
<td></td>
</tr>
<tr>
<td>Kobon (Davies, 1981)</td>
<td>Ura (Crowley, 1998)</td>
</tr>
<tr>
<td>Kolami (Subrahmanyan, 1998: 303)</td>
<td>Uyghur (Hahn and Ibrahim, 1991)</td>
</tr>
<tr>
<td>Kristang (Baxter, 1988)</td>
<td>West Greenlandic (Fortescue, 1984)</td>
</tr>
<tr>
<td>Yampchu: Initial (but not medial)</td>
<td>Yampchu (Rutgers, 1998: 33)</td>
</tr>
</tbody>
</table>

Yampchu: Initial (but not medial) \( g \) often surfaces as \( n \); initial \( n \) never surfaces as \( g \).

(5) Yampchu

<table>
<thead>
<tr>
<th>Language</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ( n )</td>
<td>na, ‘fish’</td>
</tr>
<tr>
<td>( n )kma</td>
<td>na,kma, ‘to request’</td>
</tr>
<tr>
<td>b. ( n )m</td>
<td>( n )m, ‘count’</td>
</tr>
<tr>
<td>( n )c</td>
<td>( n )c, ‘two’</td>
</tr>
<tr>
<td>c. ( n )nd</td>
<td>( n )nd, ‘head’</td>
</tr>
<tr>
<td>( c )nd</td>
<td>( c )nd, ‘sizzling’</td>
</tr>
<tr>
<td>( p )r ( l )n</td>
<td>( p )r ( l )n, ‘tale’</td>
</tr>
</tbody>
</table>

The other marked onsets \( z \) and \( h \) can also be banned in only word-initial onset position.

(6) \( z \) and \( h \) medial onsets: not word-initial

<table>
<thead>
<tr>
<th>Language (Ref.)</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awa (McKaugham, 1973)</td>
<td>Lower Grand Valley Dani (Bromley, 1961)</td>
</tr>
<tr>
<td>Barua (Lloyd and Healey, 1970: 11)</td>
<td>Lusíeño (Kroober and Grace, 1960)</td>
</tr>
<tr>
<td>Bhumij (Ramaswami, 1992)</td>
<td>Nahuatl (Sullivan, 1988)</td>
</tr>
<tr>
<td>Chepa (Caughley, 2000)</td>
<td>Ngonasan (Helmski, 1998a: 484)</td>
</tr>
<tr>
<td>Djinang and Djinba (Waters, 1989)</td>
<td>Timugon Murut (Prentice, 1971)</td>
</tr>
<tr>
<td>Fe’le’fe’le’ Balimeleke (Hyman, 1978)</td>
<td>Kongla (Krishnamurti and Benham, 1998: 243)</td>
</tr>
<tr>
<td>Western Shoshoni (Crum and Dayley, 1993: 233)</td>
<td></td>
</tr>
</tbody>
</table>

---

\(^4\) In languages where \( g \), \( h \), and \( z \) are banned in all onsets, they also typically cannot appear word-initially, as prosodic structure is typically implicational and thus word-initial consonants are usually onsets. This section discusses languages in which marked onsets are banned only word-initially.

1.3. Corresponding restrictions on utterance-initial onsets

Marked onsets can also be banned strictly utterance-initially.

Kaiwa: \( z \) is licensed syllable-initially and word-initially, but banned in strictly utterance-initial position (Bridgeman, 1961: 332)

Tucano: \( h \) is banned only utterance-initially (West and Welch, 1967: 14)

Similarly, there is a tendency to drop utterance-initial \( g \) in the Kunwunjku dialect of Binin Gun-Wok:

Kunwunjku has “[a] large number of words which freely drop the initial \( g \) found in their cognates in other dialects, particularly when coming at the beginning of a breath group.” (Evans 2003, p. 94; emphasis added).

(7) Kunwunjku

<table>
<thead>
<tr>
<th>Language</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \eta n )abbaru</td>
<td>anabaru, ‘buffalo’</td>
</tr>
<tr>
<td>( \eta n )aje</td>
<td>aje, ‘I, me’</td>
</tr>
<tr>
<td>( \eta n )kokko</td>
<td>okko, ‘already’</td>
</tr>
<tr>
<td>( \eta n )unwam</td>
<td>unwam, ‘you two went’</td>
</tr>
</tbody>
</table>

1.4. Summary of the data

Any segment which is a marked syllable onset is also a marked word-initial and utterance-initial onset.

