The aim of this chapter is twofold: 1) it introduces the syllabic approach to deletion and epenthesis and evaluates its empirical coverage, and 2) it presents a number of empirical generalizations concerning these processes, which the framework developed in chapters 3-5 is meant to account for.

Deletion and epenthesis are standardly assumed to follow from the principle of prosodic licensing, and specifically the requirement of exhaustive syllabification, whose application is conditioned by syllable well-formedness conditions. I argue against this approach, on the basis that it is:

- insufficient: It cannot account for all cases of deletion and epenthesis and must be supplemented by independent principles;
- inadequate: Several cases for which a syllabic account has been proposed turn out to be incompatible with a non-circular definition of the syllable;
- unnecessary: In syllable-based analyses that are not empirically problematic, it appears that the syllabic level is unnecessary, as an equally simple sequential analysis is available.

The bulk of the discussion is devoted to the inadequacy problem. I present five cases of consonant deletion, vowel epenthesis, and vowel deletion which are standardly analyzed in syllabic terms, ... Given the complexity of the latter case, it is discussed in the following chapter, entirely devoted to the French schwa.

While showing the inadequacy of syllable-based analyses, these patterns also reveal generalizations and tendencies in the application of deletion and epenthesis which constitute the main empirical ... sequential in nature, a property that will be crucially reflected in the analysis I develop in the following chapters.
The power of the syllable is forcefully expressed by its "ability to simultaneously generate predictions in three distinct empirical domains: ... of certain processes more enlightening. The following quote from Vennemann (1972: 2) illustrates this position well:

I will advocate here the incorporation of syllable boundaries and syllables in phonological descriptions. I will not say, however, that the incorporation of these concepts into the theory ... cases such a formulation would miss the point, would obscure the motivation of the process rather than reveal it.

Ultimately, the syllable has secured its place in the theory, and its explanatory potential has been greatly exploited in the last decades, particularly within what has been called Prosodic Phonology. A ... decade" (Blevins 1995: 206), phonological processes being now typically accounted for with reference to syllabic structure.

The most basic principle of Prosodic Phonology is that of Prosodic Licensing, given in (1) in Itofl's (1986: 2) formulation:

(1) PROSODIC LICENSING:
All phonological units must be prosodically licensed, i.e., belong to higher prosodic structure (modulo extraprosodicity).

The phonological units I am concerned with are segments, the higher prosodic structure to which they must belong is the syllable. Segments – and the features that compose them – must be incorporated into the theory of syllable structure directly from Prosodic Licensing through the general convention of Stray Erasure (Steriade 1982; Itofl 1986, 1989), which automatically deletes at the end of a syllable structure any consonant that cannot be included into a well-formed syllable. Consonant deletion rules can then be eliminated from the grammar. The introduction of universal principles and conventions which allow for the elimination of a number of phonological processes, a large number of which have been analyzed as motivated by the requirement of exhaustive syllabification.

Syllable well-formedness conditions mainly fall into three groups: 1) those that govern the complexity of the different syllabic constituents (nucleus, onset, and coda), 2) those concerned with the size of the syllable (number of consonants, number of syllables, etc.), 3) those concerned with the position of the syllable in the word (initial, final, medial). Syllable well-formedness conditions mainly fall into these groups (1): those

### 1.2.1.1. STRUCTURAL WELL-FORMEDNESS CONDITIONS

The first condition is that of the syllable template, which is expressed in (2) in Itofl's (1986: 2) formulation:

(2) SYLLABLE TEMPLATE:
A syllable must consist of a nucleus followed by an optional onset and an optional coda.

The second condition is that of the coda, which is expressed in (3) in Itofl's (1986: 2) formulation:

(3) CODA CONDITION:
The coda of a syllable must consist of a single consonant.

The last condition is that of the onset, which is expressed in (4) in Itofl's (1986: 2) formulation:

(4) ONSET CONDITION:
The onset of a syllable must consist of a single consonant or a single vowel.

These conditions are often expressed in terms of phonological processes, which are divided into three groups: 1) those that delete consonants that cannot be included into well-formed syllables, 2) those that add consonants that are missing from well-formed syllables, 3) those that alter the structure of well-formed syllables.

To avoid deletion, consonants may be syllabified before the application of Stray Erasure by epenthesis (Stray Epenthesis) or feature-changing rules, which provide an additional nucleus or alter the structure of the syllable. Consonant deletion rules can then be eliminated from the grammar. The introduction of universal principles and conventions which allow for the elimination of a number of phonological processes, a large number of which have been analyzed as motivated by the requirement of exhaustive syllabification.

4 There has been a debate over whether syllables are built through syllable templates (e.g. Itofl 1986) or syllabification rules (e.g. Steriade 1982; Levin 1985). This distinction is not crucial here and my use of templates is intended to capture the idea of the formation of syllable structure in a similar way to the way syllable templates can be used to specify the structure of syllable-boundary phenomena. The second condition concerns the structure of the syllable, which is expressed in (5) in Itofl's (1986: 2) formulation:

(5) SYLLABLE STRUCTURE:
The syllable must consist of a single consonant or a single vowel followed by an optional onset and an optional coda.

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Chapter 1: Against the syllable

1.1.2.1. Syllable templates

The three languages cited in table 1 – Korean, Cairene Arabic, and Tonkawa – can be assumed to have a CVC template. No more than one consonant is allowed in the onset or the coda (I ignore the complexity of the nucleus). Cairene Arabic also allows one additional extrasyllabic consonant phrase-finally.

Korean has a limited number of morphemes that end in a two-consonant cluster underlyingly (K.-O. Kim & Shibatani 1976; Iverson & Lee 1995; S.-H. Kim 1995; Shim 1995 and numerous other researches). When one of the two consonants deletes to conform to the CVC template, this is shown in (4) below (data from S.-H. Kim 1995).

(4) CONSONANT DELETION IN KOREAN:

a. /kaps+to/ _ [kap.t'o] 'price-ADJUNCTIVE'
   /kaps/ _ [kap]'price'
   vs. /kaps+e/ _ [kap.s'e] 'price-LOCATIVE'

b. /salm+to/ _ [sam.to] 'life-ADJUNCTIVE'
   /salm/ _ [sam]'life'
   vs. /salm+e/ _ [sal.me] 'life-LOCATIVE'

In Cairene Arabic (Broselow 1980, 1992; Selkirk 1981; Wiltshire 1994, 1998), unsyllabifiable consonants that arise through morpheme or word concatenation do not delete but are "saved" by an epenthetic vowel that provides an additional syllable: a CVC template. This is shown in (5) below. In Cairene Arabic, a vowel is inserted between the second and third consonant:

(5) VOWEL EPENTHESIS IN CAIRENE ARABIC:

a. /katab-t-l-ha/ _ [ka.tab.t il.ha] 'I wrote to her'
   /katab-t gawaab/ _ [ka.tab.t i ga.waab] 'you (m.) wrote a letter'
   c. /bint nabiiha/      _ [bin.t i.na.bii.ha] 'an intelligent girl'

Other processes analyzed as triggered by syllable templates include: 1. consonant deletion: Menomini (CVC) (Y.-S. Kim 1984), Kamaiura' (CV) (Everett & Seki 1985; McCarthy & Prince 1993); vowel epenthesis: Chukchi (CVC) (Kenstowicz 1994b), Lenakel (CVC) (Lynch 1978; Blevins 1995; Kager 1999); vowel deletion: Korean, and so on. The use of syllable templates in addition to well-formedness conditions is widespread. The following table gives one representative example found in languages of the world. Relevant data and references follow.

Table 1:

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>PROCESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template Coda Conditions</td>
<td>SSP</td>
</tr>
<tr>
<td>C deletion</td>
<td>Korean, Lardil, Quée'bec, French</td>
</tr>
<tr>
<td>V epenthesis</td>
<td>Cairene Arabic, Selayarese, Chaha</td>
</tr>
<tr>
<td>V deletion blocked</td>
<td>Tonkawa, Kuuku-Ya'u, Gallo-Romance</td>
</tr>
</tbody>
</table>

When one of the well-formedness conditions is violated, the available repair strategies mainly include deletion, epenthesis, and feature-changing processes. Other processes may be sporadically used (e.g., epenthesis).
Chapter 1: Against the syllable

Tonkawa has a very productive process of internal vowel syncope, in addition to a process of final vowel deletion, which I disregard here (Hoijer 1946; Kisseberth 1970; Phelps 1973, 1975; Noske ... CVC syllables. It is blocked when it would result in an unsyllabifiable sequence of consonants. This is illustrated in (6).

(6) SYNCOPE IN TONKAWA:

- /picena+n+o÷/ _ [picnano÷] 'he is cutting it'
- /we+picena+n+o÷/ _ [wepcenano÷] 'he is cutting them'

In the form in (6a), only the second vowel of the stem may be dropped. If the first were to delete, we would get an initial [pc...n] cluster that cannot be parsed since complex onsets are disallowed in Tonkawa. (I ignore here why it is the first rather than the second vowel of the stem that deletes in (6b)).

1.1.2.2. Coda Conditions

Coda conditions are extremely varied and deal with a great number of distinct features. Cross-linguistically, consonant deletion, vowel epenthesis, and vowel deletion seem to be triggered or blocked by constraints on manner and place features, with laryngeal features playing only a secondary role.

The examples presented here involve place features.

Lardil (K. Hale 1973; Klokeid 1976; Itofl 1986; Wilkinson 1988) and Kuuku-Ya'u (Thompson 1988) do not allow non-coronal consonants in coda position (with the exception of nasals homorganic with the following onset). Kuuku-Ya'u displays additional restrictions on morpheme-final consonants, which can only be a member of the set \{n,l,j\}.

In Lardil, the only context where non-coronal consonants do not appear before a vowel (i.e., in onset position) is when stems ending in a non-coronal consonant are uninflected. The examples in (7c-d) show the distinct behavior of coronal consonants, which are retained in the output.

