The spell-out of lexical categories within words: Violating the onset requirement in Ojibwa*

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This paper provides evidence that word-internal syntax can play a crucial role in the determination of phonological well-formedness. It looks at contexts where V-initial syllables are tolerated in Ojibwa and argues that they invariably coincide with the left edge of lexical categories. Ojibwa verbs and nouns, which obviously contain the categories vP and nP, respectively, may also contain a member of the adjective/adverb category aP. Crucially, these combinations (i.e. [aP–vP], [aP–nP]) constitute single prosodic words. V-initial syllables are tolerated word-initially or at the beginning of a lexical category. These domains correspond to derivational phases in the sense of Chomsky (1999). The paper proposes that, at the PF interface, each phase must satisfy phonological well-formedness conditions, among which is a requirement that an element spelled out at the beginning of a phase be left-aligned with a syllable. Onsetless syllables emerge from this requirement. The paper also argues that cliticization (at least in Ojibwa) is a PF phenomenon and may affect phase structure.

1. Introduction

It is generally recognized that there is a cross-linguistic preference for vowels to be immediately preceded by consonants, interpreted by many phonologists as a preference for syllables to have onsets. In Optimality Theory (OT) (Prince & Smolensky 1993), the manifestation of this preference is attributed to the way in which different languages enforce the Onset constraint. Senufo (Guinea) and Yawelmani (California) are often cited (e.g. Hammond 1997) as examples of languages that tolerate no exception to this constraint. However, Onset violations are permitted in other languages. Axininca Campa (Payne 1981) is in the latter group. It allows for the occurrence of vowel-initial (i.e. onsetless) syllables, but this possibility is realized only at the beginning of words. Such a limited violation of the onsets requirement is attributed in the OT framework to the satisfaction of a competing demand, forcing the left edge of a morphological category to coincide with the left edge of a phonological category. Kager (1999: 111) adopts the

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standard OT position and formulates the relevant demand in alignment-theoretic terms, identifying the morphological category as the grammatical word and the phonological category as the prosodic word (PrWd).¹

(1) **Align-L**
The left edge of the Grammatical Word coincides with the left edge of the PrWd.

The dominance of Align-L over Onset would force the initial syllable of a word to violate the onset requirement, whenever the first morpheme in a word begins with a vowel.

Ojibwa, an Eastern Algonquian language, shares with Axininca Campa a similar tolerance of onsetless syllables at the beginning of words. However, such syllables also occur in Ojibwa in a second context that is demonstrably not word-initial. The satisfaction of Align-L is therefore insufficient to account for Onset violations in this language. This paper addresses this problem; it identifies the unity that underlies the word-initial and word-internal contexts where V-initial syllables are tolerated. It relies crucially on elements of the word-internal syntax. I argue that the Ojibwa word contains one or more lexical categories and that V-initial syllables are invariably at the left edge of a lexical category. I adopt a recent proposal that the cyclic derivation of the properties of words proceeds by stages called phases (cf. Chomsky 1999, Marvin 2002, Newell 2004). I propose that the phases within an Ojibwa word are partly determined by the occurrence of certain obligatory category-defining morphemes. I claim that the spell-out of a phase takes the form of a set of phonological constituents that includes segments, syllables and feet but not prosodic words. The prosodic word emerges from the designation of one of the spelled-out feet as the head foot.

The outline of the paper is as follows. In §2.1, I describe a number of ways in which Ojibwa ensures that a syllable begins with an onset consonant. Section 2.2 then provides examples of instances where violations of the onset requirement are tolerated. In §2.3, I explain why the domain in which Onset violations occur cannot be equated with the PrWd. Section 3.1 provides a brief overview of the basic structure of an Ojibwa word, focusing primarily on verbs; it justifies recognition of word-internal lexical categories such as aP and vP. I then develop a proposal in §3.2 that links Onset violations to the phonological spell-out of these categories. An alternative to the Align-L constraint is provided in this section. Implications of my analysis for current approaches to phonology are briefly summarized in §4.

### 2. Conflicting Ojibwa requirements

Ojibwa, as described by Bloomfield (1957), Kaye, et al. (1971), Piggott & Kaye (1973), Piggott (1980b) and others, is among the languages where a general onset requirement conflicts with a more specific demand that allows for onsetless syllables. Some of the usual cross-linguistic evidence that signals a preference for onsets is found in this language.

¹ It is not obvious that the grammatical word refers to a well-defined morphological or syntactic category.
2.1. The preference for onsets

Languages usually signal a preference for syllables with onsets by avoiding the occurrence of vowels in hiatus (i.e. heterosyllabic V-V sequences). Ojibwa employs a number of strategies to prevent the occurrence of such sequences within words. One of these is the familiar strategy of vowel deletion. It is responsible for the loss of one of the vowels in an underlying V-V sequence. In the clearest cases, the vowels differ in length and the long vowel is invariably preserved. In (2a), the vowels of the plural (/-ag/) and possessive (/-im/) suffixes are lost after a root that ends in a long vowel. In (2b), the final vowel of the 1st Person (1p) prefix is lost before roots that begin with long vowels.