Rather than stipulating the markedness of these segments independently in each prosodic domain, there should be a theoretical mechanism for formally encoding these parallels.

The fact that bad syllable onsets are also bad initial onsets in larger prosodic domains should be predictable.

2. A constraint schema for marked onsets

Proposal: Each markedness constraint which encodes a restriction on syllable onsets is part of a constraint schema containing individual constraints enforcing that restriction on initial onsets in each prosodic domain.
2.1. Formalizing the constraint schema

To formulate these constraint schemas, we need to unify domain-initial onset positions in order to talk about the parallels among domain-initial onsets.

Redefine ‘onset’ → All prosodic domains (syllables, words, utterances…) have onsets.

Intuitively: The onset of a prosodic domain is the onset of the domain-initial syllable.

Formally:

(8) Onset/Y The (initial) onset of Y.
Where Y is some prosodic domain (e.g. syllable, word, phrase, utterance): All consonants in Y which belong to the leftmost syllable of Y and which precede that syllable’s head.

Some examples of onsets of prosodic domains:

(9) a. Onset/0 The onset of a syllable.
b. Onset/Word The onset of a word-initial syllable.
c. Onset/Utterance The onset of an utterance-initial syllable.

Now we can formally define a general constraint schema for all domain-initial onset restrictions:

(10) *X(Onset/Y) Where X is some segment and Y is some prosodic domain, assign one violation for each instance of X in an onset of Y.

‘X cannot be the (leftmost) onset of Y.’

*X(Onset/Y) constraint schemas contain sets of constraints like this:

(11) *X(Onset/Utterance) *X(Onset/Word) *X(Onset/0) etc.³

These sets of constraints capture the parallels among restrictions on domain-initial onsets.

For any constraint on a marked syllable onset, there must be parallel constraints on word-initial, utterance-initial, etc. onsets.

The specific *X(Onset/Y) constraints in (12) are the ones used to ban the marked onsets g, i, and h initially in various prosodic domains.

(12) a. *g(Onset/Utterance) *g(Onset/Word) *g(Onset/0)
b. *i(Onset/Utterance) *i(Onset/Word) *i(Onset/0)
c. *h(Onset/Utterance) *h(Onset/Word) *h(Onset/0)

³ Constraints in these schemas must be freely rankable, rather than arranged in a fixed ranking or stringency relation. See Flack (2006) for discussion of the strict layering effects that lead to this conclusion.

2.2. Factorial typology: Specific *X(Onset/Y) restrictions

In OT, the ranking of these constraints against marked onsets with respect to faithfulness constraints determines the domains in which marked onsets are banned or licensed.

*?(Onset/Utl), *?(Onset/Word), *?(Onset/0) \(\rightarrow\) No onset? anywhere

Constraints against onset?

(13) Chamucuro: No syllable onset?

\[ \text{talat} \]

\[ \text{Faith} \]

\[ * \]

\[ \text{Faith} \]

\[ * \]

\[ * \]

(14) Awa: No word-initial?

\[ \text{talat} \]

\[ \text{Faith} \]

\[ * \]

\[ \text{Faith} \]

\[ * \]

\[ * \]

(15) Kawai: No utterance-initial?

\[ \text{iwa...talat} \]

\[ \text{Faith} \]

\[ * \]

\[ \text{Faith} \]

\[ * \]

\[ * \]

Faith \( \rightarrow \) *?(Onset/Utl), *?(Onset/Word), *?(Onset/0) \(\rightarrow\) Onset ? everywhere (as in e.g. Arabic)

Interim conclusion. The constraints generated by the *X(Onset/Y) constraint schemas can produce the attested patterns of domain-initial restrictions.
Phonotactic restrictions across prosodic domains

2.3. More typological predictions: Positional faithfulness

So far, we’ve been talking about languages where fewer segments are licensed word-initially than word-medially, due to $^\ast X$(Onset/Word) constraints.

This is the opposite of another familiar pattern where more segments are licensed word-initially than word-medially, due to positional faithfulness effects (Beckman, 1999).