(7) NON-CORONAL CONSONANT DELETION IN LARDIL:

- /˜aluk/ _ n/a ˜alu [˜alu] 'story'
- /puˇuka/_ putukpuˇu [puˇu] 'short'
- /jaöput/ _ n/a n/a [jaöput] 'snake, bird'
- /jalulu/ _ jalul n/a [jalul] 'flame'

In Kuuku-Ya'u, an optional process of vowel deletion deletes morpheme-final vowels. However, this process applies only when the preceding consonant is one of the permissible morpheme-final coronal consonants \{n,l,j\}. Otherwise, syncope and apocope fail to apply to a vowel in the coda condition against non-coronal consonants.

(8) VOWEL DELETION IN KUUKU-YA`U:

- /t∞a÷i-na/ _ [t∞a÷in] 'hit-NONFUTURE'
- /˜a˜kala/ _ [˜a˜kal] 'give-IMPERATIVE.SG'
- /mukana-pinta/ _ [mukanpinta] 'big-COMITATIVE'
- /ta˜ul/ _ [ta˜ul] 'canoe-POSITIONAL'

Selayarese (Broselow 1999) allows only glottal stops, nasals, and first parts of geminates in coda position. Word-internally, nasals are always homorganic with the following onset; word-finally, they become glottal stops. Otherwise, a copy vowel is inserted that turns the illegal consonant into an onset.
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(9) VOWEL EPENTHESIS IN SELAYARESE:

Bahasa Indonesia Selayarese

a. arus [arus\(u\)] ‘current’
b. kikir [kikir\(i\)] ‘metal file’
c. bakri [bak\(ari\)] ‘interpretation’

We can interpret the Selayarese data in terms of a constraint against place features in coda. Assuming that glottal stops and velar nasals are placeless (e.g. Trigo 1988; Paradis & Prunet 1993), we ... with the following onset. The data straightforwardly follow from the fact that codas are unable to license place features.

1.1.2.3. The Sonority Sequencing Principle

The SSP requires sonority to fall from the nucleus to both edges of the syllable. In Gallo-Romance (Pope 1961; Jacobs 1989), final vowels other than /a/ were reduced to /\(\backslash\) and subsequently lost. (...) was still present in Old French (which also illustrates other processes: cluster simplification and consonant epenthesis).

(10) A POCOPE IN GALLO-ROMANCE:

Reconstructed Old French-Gallo-Romance after vowel reduction

a. *n’t\(\overline{\text{t}}\) > net’clean, clear’
b. *ført\(\overline{\text{t}}\) > fort ‘strong’
c. *p´∂r\(\overline{\text{r}}\) > pere ‘father’
d. *siml\(\overline{\text{l}}\)\(\overline{\text{t}}\)\(\overline{\text{d}}\)\(\overline{\text{u}}\)\(\overline{\text{t}}\) > semble\(\overline{\text{l}}\)\(\overline{\text{t}}\)\(\overline{\text{u}}\)\(\overline{\text{t}}\) ‘resemblance’

Eventually, all final vowels were lost in the history of French, so that the modern language has a large number of words ending in clusters that violate the SSP. The spoken language, however, displays a strong tendency to simplify those clusters by deleting the last consonant. This process is illustrated with data from Quebec French:

(11) FINAL CONSONANT DELETION IN QUE'BECK FRENCH:

a. poutre [put\(\overline{\text{t}}\)] ‘beam’
b. cate\(\overline{\text{c}}\)\(\overline{\text{h}}\)\(\overline{\text{i}}\)\(\overline{\text{s}}\)me [kate\(\overline{\text{s}}\)\(\overline{\text{c}}\)\(\overline{\text{h}}\)\(\overline{\text{i}}\)\(\overline{\text{s}}\)] ‘catechism’

Chaha (Rose 1997b, to appear) also has a number of underlying forms ending in bad sequences of consonants according to the SSP. The only CC clusters that are allowed to surface word-finally in this language are those in which sonority falls (12a-b). Otherwise an epenthetic vowel is inserted between the consonants (12c-d).

(12) VOWEL EPENTHESIS IN CHAHA:

a. /s\(\overline{\text{t}}\)\(\overline{\text{r}}\)\(\overline{\text{t}}\)/ [sπ\(\overline{\text{r}}\)\(\overline{\text{t}}\)] ‘cauterize!’
b. /k\(\overline{\text{f}}\)\(\overline{\text{t}}\)\(\overline{\text{t}}\)/ [kπ\(\overline{\text{f}}\)\(\overline{\text{t}}\)] ‘open!’
c. /d\(\overline{\text{\(\text{\i}n\)\(\overline{\text{t}}\)\(\overline{\text{t}}\)}\)/ [dπ\(\overline{\text{\(\text{\i}n\)\(\overline{\text{t}}\)\(\overline{\text{t}}\)}\)] ‘add!’
d. /\(\overline{\text{\(\text{\i}m\)\(\overline{\text{t}}\)\(\overline{\text{t}}\)}\)/ [\(\overline{\text{\(\text{\i}m\)\(\overline{\text{t}}\)\(\overline{\text{t}}\)}\)] ‘pick!’

1.2. THE SYLLABIC APPROACH: WEAKNESSES

Although the syllabic approach adequately accounts for the above cases, I argue in this section that deletion and epenthesis patterns should not be treated with reference to syllable structure. The following points can be brought in support of this conclusion:

THE SYLLABIC APPROACH: WEAKNESSES:

a. The syllabic approach is insufficient: Epenthesis and deletion often fail to apply in contexts where syllable well-formedness predicts them to be applicable.
b. The syllabic approach is inadequate: Upon closer examination, the syllabic account cannot be maintained for several of the cases of epenthesis and deletion for which it has been proposed.
c. The syllabic approach is unnecessary: For the patterns that are naturally compatible with a syllabic analysis, an explanation in terms of syllable well-formedness is unnecessary.

 Chapters (Krippendorff 1999, Krippendorff 2012) and (Baayen et al. 2008) on multi-word units are not syllables but constituents.

(13) WEAKNESSES OF THE SYLLABIC APPROACH: Conclusion:

Reference to syllable structure is dispensable. The following points can be brought in support of this conclusion:

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(14) VOWEL EPENTHESIS IN CHINA:

(15) VOWEL EPENTHESIS IN QUE'BECK FRENCH: We observe variation in whether epenthesis applies in sonorant-sonorant clusters and obstruent-obstruent ones other than fricative-stop (12b). See Rose (to appear) for discussion.

(16) AMONG OTHER LANGUAGES THAT USE EPENTHESIS TO AVOID VIOLATING THE SSP: Itelmen (Bobaljik 1997), Romansch (Montreuil 1999), Khalkha Mongolian (Svantesson 1995; Harada 1999).
I will present in more detail each of these points. The bulk of the discussion will focus on (13b), which I treat last: We will review a number of deletion and epenthesis patterns that have been proposed. This approach, which will be presented in chapter 3, has been supported for palatalization processes by Kochetov (1999).

The work presented here can be seen as part of this more general line of research questioning the role of the syllable in phonotactic patterns.

1.2.1. It is insufficient: Extrasyllabicity and Sequential Constraints

It is well-known that epenthesis and deletion may behave in ways that are unexpected given syllable well-formedness alone. First, consonants may surface even though they cannot be incorporated into syllables, and the deletion of extrasyllabic consonants is not blocked even though the constraints that disallow their extrasyllabicity are properly satisfied. These "exceptions" are not necessarily problematic for the syllabic approach, if independent and well constrained principles that interact with syllable well-formedness conditions can account for them. The implicit assumption so far has been that such principles exist. On the one hand, a device of extrasyllabicity (11) has been proposed to allow certain consonants to escape the requirement of exhaustive syllabification. Consonants may be marked as extrasyllabic and not be subject to syllable well-formedness conditions. On the other hand, epenthesis and deletion processes may apply domain-internally, typically at the edges of prosodic constituents, such as the prosodic word. Thus, consonant deletion and vowel epenthesis may apply only word-finally, but not at word-internal morpheme boundaries. Contrast [karikari-wur] ‘butter-fish-FUTURE’ with the bare stem [karikar]: the stem-final vowel [i] deletes word-finally but remains before a suffix. See Piggott (1980, 1999), looking at patterns of assimilation in sequences of two nasal consonants, for similar patterns of prosodic licensing to allow certain consonants to escape the requirement of exhaustive syllabification. Consonants may be marked as extrasyllabic and not be subject to syllable well-formedness conditions.

To account for these "edge effects", I argue that processes that escape deletion and epenthesis are open to processes that apply extrasyllabically. The following four approaches may be mentioned:

1. Extrasyllabicity

The terms "extrametricality" and "extraprosodicity" are often used, but I prefer "extrasyllabicity", which is the only term that is compatible with the different implementations of this idea. Consonants may be marked as extrasyllabic and escape syllable well-formedness conditions or may attach directly to a constituent higher than the syllable, or may be part of a prosodic word. Epenthesis and deletion processes may apply domain-internally, typically at the edges of prosodic constituents, such as the prosodic word. Thus, consonant deletion and vowel epenthesis may apply only word-finally, but not at word-internal morpheme boundaries. Contrast [karikari-wur] ‘butter-fish-FUTURE’ with the bare stem [karikar]: the stem-final vowel [i] deletes word-finally but remains before a suffix. See Piggott (1980, 1999), looking at patterns of assimilation in sequences of two nasal consonants, for similar patterns of prosodic licensing to allow certain consonants to escape the requirement of exhaustive syllabification. Consonants may be marked as extrasyllabic and not be subject to syllable well-formedness conditions.

To account for these "edge effects", it has been proposed that edge consonants may remain extrasyllabic and escape syllable well-formedness conditions and the requirement of exhaustive syllabification. Consonants may be marked as extrasyllabic and not be subject to syllable well-formedness conditions. On the other hand, epenthesis and deletion processes may apply domain-internally, typically at the edges of prosodic constituents, such as the prosodic word. Thus, consonant deletion and vowel epenthesis may apply only word-finally, but not at word-internal morpheme boundaries. Contrast [karikari-wur] ‘butter-fish-FUTURE’ with the bare stem [karikar]: the stem-final vowel [i] deletes word-finally but remains before a suffix. See Piggott (1980, 1999), looking at patterns of assimilation in sequences of two nasal consonants, for similar patterns of prosodic licensing to allow certain consonants to escape the requirement of exhaustive syllabification. Consonants may be marked as extrasyllabic and not be subject to syllable well-formedness conditions.
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Approaches to Extrasyllabicity:

a. Extrametricality: Edge consonants are marked as extrametrical for syllabification purposes, and are ultimately licensed by adjoining to a syllable late in the derivation, once syllable well-formedness conditions no longer apply (Borowsky 1986; Itofl 1986; Booij 1999).

b. Final consonants as onsets: Final consonants are represented as onsets of empty-headed syllables and are not subject to the coda conditions that apply to domain-internal codas. This approach is prominent in Government Phonology (e.g. Kaye 1990); see also Dell (1995) for French.

c. Indirect licensing: Edge segments are licensed not by the syllable but by a higher constituent, especially the prosodic word (Piggott 1999; Spaelti 1999; Auger & Steele 1999; Steele & Auger 1999).


Proposed in the context of edge effects, extrasyllabicity has standardly been restricted to margins of prosodic domains, especially the prosodic word. This is the so-called Peripherality Condition. In general, segments that are extrasyllabic are those that are not licensed by the syllable. This principle of segmental phonology, extrasyllabicity has to be strictly constrained, which is presently not clearly the case.

One additional argument in favor of extrasyllabicity is the fact that certain consonants, especially those at edges, often freely violate constraints which normally apply to syllable-affiliated segments (Piggott 1999: 189). This relative freedom is expected since syllable well-formedness conditions do not apply in this position. Therefore, if the violation of a segmental constraint is not due to extrasyllabicity, the constraint must be violated by extrasyllabic consonants. This result cannot follow from extrasyllabicity, since extrasyllabic consonants do not follow from a harmonic relationship with the syllable.

1.2.1.2. Sequential constraints

The development of prosodic analyses has not removed the need for purely sequential rules and constraints, which apply over sequences of segments irrespective of their prosodic affiliation. This has been recognized by proponents of the prosodic approach, for example Itofl (1986: 45), who states that "certain intersyllabic melody constraints are only made unenlightening by reference to syllabic structure". It is therefore not surprising that constraints on syllable structure are also present in the context of edge effects.

The most widely accepted sequential principle is certainly the Obligatory Contour Principle (OCP), which prohibits identical adjacent segments on a given tier. Proposed by Leben (1973) and McCarthy (1986), the OCP has been extended to account for tonal phenomena, it was first extended to segmental processes by McCarthy (1986), Odden (1988), and Yip (1990). Subsequently, a large number of segmental processes have been argued to fall under the scope of the OCP, and many others are still under discussion.

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Catalan has a productive process of word-final stop deletion, which applies only if the stop follows a homorganic consonant (Mascaro 1983, 1989; Bonet 1986; Wheeler 1986, 1987; Morales 1995; Herrick 1999). Contrast the examples in (16), in which the stop and the preceding fricative are deleted to avoid sequences of homorganic consonants.

(15) DELETION IN HOMORGANIC CLUSTERS IN CATALAN:

<table>
<thead>
<tr>
<th>Word</th>
<th>Original Form</th>
<th>Deletion Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>fort</td>
<td>/fort/</td>
<td>[for]</td>
</tr>
<tr>
<td>alt</td>
<td>/alt/</td>
<td>[al]</td>
</tr>
<tr>
<td>punt</td>
<td>/puNt/</td>
<td>[pun]</td>
</tr>
<tr>
<td>camp</td>
<td>/kaNp/</td>
<td>[kam]</td>
</tr>
<tr>
<td>bank</td>
<td>/baNk/</td>
<td>[ba]</td>
</tr>
<tr>
<td>bast</td>
<td>/bast/</td>
<td>[bas]</td>
</tr>
</tbody>
</table>

(16) NO DELETION IN NON-HOMORGANIC CLUSTERS IN CATALAN:

<table>
<thead>
<tr>
<th>Word</th>
<th>Original Form</th>
<th>Deletion Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>balp</td>
<td>/balp/</td>
<td>[balp]</td>
</tr>
<tr>
<td>calc</td>
<td>/kalk/</td>
<td>[kalk]</td>
</tr>
<tr>
<td>erb</td>
<td>/erp/</td>
<td>[erp]</td>
</tr>
<tr>
<td>arc</td>
<td>/ark/</td>
<td>[arc]</td>
</tr>
<tr>
<td>kasp</td>
<td>/kasp/</td>
<td>[kasp]</td>
</tr>
<tr>
<td>fosc</td>
<td>/fosk/</td>
<td>[fosc]</td>
</tr>
</tbody>
</table>

An OCP-place constraint cannot be the whole story, as homorganic clusters in which the final consonant is not a stop surface intact (e.g. /pots/ 'you can'). Morales's (1995) solution to this is based on Radical Underspecification and the assumption that stops lack manner specifications. Also, the constraint ... chapters a different account of the Catalan case and the special status of stops in deletion patterns more generally.

Other cases of deletion motivated by the OCP include Korean /y/-deletion after (alveo-)palatal consonants (H.-S. Kang 1998) and /r/-deletion in Vinzelles Occitan (Elordieta & Franco 1995; see also Morin 1982; Dauzat 1984). In the second case, ... for this process in all the other Basque dialects I have looked at, and that the case for the Baztan variety is unclear.

A classic case of epenthesis is found in the suffixation of -ed and -s in English. When these suffixes are added to stems ending in a dental stop and a coronal fricative, an epenthetic vowel is inserted between the two morphemes. Hence /cheated/ [tʃit] and /passes/ [pæs]. A similar example is found in Hebrew (Kenstowicz 1994a: 533).

Afar (McCarthy 1986, based on Bliese 1981), an East Cushitic language, illustrates how vowel deletion can be blocked by the OCP. This language has a syncope rule that deletes an unstressed short vowel when it is followed by a syllable that contains a vowel not in the OCP. This leads to a large number of deletion and epenthesis processes.

The OCP may motivate a large number of deletion and epenthesis processes.
Constraints that deal with more specific sequences of consonants are also needed. For instance, the constraint *RG, which bans sequences of a sonorant consonant followed by a voiced obstruent, was proposed by Ni' Chiosa'in (1996, 1999; see also Green 1997). This constraint accounts for cases of vowel epenthesis in Irish and Gaelic. Smith (1999) uses similar but even more specific constraints in his analysis of related facts in Leurbost Gaelic.

The OCP – or a similar principle against identical adjacent elements in some dimension(s) – appears to be empirically well-motivated, and plays an important role in the analysis of various deletion and epenthesis facts. On this point, the prosodic licensing theory of segmental processes is not satisfactory.

As an illustration of the tension between syllabic and sequential constraints used to prevent nearly identical configurations, consider vowel deletion in Tonkawa, Piro, and South-eastern Tepehuan. As...
Chapter 1: Against the syllable

Consonants. Second, all non-prevocalic consonants surface "either as a syllabic consonant or has to be followed by a very short epenthetic vowel" (Lin 1997b: 405), properties that are considered uncharacteristic of coda consonants.

Lin and Matteson differ, however, on the alternative template they propose: CCCV for Matteson, CV for Lin, with extrasyllabic consonants in between. The latter is that both force the use of a sequential constraint of the type *CCC to account for the blocking of vowel syncope.

We see that syncope in Tonkawa, North-eastern Tepehuan, and Piro is subject to the same descriptive constraint, that of avoiding sequences of three consonants word-internally. But only Tonkawa and Tepehuan seem to be amenable to an analysis in terms of syllable templates.

Is there a principled reason for adopting two radically different analyses – sequential and syllabic – for what appears to be manifestations of the same process? One reason is that all (word-internal) consonants have to be adjacent to a vowel. We will shortly come back to this generalization.

1.2.2. It Is Unnecessary: Equivalent Sequential Analyses

We have seen that the analysis of deletion and epenthesis patterns generates an undesirable tension between syllabic and sequential accounts. I have suggested that we should seek a unified approach to these processes, which has to be

...
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The proposed correspondences between syllable and sequential constraints are summarized below:

**Quebec French**

The theory that the syllable and sequential constraints both account for final sonorant deletion in Quebec French (Artiagoitia 1993) adheres to the principle that the [C] in a word-final sequence (when the prounoun C) is obligatorily the deletion before a vowel, and that the [C] in a word-initial position becomes both the deletion before a consonant.

Recall from (4) that Korean enforces a strict CVC template or, in an OT terminology, an undominated constraint against complex codas and onsets *C_{OMPLEX}. Consonant deletion applies when a consonant cannot fit into this template. But notice that we could equally well characterize the facts by saying that all consonants in Korean must be adjacent to a vowel. A constraint requiring that consonants be adjacent to a vowel would trigger consonant deletion in the same way as *C_{OMPLEX}, without referring to syllables.

**The Menomini case is equivalent** (contrast for the stem /m´t´mohs-/ 'woman' the plural form [met´mohsak] with the singular one [met´moh]).

**Degemination in Turkish follows the same logic** (Clements & Keyser 1983): a stem-final geminate consonant surfaces before a vowel-initial suffix but degemmetates when a C2 is added to the nominative 

**Quebec French** optionally deletes all word-final consonants in C2 clusters where C2 is more sonorous than C1, given the sonority hierarchy proposed in (3). The process follows straightforwardly from the SSP, which requires sonority to fall within the coda. The SSP, however, can be reformulated independently from a syllable specification. 

**21**

**The proposed correspondences between syllable and sequential constraints are summarized below:**

**Sonority Sequencing Principle (sequential):**

Sonority maxima correspond to possible sonority peaks.

For the contrary claim that consonant-final and vowel-final syllables are not available here, it is argued that a syllable and voyeau analysis is not only possible for vowels, but that the process that deletes a vowel-final syllable is the same as the process that deletes a consonant-final syllable. Therefore both the segmental and syllabic SSP account for final sonorant deletion in Quebec French.