Constraints against marked word-initial onsets, as in (16), conflict with positional faithfulness constraints, as in (17).

(16) $^\ast X$(Onset/Word) $X$ cannot appear in word-initial onsets.

(17) FAITH/$O_1$ Segments appearing in word-initial syllables must faithfully appear in the output.

Prediction Languages should be able to license marked onsets (e.g. $g$) only word-initially, given the possibility of rankings as in (18).

(18) a. FAITH/$O_1$ $\Rightarrow$ $^\ast g$(Onset/Word) $\Rightarrow$ $g$ is licensed word-initially.

b. $^\ast g$(Onset/$O$) $\Rightarrow$ FAITH $\Rightarrow$ $g$ is banned syllable-initially.

Marked onsets are only licensed word-initially

<table>
<thead>
<tr>
<th>$g\partial$</th>
<th>FAITH/$O_1$</th>
<th>$^\ast g$(Onset/Word)</th>
<th>$^\ast g$(Onset/$O$)</th>
<th>FAITH</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $g\partial$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td></td>
</tr>
<tr>
<td>b. $g\partial$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td></td>
</tr>
<tr>
<td>c. $g\partial$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td></td>
</tr>
<tr>
<td>d. $g\partial$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td>$^\ast$</td>
<td></td>
</tr>
</tbody>
</table>

This prediction is accurate, as this type of pattern occurs in a number of languages:

(20) Marked onsets present in word-initial, not medial onsets

$g$: Lango (Noonan, 1992: 10, 16-7)

$k$: Lamani (Trail, 1970) Txissaath Nootka (Stonham, 1999)

Leko (Frajzyngier, 2001) Wiyot (Teeter, 1964)

Songhay (Prost, 1956) Yana (Sapir and Swadesh, 1960)

Lango: $g$ can be a word-initial onset, but not a medial onset.

(21) Lango

a. $\partial g$‘c ‘back’ $\partial g/w\partial c$ ‘to run from’

$\partial g/\partial e$ ‘smelly’ $\partial g/\partial u$ ‘beast of prey’

b. $\partial c\partial g/\partial e$ ‘hands’ $\partial g/\partial p\partial e$ ‘crocodiles’

$\partial c\partial g/\partial e$ ‘knees’ $\partial g/\partial y\partial e$ ‘dura stalks’

Interim conclusion $^\ast X$(Onset/$Y$) constraints’ interaction with positional faithfulness constraints also generates attested patterns.

2.4. Further predictions: Generalized domain-edge markedness constraints

The argument so far Each constraint on a marked onset segment is part of a set of constraints against that segment in initial onsets of all prosodic domains.

Within OT, this reveals a novel aspect of the structure of the constraint inventory CON:

CON cannot include arbitrarily different sets of markedness constraints targeting the initial onsets of different prosodic domains.

Instead, these onsets are subject to parallel sets of restrictions.


Identifying structure within CON is a major goal of current OT research.

A further question Is it possible to generalize the $^\ast X$(Onset/$Y$) constraint schema, and thus find additional structure within CON?

Generalized hypothesis Every markedness constraint which targets onsets or codas is part of one of the domain-edge markedness constraint schemas in (22) or (27), below.

Onsets: Any constraint on syllable onsets can be reformulated as a set of $M_{\text{cont}}$(Onset/$Y$) constraints, which target initial onsets in all prosodic domains.

(22) $M_{\text{cont}}$(Onset/$Y$) Where $M_{\text{cont}}$ is some markedness constraint which targets onsets, and $Y$ is some prosodic domain, assign one violation for each instance of $Y$ in which there is a violation of $M_{\text{cont}}$.

(23) $M_{\text{cont}}$(Onset/Ut) $M_{\text{cont}}$(Onset/Phr) $M_{\text{cont}}$(Onset/Wd) $M_{\text{cont}}$(Onset/$O$)

Onset requires syllables to have onsets.

(24) All syllables have onsets

Cairene Arabic, Sedang, Klamath (Blevins, 1995)

There should be languages where specific Onset/$Y$ constraints require initial onsets only in words, phrases, utterances, etc.

Formalization Onset should be reformulated as in (25):

(25) Onset/$Y$ Where $Y$ is some prosodic domain, assign one violation for each instance of $Y$ which lacks an onset.