**The proposed correspondences between syllable and sequential constraints are summarized below:**

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(22) CORRESPONDENCES BETWEEN SYLLABIC AND SEQUENTIAL CONSTRAINTS:

a. Korean/Menomini:
   - Syllabic: *COMPLEX (CVC template)
   - Sequential: Consonants are adjacent to vowels

b. Kamaiura':
   - Syllabic: *CODA (CV template)
   - Sequential: Consonants are followed by a vowel

c. Lardil/Basque:
   - Syllabic: *F/CODA (coda condition)
   - Sequential: F is followed by a vowel

d. Que'bec French:
   - Syllabic: Sonority does not increase from the nucleus to the edges of the syllable
   - Sequential: Sonority maxima correspond to possible sonority peaks

Note that I am not claiming that the sequential and syllabic constraints above are empirically equivalent in all respects – they are not. For example, the exclusion of stops from the coda position is not accounted for by any of the constraints described above. Likewise, a sequence [rmt] does not violate the sequential version of the SSP because [m] is not more sonorous than both [r] and [t], but it may violate the syllabic version of this principle. If a sequence violates the sequential SSP, it necessarily also violates the syllabic version, but not vice versa.

The language that remains to be discussed is English. Borowsky (1986) uses coda conditions to account for word-final consonant deletion in nasal-nasal (condemn vs. condemnation), voiced stop-nasal (resign vs. resignation), and nasal-voiced stop (bomb vs. bombard) sequences, as well as /h/-deletion before a (non-word-initial) unstressed vowel (vehicle). These are fairly limited cases, which require specific coda conditions against certain combinations of consonants and a constraint against onset/h/, coupled with a rule that affects the position of the vowel. These are the cases where Borowsky's account of /h/-deletion and an alternative proposal in which syllable well-formedness plays no role. The cluster simplification cases would fall out naturally from the special status of stops and the approach to contrast I introduce in my analyses of Hungarian, English, Icelandic, and French in the next section, and more fully develop in chapter 4.

This exhausts the list in (20). I conclude that the syllable never appears to be necessary or even useful in analyzing consonant deletion processes. It does not seem to provide any insight into the patterns of vowel deletion or epenthesis that may be argued to follow from the sequential correspondences in (22).

The next section begins a chapter on the pros and cons of the sequential and syllabic approaches to consonant deletion, and their implications for the development of the definition of the syllable. The discussion starts with the idea that the sequential approach is more natural, and that the syllabic approach is more useful. I argue that both approaches have their merits, and that the best approach is a combination of the two. The conclusion of the chapter is that the syllable is a useful concept, but that the sequential approach is more natural and intuitive.
The SSP:
Chaha, Romansch, Mongolian, Gallo-Romance, Itelmen
Those in (23a-b) and, to a lesser extent (23d), will play a central role in the discussions and analyses to follow. Consonants tend to delete or trigger vowel epenthesis when they are not adjacent to a vowel, and preferably followed by a vowel. This brings us to Generalization 1:

Generalization 1: Consonants want to be adjacent to a vowel, and preferably followed by a vowel.

Additional generalizations will be presented in the following section. All are refinements, more specific instances of this generalization, which identify consonants that need more than others to be adjacent to a vowel. They are constraints that condition the application of consonant deletion, vowel deletion, and vowel epenthesis:

1.2.3. Hungarian Cluster Simplification and Degemination

In full force in the description of the Hungarian

Hungarian establishes generalizations 2-5. The French

Generalization 6: Consonants want to be adjacent to a vowel, and preferably followed by a vowel.

Generalization 5: Consonants that are not in the edge of a prosodic domain want to be adjacent to a vowel, and preferably followed by a vowel.

Generalization 4: Consonants that are not followed by a [+continuant] segment want to be adjacent to a vowel, and preferably followed by a vowel.

Generalization 3: Stops want to be adjacent to a vowel, and preferably followed by a vowel.

Generalization 2: Coronal stops want to be adjacent to a vowel, and preferably followed by a vowel.

The application of consonant deletion, vowel deletion, and vowel epenthesis reinforces my argument that to be adjacent to a vowel, and preferably followed by a vowel is a necessary condition. This is not to say that all consonants that are not adjacent to a vowel are disallowed. There are some permitted exceptions. The section below describes these cases. However, the generalizations that have been introduced in this section will be revisited in the next chapter. The section below provides some constraints on the French

1.2.3.1. Hungarian Cluster Simplification and Degemination

Hungarian has an optional process of cluster simplification in neutral position. This process applies to a subset of sequences of three or more consonants, and always deletes a medial consonant. Dressler & Siptár (1989), Siptár (1991), A'cs & Siptár (1994), Toörkenczy & Siptár (1999), and Siptár & Toörkenczy (2000) have detailed the process, which will be the focus of the following chapter. This is my main argument for the application of consonant deletion, vowel deletion, and vowel epenthesis.
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Sipta'r (1991), and A'cs & Sipta'r (1994) suggest that the process is syllabically-driven. More specifically, it is claimed to depend on whether the last two consonants can form a permissible onset. This would account for the contrast between (24), where simplification is possible, and (25), where it is not. All data come from Toörkenczy & Sipta'r (1999) and Sipta'r & Toörkenczy (2000) and appear in their Hungarian spelling, together with the IPA transcription.

<table>
<thead>
<tr>
<th>CLUSTER SIMPLIFICATION IN HUNGARIAN:</th>
<th>No simplification</th>
<th>Simplification</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. lambda</td>
<td>[lømbdø]</td>
<td>[lømdø]</td>
</tr>
<tr>
<td>b. asztma</td>
<td>[østmø]</td>
<td>[øsmø]</td>
</tr>
<tr>
<td>c. rontgen</td>
<td>[rØndg´n]</td>
<td>[rؘgen]</td>
</tr>
<tr>
<td>d. dombtetoÿ</td>
<td>[dompt´tØ:]</td>
<td>[domt´tØ:]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLUSTER RETENTION IN HUNGARIAN:</th>
<th>No retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. a'mbra</td>
<td>[a:mbrø]</td>
</tr>
<tr>
<td>b. espresszo'</td>
<td>[´spres:o:]</td>
</tr>
<tr>
<td>c. centrum</td>
<td>[tÍ´ntrum]</td>
</tr>
<tr>
<td>d. templom</td>
<td>[t´mplom]</td>
</tr>
</tbody>
</table>

The contrast between (24) and (25) derives from the following three assumptions: 1. Complex codas are disallowed (at least word-internally); 2. Consonantal nuclei are not tolerated; 3. Only the first member of the cluster is ever syllabified. It follows that in three-consonant sequences such as those above, the only possible syllabification is [C[1, C2, C3]]; [C1, C2, C3] is excluded by the constraint against complex codas and [C1, C2, C3] by that against consonantal nuclei. So the fate of the clusters in (24)-(25) depends on the well-formedness of C2C3 as complex onsets. The last two members of the clusters in (25) form stop-liquid sequences that constitute typical complex onsets cross-linguistically. These sequences appear in word-initial position, so they are marked as complex onsets as well. On the other hand, the last two segments in the clusters of (24) – [bd], [tm], [dg], [pt] – are much more marked as complex onsets and do not appear in word-initial position (Sipta'r 1980; Olsson 1992). If it is assumed that these sequences are ill-formed as onsets in Hungarian, no possible syllabification is available for the clusters in (24) and the deletion of the medial segment then just follows from Stray Erasure. Furthermore, Sipta'r & Törkenczy (2000) propose that the examples presented here mostly involve word-internal clusters, but simplification is also possible in compounds (i) and across word boundaries (ii).

<table>
<thead>
<tr>
<th>NO DELETION IN C1C2C3 CLUSTERS WHERE C2C3 IS NOT A POSSIBLE ONSET:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. aktfoto'</td>
</tr>
<tr>
<td>b. hangsor</td>
</tr>
<tr>
<td>c. handle'</td>
</tr>
<tr>
<td>d. bazaltkoÿ</td>
</tr>
<tr>
<td>e. szerbtoÿl</td>
</tr>
<tr>
<td>f. sejtmag</td>
</tr>
<tr>
<td>g. szenvtelen</td>
</tr>
<tr>
<td>h. narancsbo'l</td>
</tr>
</tbody>
</table>

None of the final two consonants in the underlined sequences in (27) appears in initial position in Hungarian, and all are rather marked crosslinguistically as complex onsets. Therefore, simplification cannot be related to the well-formedness of the last two consonants as onsets. It follows that some clusters do not simplify even though the last two consonants are better-formed onsets than those in (24). Consider the data in (27).

<table>
<thead>
<tr>
<th>NO DELETION IN C1C2C3 CLUSTERS WHERE C2C3 IS NOT A POSSIBLE ONSET:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. bronz</td>
</tr>
<tr>
<td>b. prem</td>
</tr>
<tr>
<td>c. tre'fa</td>
</tr>
<tr>
<td>d. ple'h</td>
</tr>
</tbody>
</table>

However, Törkenczy & Sipta'r (1999) and Sipta'r & Törkenczy (2000) propose that the examples presented here mostly involve word-internal clusters, but simplification is also possible in compounds (i) and across word boundaries (ii).