‘$Y$ must have an (initial) onset.’

Many languages have the syllable restrictions discussed in this section; see e.g. Blevins (1995), Maslović and Wetzelis (2001), and Prince and Smolensky (2004: ch. 6) for additional references and discussion.
Phonotactic restrictions across prosodic domains

(26) ONSET/Utterance ONSET/Phrase ONSET/Word ONSET/

Codas: Any constraint on syllable codas can also be reformulated as a set of $M_{coda}(Coda/Y)$ constraints, which target final codas in all prosodic domains.

(27) $M_{coda}(Coda/Y)$ Where $M_{coda}$ is some markedness constraint which targets codas, and $Y$ is some prosodic domain, assign one violation for each instance of $Y$ in which there is a violation of $M_{coda}$.

(28) $M_{coda}(Coda/Ut) M_{coda}(Coda/Phr) M_{coda}(Coda/Wd) M_{coda}(Coda/o)$

The codas in Codas(Y) constraints require a redefinition of ‘coda’, like the redefinition of ‘onset’ given above, so that all prosodic domains have codas:

Intuitively The coda of a prosodic domain is the coda of the domain-final syllable.

Formally

(29) Coda/Y The final coda of $Y$.

Where $Y$ is some prosodic domain (e.g. syllable, word, phrase, utterance): All consonants in $Y$ which belong to the rightmost syllable of $Y$ and which follow that syllable’s head.

NoCoda bans codas in all syllables.

(30) No syllables have codas

Mazateco (Pike and Pike, 1947)

Hua, Cayuvava (Blevins, 1995)

There should be languages where specific NoCoda/Y constraints ban final codas only in words, phrases, utterances, etc.

Formalization NoCoda should be redefined as in (31):

(31) NoCoda/Y Where $Y$ is some prosodic domain, assign one violation for each instance of $Y$ which has a coda.

‘$Y$ cannot have a (final) coda.’

(32) NoCoda/Ut NoCoda/Phr NoCoda/Word NoCoda/o

*VoObs/Coda bans marked voiced obstruents in syllable codas.

(33) *No codas are voiced obstruents

German (Mascaró and Wetzel, 2001)

Malaya Ambong (van Minde, 1997)

There should be languages where specific *VoObs(Coda/Y) constraints devolve final codas only in words, phrases, utterances, etc.

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Formalization *VoObs/Coda should be redefined as in (34) (creating a *X(Coda/Y) constraint parallel to the *X(Onset/Y) constraints).

(34) *VoObs(Coda/Y) Where $Y$ is some prosodic domain, assign one violation for each voiced obstruent in a coda of $Y$.

‘A voiced obstruent cannot be the (final) coda of $Y$.’

(35) *VoObs(Coda/Ut) *VoObs(Coda/Phr) *VoObs(Coda/Wd) *VoObs(Coda/o)

The next section will provide data showing that these predictions are accurate:

Constraints on syllable onsets and codas can also target the edges of words and larger prosodic domains.

3. Additional restrictions on prosodic domain edges

3.1. Restrictions on word edges

ONSET/Word Languages can tolerate onsetless syllables in word-medial position (i.e. medial hiatus) but require all word-initial syllables to have onsets. (See Bell (1971) and Smith (2002: 126-31), among others.)

(36) Onsets are required of (all and only) word-initial syllables: ONSET/Word

Babungo (Schauf, 1985: 272) Manam (Lichtenberk, 1983)
Binjin Gun-Wok (Evans, 2003: 94-5) Maricopa (Gordon, 1986)
Brahui (southern dialects; Ellenben, 1998: 393) Mundang (Elders, 2000)
Camling (Ebert, 1997: 12) Northern Arapaho (Salzmann, 1956: 51)
Dogoyan (Wiering and Wiering, 1986) NW River Montagnais (Clarke, 1982)
Guarani (Gregores and Suarez, 1967) Squamish (Kuiipers, 1967)
Guahage (Newell, 1956: 536) Tabukang Sangir (Maryott, 1961)
Hausa (Greenberg, 1941) Woleian (Sohn, 1975)
Luiseno (Kroeber and Gatsche, 1960) Woloif (Ka, 1994)
Madi (Tucker, 1967) See also examples in Bell (1971: 36)
Mam (England, 1983)

For underlyingly onsetless words, most languages satisfy the word-initial onset requirement via epenthesis of initial $\mathcal{I}$. 