The contrast between (24) and (25) derives from the following three assumptions: 1. Complex codas are disallowed (at least word-internally); 2. Consonantal nuclei are not tolerated; 3. Only the first member of the cluster is ever syllabified. It follows that in three-consonant sequences such as those above, the only possible syllabification is [C[1, C2, C3]]; [C1, C2, C3] is excluded by the constraint against complex codas and [C1, C2, C3] by that against consonantal nuclei. So the fate of the clusters in (24)-(25) depends on the well-formedness of C2C3 as complex onsets. The last two members of the clusters in (25) form stop-liquid sequences that constitute typical complex onsets cross-linguistically. These sequences appear in word-initial position, so they are marked as complex onsets as well. On the other hand, the last two segments in the clusters of (24) – [bd], [tm], [dg], [pt] – are much more marked as complex onsets and do not appear in word-initial position (Sipta'r 1980; Olsson 1992). If it is assumed that these sequences are ill-formed as onsets in Hungarian, no possible syllabification is available for the clusters in (24) and the deletion of the medial segment then just follows from Stray Erasure. Furthermore, Sipta'r & Törkenczy (2000) propose that the examples presented here mostly involve word-internal clusters, but simplification is also possible in compounds (i) and across word boundaries (ii).
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**Generalizations in Consonant Deletion (T&S 1999; S&T 2000):**

a. Only stops delete; fricatives and affricates never do (27g-h).

b. Stops do not delete if preceded by a [+sonorant, +continuant] segment: glides (27f) and liquids (27d-e).

c. Stops do not delete if followed by a [+continuant] segment: glides (31b), liquids (25, 27c), and fricatives (27a-b).

These generalizations are further supported by the examples below, also from Toőrkenczy & Sipta'r (1999) and Sipta'r & Toőrkenczy (2000).

(29) NO DELETION IN C1C2C3 CLUSTERS IF C2 IS A FRICATIVE/AFFRICATE:  
   a. ko‹nyvta'r [kØn∆fta:r] * [kØn∆ta:r] 'library'
   b. ekszta'zis [´ksta:ziß] * [´kta:ziß] 'extasy'
   c. Amszterdam [ømst´rdøm] * [ømt´rdøm] 'Amsterdam'
   d. inspekcio' [inßp´ktÍi] * [inp´ktÍi] 'inspection'
   e. obskurus [opßkuruß] * [opkuruß] 'obscure'
   f. la'nctalp [la:ntÍtølp] * [la:ntølp] 'caterpillar track'
   g. ta'ncdal [ta:nd¸døl] * [ta:ndøl] 'popular song'
   h. parancsnok [pørøntÎnok] * [pørønnok] 'commander'

(30) NO DELETION IN C1C2C3 CLUSTERS IF C1 IS A LIQUID OR GLIDE:  
   a. talpnyalo' [tølpn∆ølo:] * [tøln∆ølo:] 'lackey'
   b. partner [pørtn´r] * [pørn´r] 'partner'
   c. fajdkakas [føjdkøkøß] * [føjkøkøß] 'black cock'

(31) NO DELETION IN C1C2C3 CLUSTERS IF C3 IS [+CONTINUANT]:  
   a. pa'ntlika [pa:ntlikø] * [pa:nlikø] 'ribbon'
   b. kompu'ter [kompju:t´r] * [komju:t´r] 'computer'
   c. pemzli [p´mzli] * [p´mli] 'brush'

The restriction to stops in this deletion pattern is just the first instance of a generalization that we will find again in numerous other deletion and epenthesis processes to be described in this section...

**Generalization 1**: Stops, more than other consonants, want to surface next to a vowel. I take this to be the basic motivation in Hungarian for deleting stops that find themselves in interconsonantal position. Other languages, described in chapter 5, also delete stops that are not followed by a [continuant] segment...

**Generalization 2**: Stops that are not followed by a [continuant] segment want to be adjacent to a vowel.

**Generalization 3**: Stops, more than other consonants, want to be adjacent to a [continuant] segment.

The fact that stops do not delete when preceded by a glide or affricate can be interpreted in terms of contrast in manner of articulation. Stops may delete only if preceded by a relatively similar consonant, or in final position, or in discrete syllables where no stop is introduced...

**Generalization 4**: Stops that are not followed by a [continuant] segment want to be adjacent to a vowel.
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Clements's (1990) major class features:

<table>
<thead>
<tr>
<th>Obstruents</th>
<th>Nasals</th>
<th>Liquids</th>
<th>Glides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonorant</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Approximant</td>
<td>–</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td>Vocoid</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

The level of contrast between two classes of consonants can be derived by comparing the number of plus- or minus-specifications they are associated with. Obstruents have no plus-specifications, while sonorants have at least one. This system I will use in chapter 4 to deal with cases of degemination.

The levels of contrast among phonological processes are related to the OCP, but they require a more general approach. This generalization is obviously related to the OCP, but requires a

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Chapter 4: Degemination

Generalization 4: Consonants that are relatively similar to a neighboring segment want to be adjacent to a vowel, and preferably followed by a vowel.

Contrast in manner of articulation is also a major factor in the likelihood of degemination, interpreted as a specific instance of consonant deletion. According to Sipta'r (2000), the traditional generalization concerning geminates in Hungarian is that they only occur intervocically (e.g. "Attila" stands) and utterance-finally if preceded by a vowel ("Attila" stands'). But this view is oversimplified: retention of gemination is in many contexts optional, and its likelihood depends on the nature of the flanking segments and the morphological and prosodic structure.

Sipta'r (2000), after Nadasdy (1989), distinguishes between underlying geminates (e.g. "Attila"), those that arise from assimilation processes (e.g. "his brother"'), and those that arise through juxtaposition of identical consonants at morpheme and word boundaries (e.g. "hilltop"). The first two types (underlying and assimilation-based) constitute true geminates; they pattern together and contrast in their behavior with juxtaposition-based or fake geminates. Degemination occurs only next to a consonant, and a distinction is made between left-flanked and right-flanked geminates. Left-flanked true geminates arise only at the word level and degemination is obligatory. I disregard this process of degemination and focus on the other cases of degemination, which apply to right-flanked geminates and occur on the level of prosody and prosodic structure. The process of degemination is also influenced by the neighboring segments, which affect the likelihood of degemination.

The case for underlying left-flanked geminates is not clear; they occur at best in very limited contexts. See Sipta'r (2000).
The establishment of the real generalization about Hungarian, which concerns

prosodic structure, is reflected in a cumulative fashion. That is, for any

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word boundaries.

Since all initial and practically all final clusters begin and end,

respectively, in an obstruent, this type of gemination concerns mostly obstruents.

(34) DEGEMINATION OF FAKE LEFT-FLANKED GEMINATES:

a. In compounds:

OE- direkttermoð

[díkr(ː)tʰrmØː] 'a type of wine'

↓

likely

b. In phrases:

OE- most tala'nos

[moßt(ː)øla:n] 'now perhaps'

↓

likely

These data can be interpreted in terms of syntagmatic contrast, using the

feature specifications in (32). In cluster simplification, a stop adjacent to a liquid – that is, which contrasts in the...

in (32)), degemination is almost obligatory. This situation arises when the geminate occurs next to an obstruent.

Dressler & Sipta'r (1989) identify an additional factor in the likelihood of

degemination: the strength of the prosodic boundary the geminate is adjacent to. The weaker the boundary, the more likely degemination is. They cite the following contrast between

ta'rt to le

[ta:r(ː)l] 'be afraid of'. The two forms

are no instances of surface gemination in a cluster where the right-flanked one is more likely to occur. Here

contrast between particle, preposition and main verb, and not the_articles of the two forms

The weaker the boundary, the more likely degemination is. They cite the following contrast between

de gemination in a cluster where the right-flanked one is more likely to occur. Here

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contrast between particle, preposition and main verb, and not the_articles of the two forms

The weaker the boundary, the more likely degemination is. They cite the following contrast between

de gemination in a cluster where the right-flanked one is more likely to occur. Here

Contrary to expectation, the type of gemination concerns mostly obstruents.

Dressler & Sipta'r (1989) identify an additional factor in the likelihood of
degemination: the strength of the prosodic boundary the geminate is adjacent to. The weaker the boundary, the more likely degemination is. They cite the following contrast between

ta'rt to le

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Contrary to expectation, the type of gemination concerns mostly obstruents.
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It follows that consonants at the edge of domain i are licensed more easily than consonants at the edge of domain j (in other words if domain i is higher in the prosodic hierarchy than domain j).

Generalization 5:
Consonants that are not at the edge of a prosodic domain want to be adjacent to a vowel, and preferably followed by a vowel.

This concludes our description of consonant deletion in Hungarian, which, as it will become clear after discussing these generalizations, has the ingredients of a classic case of cluster simplification, subject to well-attested and motivated constraints.

1.2.3.2. Attic Greek coronal stop deletion

In Attic Greek the possible contexts of occurrence of stops with different points of articulation are severely restricted. In Steriade (1982), followed by Itofl (1986), these restrictions are said to result from a coda condition against stops, all cases of deletion resulting from a repaired context. This constitutes our sixth generalization:

Generalization 6:
Coronal stops want to be followed by a vowel.

Generalizations on attested non-geminate stops in Attic Greek can be summarized as follows:

(38) GENERALIZATIONS ON THE OCCURRENCE OF STOPS IN ATTIC GREEK:


b. Only non-coronal stops appear before obstruents; in this case the second obstruent is licenses more easily.

Coronal stops are never preceded by a vowel.

(39) INITIAL CORONAL AND NON-CORONAL STOPS IN PRE-SONORANT POSITION:

a. gnø:m´: 'judgement' b. p˙lauros 'petty'

c. dnop˙os 'darkness' d. tlaø:'to endure'

(40) INITIAL NON-CORONAL STOPS IN PRE-OBSTRUENT POSITION:

a. kte:nø:'to kill' b. ptuttø: 'to spit'

c. ksenos'stranger' d. psauø:'to touch'

When a stop finds itself in a disallowed environment, through morpheme concatenation, a repair strategy must be adopted. Deletion is of course one of them, and it is used in two contexts:...
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b. /plek+d´:n/ _ [pl´gden] ‘entwined’

As a special case, non-coronal stops remain before the word-final vocative suffix /s/, which is assumed to be the only final extraprosodic consonant allowed in Attic Greek (46). By contrast, stems ending in a coronal stop do not take the vocative suffix /s/ and always lose their final segment, as in (43b).

(46) NON-CORONAL STOPS BEFORE THE VOCATIVE SUFFIX /s/:

a. /p˙leb+s/ _ [p˙leps] ‘vein.VOC’

b. /p˙ula:k+s/ _ [p˙ula:ks] ‘guard.VOC’

Golston (1996) reports that the vocative suffix /s/ in Greek is historically epenthetic. It is hypothesized that it was added to save stem-final labial and velar stops from deletion.