Phonotactic restrictions across prosodic domains

Other possible repair processes:
Madi:  \( h \) epenthesis

Wolealian: Glide epenthesis

NW River Montagnais: Word-initial (short) vowel deletion.

NoCoda/Word Languages can also allow medial cadas to surface freely, but ban cadas only in word-final syllables.

(37) Codas are banned in (all and only) word-final syllables: NoCoda/Word

Chamcuro (Parker, 2001: 365-6)
Italian, Telugu (Harris and Gussmann, 1998)
See also examples and discussion in Broselow (2003)

VotOss(Coda/Word) Marked coda segments (e.g. voiced obstruents) can be tolerated word- internally but avoided in word-final syllables

(38) Voi. obs. coda are banned in (all/only) word-final syllables: *VotOss(Coda/Word)

Polish, Wallloon (Mascaró and Wetzels, 2001)
Russian (Halle, 1959, Mascaró and Wetzels, 2001)
Mideaster (Polish) Yiddish (Katz, 1987: 39, Mascaró and Wetzels, 2001)
See detailed discussion in Mascaró and Wetzels (2001).

Interim conclusion Restrictions on marked onset and coda segments and structures can also target the edges of words.

The next sections will give examples of these restrictions at the edges of larger prosodic domains.

3.2. Corresponding restrictions on phrase edges

Segments and structures which can be banned at the edges of both syllables and words can also be banned at the edges of higher prosodic domains, e.g. phrases and utterances.

NoCoda/Phrase Codas can be banned at the ends of only phrase-final words.

Leti: Consonants at the ends of phonological phrases (roughly equivalent to major syntactic XPs) metathesize with preceding vowels. (Engelenhoven, 2004, Hune, 1998).

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(39) Leti a. Phrase-final C# /urun/ [uron] ‘beautiful’
   b. Phrase-medial C# /uron məː/ [uron məː] ‘Moanese breadfruit’
   c. Phrase-final C# /məsər/ [mesə] ‘teacher’
   d. Phrase-medial C# /məsər ləvəː/ [mesə ləvəː] ‘teacher, big’

*VotOss(Coda/Phrase) Codas can be devoiced at the ends of only phrase-final words.

Yiddish: Voiced obstruents are devoiced phrase-finally, when “followed by a break in speaking, even a short one, and, of course, at the end of a sentence.” (Birnbaum 1979: 211)

(40) Yiddish a. /di maːj er vēt/ [di maːj er vēt] ‘the mice, he will…’
   b. /er iz məʃ, bin eʃ/ [er iz məʃ, bin eʃ] ‘he is tired, so I…’
   c. /my mēʃ, ober/ [my mēʃ,ober] ‘one may – but…’
   d. /zaːn vaːb, dəmîl/ [zaːn vaːb, dəmîl] ‘his wife, at that time’

3.3. Corresponding restrictions on utterance edges

Finally, languages can enforce onset and coda restrictions on only utterance-initial or utterance-final syllables.

Onset/Utterance Languages can require only utterance-initial syllables to have onsets, while tolerating hiatus within words and across word and phrase boundaries.

(41) All utterance-initial syllables have onsets: Onset/Utterance

Anejořič (Lynch, 2000) Menonimi (Bloomfield, 1962: 3)
Hawaiian (Elbert and Pukui, 1979: 10) Sanuma (Borgman, 1990: 223)
Koyta (Tyler, 1969) Selayarese (Mithun and Basri, 1986: 242)

Selayarese: ? is epenthized before vowel-initial words only when they occur in isolation or otherwise in utterance-initial position (Mithun and Basri, 1986: 242)

(42) Selayarese  a. ?apa ‘what’
       ?inni ‘this’
   b. ?apa inni *?apa ?inni ‘what is this?’