I suggest that /s/ epenthesis after final stops may be related to the third generalization, presented in the context of Hungarian: a stop wants to be followed by a [+continuant] segment. The reason is that, as we will see below, they were subject to assimilation and deletion before coronal obstruents. The idea is that Greek imposes a coda condition that bans all stops, including coronals, from this position, formulated as follows by Steriade (1982):  

(47) ATTIC GREEK CODA CONDITION (Steriade 1982):

C[-son, -cont]

This coda condition directly takes care of the data in (44). The final stop can neither be an onset nor an extraprosodic segment (/s/ being the only extraprosodic consonant permitted). The stop can also not be incorporated into a coda because of the coda condition (47). It is therefore stray-erased. For this analysis to account for the behavior of other stops, three additional hypotheses are necessary. The first one relates to the syllabification rules of Greek and the second one has to do with the constraints on the application of coda conditions. Crucially, Greek imposes a syllabic account of the restrictions on obstruents in Greek. The idea is that Greek imposes a coda condition that bans all stops, including coronals, from this position, formulated as follows by Steriade (1982):  

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(47) ATTIC GREEK CODA CONDITION (Steriade 1982):

C[-son, -cont]
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...the word-final condition against stops does apply to the forms in (44), in which the stop is followed by a non-coronal obstruent. Since laryngeal spreading does not originate from non-coronals, the stop [d] has not linked features with the following onset [k], so it cannot form a coda and attach to the preceding rime. The final hypothesis concerns word-initial consonants that can neither be part of a complex onset nor be incorporated into a coda at the word-level. Instead, they are deleted and the resulting gap is filled by syllabifying as a coda at the phrase level or adjoining to the following syllable by a late adjunction rule. This analysis accounts for the given data, but there are reasons to doubt that this hypothesis is correct. Two of these reasons have been discussed by Yip (1991). The first is that the generalizations in (38b) - the contrast between coronal and non-coronal stops in onset position - involve a situation where the stop does not become a coda. The second objection is that Yip (1991) also extends this criticism to Diola Fogny. This language allows only homorganic consonant clusters: nasal-stop ones, plus, morpheme-internally, /lt/ and /rt/. Other clusters automatically simplify by deletion. Steriade's (1982) and Ito's (1986) account of these data (based on Sapir 1965) involves a coda condition against all consonants, which does not apply to those in (41a,c) and (42). These clusters are saved from deletion by syllabifying as codas at the phrasal level or adjoining to the following syllable by a late adjunction rule.

...it is not aware of a cross-linguistic tendency for laryngeal assimilation to be preferentially triggered by coronals (see Steriade 1999c). Steriade (1982: 231-232 and section 5.5.5) argues that there is no voicing assimilation in /s/ + non-coronal stop clusters. The data she mentions are 

pelasgos and presbus, in which the clusters are spelled <sg (σγ)> and <sb (σβ)> respectively. This contrasts, I assume, with the absence of clusters spelled <sd (σδ)>.

...Steriade's (1982) and Ito's (1986) account of these data involves a coda condition against all consonants, which does not apply to those in (41a,c) and (42). These clusters are saved from deletion by syllabifying as codas at the phrasal level or adjoining to the following syllable by a late adjunction rule. But in any case, there are additional empirical problems with this analysis, to which I now turn. The third objection that can be raised against this account is that it misses what seems to be the correct generalization. The discussion so far has focused on coronal obstructions in Greek. The difference from clusters of a coronal stop, for example, is that here the stop does not delete, as in (44), but becomes [continuant]. This is also extended by the fact that all voiceless stop+sonorant clusters obligatorily form complex onsets. Since these sequences are subject to voicing assimilation (Steriade 1982: 231) and laryngeal assimilation (Steriade 1982: 231), it is not subject to voicing assimilation (Steriade 1982: 231). This observation is crucial for the derivation of the data in (44). The crucial role of this restriction plays in Steriade's analysis of the data in (44). In any case, co-occurrence of a coronal stop and a non-coronal stop is prohibited by the coda condition. The syllabification rules for (44) were also crucial for deriving the data in (44). The crucial role of this restriction plays in Steriade's analysis of the data in (44). But the crucial role of this restriction plays in Steriade's analysis of the data in (44). The crucial role of this restriction plays in Steriade's analysis of the data in (44).
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true both before /t,d/ (49a-b) and before /s/ (49c-e). Laryngeal assimilation and degemination subsequently apply.

(49) FRICATIVIZATION OF CORONAL STOPS BEFORE CORONAL OBSTRUENTS:

a. /komid+t´:+s/ _ [komist´:s] 'one who takes care of'
b. /korut˙+t´:+s/ _ [korust´:s] 'man with a helmet'
c. /pod+si/ _(possi) _ [posi] 'foot+

d. /ornit˙+si/ _ (ornissi) _ [ornisi] 'bind+DAT.PL'
e. /k˙arit+s/ _ (k˙ariss) _ [k˙aris] '??+NOM.SG'

This change in continuancy is accounted for by Steriade by a linear rule triggered by and targeting coronal obstruents, a rule that is completely disconnected from stray erasure of coronal stops. They should indeed be put together, as the avoidance of coronal stops in pre-obstruent (and more generally pre-consonantal) position is a well-attested tendency cross-linguistically (Blust 1979; Y. Kang 1999, 2000), and is achieved by a variety of means. Attic Greek uses stop-deletion and fricativization, Tagalog metathesis and assimilation. Yakut (Wetzels 1989) and Latin use assimilation alone.

This convergence of the Greek facts with known crosslinguistic tendencies provides strong evidence that coronal stop deletion in this language is not a separate process triggered by stop-deletion rules, but rather a part of a general rule that targets coronal obstruents. The avoidance of coronal stops is a well-attested tendency cross-linguistically, and is achieved by a variety of means. Attic Greek uses stop-deletion and fricativization, Tagalog metathesis and assimilation. Yakut (Wetzels 1989) and Latin use assimilation alone.

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A comparison with Latin sheds additional light on the Greek data. Word-internally, Latin looks just like Attic Greek and the generalizations in (38a-b) equally apply to it. Coronal stops are deleted before an obstruent, yielding a Geminate consonant. This is true both before an obstruent (except in the Greek borrowing tmesis). The voiceless stop therefore has to be in the coda, and the coda condition+LFA approach proposed for Greek cannot work here. The two forms in (53) contrast with those in (52), in which the stem ends in a non-coronal stop. In particular, the vowel in the Greek forms is longer, and the Greek forms have an additional syllable.

One interesting point about the data in (50) is that both Steriade (1982) and Jacobs (1989) argue that the word-initial coronal stop cannot form a complex onset in Latin, in particular because it does not appear word-initially (except in the Greek borrowing tmesis). The voiceless stop therefore has to be in the coda, and the coda condition+LFA approach proposed for Greek cannot work here. However, Latin differs from Greek in this respect.

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The forms in (53) contrast with those in (52), in which the stem ends in a non-coronal stop. The voiceless stop therefore has to be in the coda, and the coda condition+LFA approach proposed for Greek cannot work here. However, Latin differs from Greek in this respect. In Latin, coronal stops assimilate to the following obstruent, yielding a Geminate consonant. This is true both before an obstruent (except in the Greek borrowing tmesis). The voiceless stop therefore has to be in the coda, and the coda condition+LFA approach proposed for Greek cannot work here. However, Latin differs from Greek in this respect.
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1.3.4. English final coronal stop deletion

...
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1994; Bayley 1994; Reynolds 1994; Guy & Boberg 1997; and Labov 1997, who also summarizes the research on this topic since the 60's, with older references). Classic examples of this process are "old man" and "west side." This variable process applies after all types of consonants, depending on a number of well described grammatical and extra-grammatical factors:

- Nature of the preceding segment
- Nature of the following environment (segment, pause)
- Morphological status of the final stop
- Social and personal characteristics of the speaker
- Register / style

What has not been addressed, however, is the question: Why is it only stops that are subject to deletion and not other consonants? As is already clear, English is not isolated in targeting stops in cluster reduction. The answer to the question "why stops?" will come in the next chapter.

The research has examined almost exclusively the deletion of alveolar stops /t, d/, as illustrated by the two examples cited above. But this should not be taken to imply that other stops cannot be deleted. In fact, deletion of these consonants is described in the English sociolinguistic literature on American English. I will follow the existing literature and also restrict my attention to coronal stops.

The factor I am concerned with in English final stop deletion is the adjacent phonological context. Regarding the preceding segment, studies on a variety of dialects converge on one result: the more similar the segment is to the [t, d] sequence, the more it is subject to deletion. The opposite situation makes them more susceptible to deletion. One such situation is when the preceding segment ends with a vowel. The answer to the question "why stops?" comes from the fact that English stops are more likely to be adjacent to or followed by a vowel. The answer to the question "why stops?" will come in the next chapter.

Independently from frequency, it could be that coronal stops are associated with a significantly higher propensity to delete than other stops. This would be consistent with the fact that coronal stops are associated with a more prominent front position. If old stops are fronted, then it would be consistent with the fact that they are also more susceptible to deletion.

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/pt, kt/ are reduced significantly less often than homorganic sonorant-stop ones /ld, nd/, even though the latter display more contrast in manner of articulation. The role of contrast/similarity, analyzed in OCP terms by Guy & Boberg (1997), seems to be orthogonal to syllable well-formedness and does not constitute an argument in the debate about the...syllable in deletion and epenthesis processes. More interesting for our purposes is the context following the final stop.

Many have analyzed the effect of the following context in terms of resyllabification possibilities. The retention of a final consonant is favored when it can be integrated into a following.../r, w, j/ are the consonants that may appear with /t, d/ in complex onsets; they are also the most sonorous consonants. Resyllabification, on the basis of both English-specific phonotactics and universal sonority tendencies, predicts the following hierarchy: obstruents > nasals > /l/ > /r, w, j/, with stop deletion being maximally favored by a following obstruent.