Requirements for utterance-initial onsets can also be satisfied in other ways:

Menonimi: \( h \) epenthesis
Koyta: Homorganic glide epenthesis
Kunjjen: Utterance-initial vowel deletion
**Phonotactic restrictions across prosodic domains**

**NoCoda/Utterance** Codas may occur word-medially, and also word-finally except in utterance-final words.

(43) No utterance-final syllables have codas: NoCoda/Utterance

Armenite (Tabain et al., 2004: 178)
Sardinian (Ferrer, 1994: 45)
Western Shoshoni (Crum and Dayley, 1993: 235, 248)

Western Shoshoni: Utterance-final codas are deleted.

Sardinian: Utterance-final consonants are followed by epenthetic vowels.

(44) Sardinian: medas [mēدا] sun [sun]
fit [fiṭ] fat [fiṭ]

**4. Conclusion**

**4.1. Summary of the argument**

<table>
<thead>
<tr>
<th>Typological Generalization:</th>
<th>Any segment or structure that is marked in onsets (or codas) is also marked at the edges of other, larger prosodic domains.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(45) Attested phonotactic restrictions on specific prosodic domains</td>
<td><img src="image" alt="Table showing phonotactic restrictions" /></td>
</tr>
</tbody>
</table>

**Theoretical Proposal:** Every markedness constraint which targets onsets or codas is part of a domain-edge markedness constraint schema.

(46) $M_{\text{onset}}$(Onset/Y) Where $M_{\text{onset}}$ is some markedness constraint which targets onsets, and Y is some prosodic domain, assign one violation for each instance of Y in which there is a violation of $M_{\text{onset}}$.

(47) $M_{\text{coda}}$(Coda/Y) Where $M_{\text{coda}}$ is some markedness constraint which targets codas, and Y is some prosodic domain, assign one violation for each instance of Y in which there is a violation of $M_{\text{coda}}$.

(48) $M_{\text{coda}}$(Coda/Ult) $M_{\text{coda}}$(Coda/Phr) $M_{\text{coda}}$(Coda/Wd) $M_{\text{coda}}$(Coda/ot)

(49) $M_{\text{onset}}$(Onset/Ult) $M_{\text{onset}}$(Onset/Phr) $M_{\text{onset}}$(Onset/Wd) $M_{\text{onset}}$(Onset/ot)

The interaction of the domain-edge markedness constraints with faithfulness constraints produce attested patterns of phonotactic restrictions.

These constraint schemas contribute to our understanding of the internal structure of CON.

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**4.2. Further predictions**

**More phrase and utterance edge restrictions**

Compared to syllable and word edge restrictions, there are relatively few examples of phrase and utterance edge restrictions.

This is because most language descriptions focus on word phonology.

If phonotactic restrictions in domains larger than the word were more often reported, we should see more examples of phrase-level and utterance-level onset and coda effects.

**Prediction** We should eventually be able to fill in the gaps in the table in (45).

**Other onset and coda constraints**

Many onset and coda restrictions have been shown to also hold on edges of larger prosodic domains.

...but there are plenty of other onset and coda restrictions that haven’t been addressed here.

- e.g. High-sonority onsets (*Onset/Glide)
  - Complex codas (*Complex/Coda)
  - Restrictions on manner/place in codas (CodaCond)

**Prediction** There should be word/phrase/utterance-edge parallels to these restrictions.

Some of these are attested:

- CodaCond(Word) Garawa (Farby, 1974, Hamilton, 1996: 257)
- CodaCond(Phrase) Koromir (Rennison, 1997)

**Strict layering**

Domain-edge markedness constraints target the edges of prosodic domains.

Two properties of prosodic structure are relevant to the action of these constraints:

- The edges of e.g. prosodic words don’t always match the edges of lexical words: prosodic structures can violate Strict Layering (Nespor and Vogel, 1986, Selkirk, 1984).
- The location of prosodic domain edges follows from constraint interaction (see Truckenbrodt, in press for an overview).
Phonotactic restrictions across prosodic domains

Prediction 1 Domain-edge markedness constraints evaluate phonotactics at the edges of prosodic words, not lexical words. Initial onsets in could be required in roots, but not clitics. Attested in Tratzüji (Dayley 1985).3

Prediction 2 Domain-edge markedness constraints can affect the location of prosodic domain edges. Onsets lexical-word-initial syllables could fall outside prosodic words. Attested in Banaw (Buller et al. 1993).

References

3See Flack (2006) for discussion of these strict layering interactions.

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