The facts fail to support this account of the effect of the following segment. First, sonority as a factor in the deletion of /t, d/ has been investigated in particular by Santa Ana (1991, 1996) for the study of Philadelphia English. His investigation of word-final /t, d/ deletion in English shows that resyllabification approach, however it is implemented, cannot explain the effect of the following segment on the variable retention of the stop. Based on two Philadelphian speaker's spontaneous speech, segments can be grouped as in (56), the segments in (56a) triggering deletion more than those in (56b), and those in (56b) more than those in (56c).

(56) Likelihood of stop deletion according to the following segment:

\[ \begin{align*}
\text{a. stops, fricatives, } /w/ & \quad \text{more deletion of preceding } /t, d/ \\
\text{b. } /h/, /l/ & \\
\text{c. } /j/, /r/, vowels, pauseless deletion of preceding } /t, d/ \\
\end{align*} \]

One element in this scale immediately stands out: the position of /w/. Resyllabification predicts at least that the consonants /r, w, j/ and the vowels will not favor deletion of the preceding /t, d/ in the context of resyllabification. The fact that there is no such effect of the following segment on /w/ shows that the phonetic interaction posited by resyllabification is actually not occurring in English. As a result, the deletion of /t, d/ in American English is not an automatic process, and it is not influenced by the following segment in a predictable way. Instead, the deletion of /t, d/ is influenced by a variety of other factors, such as stress, intonation, and the context in which the final consonant appears.

Resyllabification does not seem to be the best explanation for the deletion of /t, d/ in American English. Other factors, such as syllable structure, sonority, and stress, appear to play a more significant role in the deletion process. The deletion of /t, d/ in American English is a complex phenomenon that involves a variety of factors, and it is not possible to explain it solely in terms of resyllabification.
The phonetic transcriptions are those given in Einarsson (1945), adapted according to his practice here, and adapt the other authors' transcriptions accordingly. This decision allows me to mark the underlying distinction among unaspirated stops.

North. The different geographical origin might explain at least part of the important differences that exist between the three cities. The factors that determine the choice of the allomorph -°di/--ti are usually aspirated but become unaspirated when preceded by a voiceless p,t,k.

What first strikes the analyst about consonant deletion in weak preterits is its variability. There are classes of verbs that do not display any variation, deletion being for all speakers obligatory or optional. These data are complemented by the relevant verb stems, in Einarsson's (1945) terminology, are kemb+di.

Further, in accordance with the IPA and/or in conformity with other sources (e.g. Ro"gnvaldsson 1989; Helgason 1993), I adopt here an IPA transcription. When using data from Blöndal (1920) and Einarsson (1945), I have made the following adaptations in accordance with the IPA and/or in conformity with other sources (e.g. Ro"gnvaldsson 1989; Helgason 1993).
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always the second consonant that is dropped. The observed patterns can rather be
largely understood in terms of three of the sequential tendencies uncovered in thischapter: 1. the special status of stops, extended to non-strident fricatives; 2. contrast
within the cluster; 3. the Sonority Sequencing Principle.

In presenting the data I distinguish between two main categories of clusters
that appear stem-finally: those that include an obstruent and those that do not. Letus first look at the no-obstruent ... informants, and neither Einarsson nor Ro´gnvaldsson, who otherwise give a complete list of cases of consonant deletion,
note the dropping of a consonant in such forms. This is shown in (58); the consonant
that would be expected to delete according to Itofl's syllabic analysis is underlined.

(58) NO DELETION IN /lm/ STEMS (ALL SOURCES):

<table>
<thead>
<tr>
<th>Stem</th>
<th>Underlined</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>hylmdi</td>
<td></td>
<td>hylma 'conceal.PRET' (cf. INF. hylma)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The last two consonants in the sequence [lmd≤] can hardly be considered more
acceptable as a complex onset than those in (57b-c). An onset [md≤] violates the SSP
and is worse in terms of sonority than the stop-stop and fricative-nasal sequences in
(57). Itofl is not totally explicit about the exact shape of the permissible complex onsets
– she only assumes, as a minimal requirement, that only sequences of rising sonority
can form a complex onset. This should automatically rule out [md≤] in (58) as a
potential candidate. Moreover, we will see shortly other forms whose underlying
sequence also ends in a nasal-stop sequence, but which are subject to obligatory
cluster reduction. Sonority is therefore not the relevant factor here.

Variation already shows up in /r/+nasal stems. For my two informants, as
well as Einarsson 48, /rm/ stems behave like /lm/ ones above and tolerate no
simplification (59). Only Ro´gnvaldsson indicates the deletion of the initial /r/ in
similar forms (60).

(59) NO DELETION IN /rm/ STEMS (O, H, E):

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>vermdi</td>
<td>verma 'warm.PRET' (cf. INF. verma)</td>
</tr>
<tr>
<td>fermdi</td>
<td>ferma 'load.PRET' (cf. INF. ferma)</td>
</tr>
<tr>
<td>tyrmdi</td>
<td>tirma 'spare.PRET' (cf. INF. tirma)</td>
</tr>
</tbody>
</table>

48 Blo´ndal does not cite the forms in (59) but it must be noted that he and Einarsson almost
invariably agree in the pronunciations they propose.

With /rn/ stems, /r/-deletion is more frequent and occurs not only in
Ro´gnvaldsson, who cites (61), but also in informant H's speech. H, however,
considers that deletion is optional in this case (62). The possibility of /r/-dropping is
considered in phonology in (62c) and stressed in the comments of her students, 'howerer,
does nor occur in the /r/-less output (62a). Speaker O, unlike all the others,
also noted that this type of cluster is optional in this case (62b). The possibility of /r/-dropping is
considered in phonology in (62c) and stressed in the comments of her students, 'howerer,
does not occur in the /r/-less output (62a). Speaker O, unlike all the others,
also noted that this type of cluster is optional in this case (62b).

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Ro´gnvaldsson, who cites (61), but also in informant H's speech. H, however,
does not occur in the /r/-less output (62a). Speaker O, unlike all the others,
also noted that this type of cluster is optional in this case (62b). The possibility of /r/-dropping is
considered in phonology in (62c) and stressed in the comments of her students, 'howerer,
does not occur in the /r/-less output (62a).
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In all cases, if a consonant deletes, it is the obstruent; in the case of fricative+stop it is the stop. The main determining factor in the application of deletion appears to be the amount of overlap of the consonants. The stems whose final cluster comprises an obstruent and a nasal (in either order) show no variation across speakers or verbs: the obstruent invariably deletes. This is shown in (64) for nasal+stop stems (see also kembdi in (57b)), (65) for stop+nasal stems and (66) for fricative+nasal stems. In all cases the remaining nasal takes on the place of articulation of the deleted obstruent.

(64) OBSTRUENT DELETION IN NASAL+STOP STEMS (ALL SOURCES):

   a. hang
   [hau˜d≤ˆ] 'hang.PRET' (cf. INF. hanga [hau˜g≤a])
   b. hring
   [hr≤i˜d≤ˆ] 'ring.PRET' (cf. INF. hringja [hr≤iµÔ≤a])
   c. teng
   [t˙ei˜d≤ˆ] 'join.PRET' (cf. INF. tengja [t˙eiµÔ≤a])
   d. skenk
   [scei˜≤tˆ] 'pour.PRET' (cf. INF. skenkja [sceiµ≤c˙a])

(65) OBSTRUENT DELETION IN STOP+NASAL STEMS (ALL SOURCES):

   a. geg
   [Ôei˜d≤ˆ] 'obey.PRET' (cf. INF. gegna [Ô´g≤na])
   b. rig
   [rˆ˜d≤ˆ] 'rain.PRET' (cf. INF. rigna [rˆg≤na])
   c. sig
   [sˆ˜d≤ˆ] 'bless.PRET' (cf. INF. signa [sˆg≤na])
   d. stef
   [st´mtˆ] 'take a course.PRET' (cf. INF. stefna [st´pna])

The remaining stems show a substantial amount of variation in the preterit form. Those ending in a fricative+stop sequence – two stems in /-sk/ – have a strong tendency to lose the middle velar, but by the nature of the consonants, as the deleted obstruent may be the first or the middle consonant in the cluster.

(67) VARIABLE STOP DELETION IN FRICATIVE+STOP STEMS:

   a. æsk
   [ais(k)tˆ] 'wish.pret' (cf. inf. æskja [aisca])
   O, B [aistˆ]
   b. ræsk
   [raistˆ] 'clear the throat.pret' (cf. inf. ræskja [raisca])
   Stems composed of an obstruent and a liquid show a split between speaker H on the one hand and speaker O, Blo°ndal, and Einarsson on the other hand. For the latter three sources, obstruent deletion can be considered optional next to a liquid. (A more pronounced tendency toward loss of the stop is attributed to the detailed behavior here but refer the reader to the appendix for the complete list of the forms I have obtained.

The reader should also observe that underlying velar stops undergo fricativization to /©/ or /x/ for O, B, and E. In addition, underlying /f/ surfaces as a voiced [v] except in word-initial position and preceding a voiceless consonant (simplifying somewhat, see Einarsson for more details). These fricativization and voicing processes will become relevant later in the discussion.

Relevant factors in the behavior of particular verbs certainly include frequency, register, and homophony with the past form of another verb. But I am not in a position to discuss this aspect of the data. Fricativization also optionally applies to /p/_ [f] for informant O (i,a-b), but I found no mention of this in Blo°ndal or Einarsson. Fricativization with labials is never obligatory and it seems to be blocked with certain verbs, like verpti in (i,c). The contrast between informant O and the others for the optional fricativization of labial stops is shown below. This process can be disregarded for the rest of the discussion.

(i) a. skyrpti
   O   [skˆr≤ptˆ]  [skˆr≤ftˆ]     H [skˆr≤(p)tˆ] 'spit.
   PRET'
   b. skerpti
   O   [sk´r≤ptˆ]  [sk´r≤ftˆ]     B [sk´r≤(p)tˆ] 'sharpen.
   PRET'
   c. verpti
   O   [v´r≤ pt]  *[v´r≤ft]     E [v´r≤ (p)t] 'lay
   eggs.

The stems whose final consonant is a fricative plus a stop show a split between speaker H and
1.1.1. Vennemann claimed that the introduction of the syllable simplified the phonology of Icelandic to the extent that numerous processes in this language refer to syllable boundaries.

Let us now turn to speaker H, who is generally more inclined to deletion than O. Obstruents are always dropped next to /l/ (71-72) but are variably retained after /r/, depending on the particular sequence and verb (73).

This speaker does not (fricativize) voiced stops, as shown in (73a-b). Notice that, when consonant deletion occurs, there is a considerable amount of confusion between the two verbs, e.g. (72c) with (69a) above. Metathesis would not be unthinkable.

Notice that this conclusion weakens Vennemann’s (1972) argument for the syllable (see section 58).

In the lexicon, Einarsson gives only the pronunciation [sêldêˆ], but in the grammar (p.82), he explicitly states that the [ê] tends to be lost, as the [v] in (70c-d). I take this to mean that the [ê] is optional, which is also in accordance with Kress (1963: 41-42), who notes for Speaker H deletes the stop in examples like (72c), but he mentioned that, if a segment had to violate the SPP, he would substitute it for a vowel.

Let us also mention that consonant deletion in Icelandic is not syllabically-driven. I believe that consonant deletion in Icelandic is not syllabically-driven.
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Einarsson's pronunciations for vermdi (59a) and sigldi (69a), as well as cases of word-final clusters which I do not discuss here. However, she does not suggest an alternative solution, nor does she provide evidence for the processes she discusses. The SSP also appears to play a subsidiary role.

Let us examine each of these factors.

First, it must be noted that consonant deletion does not take place, at least never obligatorily, in word-internal two-consonant clusters, that is when each consonant is flanked by a vowel. In this example:

\[ \text{týrsta} \] [tý̛r̥̊sta] 'get thirsty.INF'

\[ \text{týrsti} \] [tý̛̊r̥̊st̥̊i] 'get thirsty.PRET'

Apart from the particular case of /r/ before a nasal (60)-(62), the only consonants that delete are stops and the fricatives [f, v, x, ... than the former. So I take the greater vulnerability of non-strident fricatives in Icelandic to follow from a modified generalization concerning the special status of stops in deletion and epenthesis, which may also include non-strident fricatives.

The two processes he cites is vowel lengthening in stressed position and cluster simplification. If the latter is not in fact syllable-dependent, other processes should be put forward for the argument to go through.

In these sequences, there is no need for an SSP prediction because a modified version of generalization 2 concerning the special status of stops in deletion and epenthesis, which may also include non-strident fricatives.

Generalization 2: Non-strident obstruents, more than other consonants, want to be adjacent to a vowel, and preferably followed by a vowel.

This argument, however, has to be completed with a note concerning the status of /s/, the only strident fricative in Icelandic. The preterit forms presented in this section do not allow us to...
Finally, Roðgnvaldsson and Einarsson both provide long and systematic lists of cases of consonant deletion. Interestingly, both fail to provide a single example of /s/ deletion. This further supports the distinct status enjoyed by /s/ as opposed to non-strident fricatives.

Consider now the contexts in which non-strident obstruents delete. We observe a clear hierarchy based on the amount of contrast in manner of articulation between the obstruent and the adjacent ... specifications are repeated from (32) above. In addition, obstruents are distinguished by the feature [strident].

(32) ELEMENTS’ (1990) MAJOR CLASS FEATURES:

<table>
<thead>
<tr>
<th>Obstruents</th>
<th>Nasals</th>
<th>Liquids</th>
<th>Glides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonorant</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Approximant</td>
<td>–</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td>Vocoid</td>
<td>–</td>
<td>–</td>
<td>+</td>
</tr>
</tbody>
</table>

The specifications in (32) allow us to establish a hierarchy among consonants in the degree of contrast they display with obstruents. Glides contrast the most with obstruents (contrast in [vocoid]), ... still less (contrast in [sonorant]). A contrast in stridency between two obstruents is independent from this hierarchy.

Recall that speaker H systematically deletes (non-strident) obstruents when the adjacent segment in the stem is a nasal (64)-(66) or /l/ (71)-(72), but variably retains them next to /r/ (73) or /s/ (67). Speaker O, Bloðndal, and Einarsson also obligatorily delete non-strident obstruents next to a nasal, but optionally retain them next to both /r/ and /l/ ... standardly assumed; I take /r/ to be a glide, specified as [+vocoid], whereas /l/ is a liquid [-vocoid, +approximant].

The generalizations concerning obstruent deletion can now be stated as follows. The likelihood that a non-strident obstruent will be deleted depends on the amount of contrast in the adjacent segment. Obstruents that contrast in [strident] with another obstruent are generally variably maintained. The main difference between H and O, B, E lies in the more stringent conditions imposed by H. This follows from the fourth generalization.

Generalization 4:

Consonants that are relatively similar to a neighboring segment want to be adjacent to a vowel, and preferably followed by a vowel.

The likelihood that a consonant will be deleted in consonant+obstruent stems...
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The rest of the dissertation will account for and further illustrate. The influence of the syllable restriction is revealed in a number of sequential generalizations, which are consistent with the more abstract generalizations which are also consistent with the more abstract generalizations. The syllable restriction is supported by the analysis of the metathesized forms in (77a). This contrast is large enough for speaker O, B, and E to license the obstruent, hence metathesis in (76). 

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(77) D ELETION IN OBSTRUENT+NASAL STEMS:

a. gegndi [Ôei˜d≤ˆ] 'obey.PRET' (cf. INF. gegna [Ô´g≤na])

b. efndi [´md≤ˆ] 'carry.PRET' (cf. INF. efna [´b≤na])

This account of deletion and metathesis in preterit forms raises one obvious question, though: Why are [sˆ©ld≤ˆ] (76a) and [´vld≤ˆ] (76b) acceptable at all for O, B, and E if they violate the SSP? Here I rely on Helgason's (1993) discussion of the behavior of voiced fricatives in Icelandic. These fricatives are subject to a variable approximantization rule 

The approximants [˘], [∂¢], and [º], to which we have to add [j], are themselves subject to deletion in various contexts, notably in preconsonantal position (A'rnason 1980: 218; Ro‹gnvaldsson 1989: 52; Helgason 1993: 38-40). This is also in line with crosslinguistic tendencies, as the loss of these segments is a frequent historical process. Examples from Helgason follow:

(i) Citation form Spoken form

a. dagbla∂i [ta©pla∂ˆ] ([taºpla∂¢ˆ]) [ta:pla∂ˆ]'newspaper+

b. sag∂i [sa©∂ˆ] ([saº∂¢ˆ]) [sa∂ˆ]'say+PRET'

c. afmœli [avmailˆ] ([a˘mailˆ]) [am:ailˆ]'birthday'

d. e∂lilega [´∂lˆl´©a] ([´∂¢lˆl´ºa]) [´lˆl´©a]'naturally'

It is unclear at this point how approximantization affects and interacts with consonant deletion in preterit forms.

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(78) APPROXIMANTIZATION OF VOICED FRICATIVES:

Citation form Spoken form

a. seig∂u [sei©∂Á] [seiº∂¢Á] 'say+IMP'

b. hugmynd [hÁ©mˆnt] [hÁºmˆnt]'idea'

c. to‹frandi [t˙œv‰antˆ] [t˙œ˘‰antˆ] 'charming'

If [sˆ©ld≤ˆ] and [´vld≤ˆ] should really be transcribed [sˆºld≤ˆ] and [´˘ld≤ˆ], we get no sonority violation. [º] and [˘] should probably be considered more sonorous than laterals: Ladefoged & Maddieson (1999: 27) have favored this analysis in their recent book. We would then get pronunciations like *[´˘nd≤ˆ] efndi in (77), which is on the surface conform to both the SSP and the minimal amount of contrast. This problem would be solved if contrast had to be computed on the “deep” fricative, which is the case in Icelandic. This process is active for speaker O, as well as Einarsson and Blo‹ndal, but does not apply in speaker H's speech. According to Helgason (1993: 31-32), these voiced fricatives are subject to a variable approximantization process in a way that can be accounted for by a sonority account and are argued to be involved in the metathesis of preterit forms. This process is active for speaker O, as well as Einarsson and Blo‹ndal, but does not apply in speaker H's speech. According to Helgason (1993: 31-32), these voiced fricatives are subject to a variable approximantization process in a way that can be accounted for by a sonority account and are argued to be involved in the metathesis of preterit forms. This process is active for speaker O, as well as Einarsson and Blo‹ndal, but does not apply in speaker H's speech.
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against reference to the syllable in deletion and epenthesis processes was completed by discussions suggesting that it is also insufficient, as the necessity of independent principles has never been...
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Obstruent+Nasal stems:
signdi  
'bless'
gegndi  
'obey'
rigndi  
'rain'
efndi  
'carry'
hefndi  
'avenge'
nefndi  
'call'
stefndi  
'take a course'

Liquid+Nasal stems:
fermdi(st)  
'confirm (a child); load'
vermdi  
'warm'
tyrmdi  
'spare'
hylmdi  

Non-nasal consonant+Obstruent stems:
berg∂i  
'taste'
byrg∂i  
'lock up'
erg∂i  
'tease'
syrg∂i  
'mourn'
fylgdi  
'follow'
svelgdi  
'swallow'
telgdi  
'whittle'
velgdi  
'warm up'

Obstruent+Liquid stems:
yggldi  
'frown'
sigldi  
'sail'
efldi  
'strengthen'
skefldi  
'form snowdrifts'

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belgdi  
'inflate'
merkti  
'mark'
styrkti  
'help'
fylkti  
'array'
verpti  
'lay eggs'
skerpti  
'sharpenn'
skyrpti  
'spit'
erf∂i  
'inherit'
horf∂i  
'look'
hvolfdi  
'capsize'
skelfdi  
'frighten'
turfti  
'need'
æskti  
'wish'
ræskti  
'clear the throat'

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