(2) a. nameːg           'sturgeons'
    nameː-ag          'STURGEON-PLURAL'
    ninameːm           'my sturgeon'
    ni-nameː-im    '1P-STURGEON-POSSESSIVE'

b. nosː           'my father'
    ni-oːs        '1P-FATHER'
    noːkomis  'my grandmother'
    ni-oːkomis  '1P-GRANDMOTHER'

The plural and possessives suffixes retain the initial vowel after consonant-final roots (3a), while the full form of the 1st Person prefix is attested in (3b).

(3) a. miskominag           'raspberries'
    miskw-imin-ag   'RED-BERRY-PLURAL'
    nigokosim           'my pig'
    ni-gokoː-im   '1P-PIG-POSSESSIVE'

b. nigwis           'my son'
    ni-gwis        '1P-SON'
    nigokom               'my wife'
    ni-gokom      '1P-WIFE'
The pattern of vowel loss illustrated by the data in (2) targets the shorter vowel in the sequence. The evidence that the process also affects sequences where the vowels do not differ in length is inclusive, but this has no bearing on the central thesis of this paper.²

Another strategy that is widely employed to avoid onsetless syllables is consonant-epentheses. Such a process is arguably the source of a coronal stop that appears between a pronominal prefix and a following vowel-initial morpheme in some constructions. There are three pronominal prefixes in Ojibwa, /ni/- ‘1st Person (1P)’, /gi/- ‘2nd Person (2P)’ and /o/- ‘3rd Person (3P)’. These prefixes appear in construction with both verbs and nouns and always occupy the word-initial position. In (2b), the combination of the 1st Person prefix and a V-initial root triggers vowel loss, but this pattern is restricted to inalienably possessed nouns, a class that includes terms referring to body parts and kinship. In all other cases, prefixation of a pronominal affix to a V-initial root triggers consonant-epenthesis, as illustrated in (4).

\[
\begin{align*}
(4) & \quad \text{a. nida:kozimin} & \quad \text{we are sick} \\
& \quad \text{ni-akozi-min} & \quad \text{'ip-be sick-Plural'} \\
& \quad \text{b. nidogima:m} & \quad \text{my leader, chief’} \\
& \quad \text{ni-ogima-im} & \quad \text{'ip-leader-Possessive'}
\end{align*}
\]

Data cited in (2) and (3) already show that no phonological adjustment is triggered when a pronominal prefix appears before a C-initial root. Further confirmation is provided by the words in (5).

\[
\begin{align*}
(5) & \quad \text{a. niniba:} & \quad \text{I sleep} \\
& \quad \text{ni-niba:} & \quad \text{'ip-sleep’} \\
& \quad \text{b. niwa:bimin} & \quad \text{my apple’} \\
& \quad \text{ni-wa:b-imin} & \quad \text{'ip-white-berry’}
\end{align*}
\]

Both the epenthesis strategy and the coronal manifestation of the epenthetic stop are attested in other languages (e.g. Axininca Campa).

The preference for syllables with onsets in Ojibwa is also signaled by the distribution of glide-initial variants of certain suffixes. For example, in traditional Algonquian studies, verb forms belonging to a paradigm called the Conjunct Order contain pronominal suffixes rather than prefixes. The morphemes marking 1st and 2nd Person in this paradigm have glide-initial variants after verb stems that end in a vowel, as illustrated by the examples below.

² Kaye and Piggott (1973) cite one case where vowel loss targets the second of two short vowels.
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(6) a. nibajːan
   nibaːjan
   ‘SLEEP-IP’

b. nibajːan
   ‘SLEEP-2P’

(7) a. dagɔʃinːan
   dagoʃin-an
   ‘ARRIVE-IP’

b. dagɔʃinan
   ‘ARRIVE-2P’

However, vowel-initial variants of the two suffixes in (6) occur after verb stems that end in a consonant.

As far as we are aware, the glide that follows the verb stem in (6a, b) but not in (7a, b) has no independent morphological function. Its appearance must therefore be controlled by the phonology. A preference for syllables with onsets would trigger the selection of glide-initial variants of the two suffixes after vowel-final verb stems.

Additional evidence of the preference for onsets comes from the manifestation of allomorphy in certain root morphemes. As in other Algonquian languages, many Ojibwa roots have consonant-initial and vowel-initial variants. Some examples of root allomorphy are given in (8) below. Generally, the difference between the variants is just the presence versus absence of an unpredictable initial consonant, but the last pair (8e) shows that the allomorphy can be fully suppletive.

(8) C-initial V-initial
   a. naːbe:
      aːbe:
      ‘MALE’
   b. waːb
      aːb
      ‘LIGHT REFLECTION’
   c. niːbiː
      iːbiː
      ‘WATER’
   d. baːp
      aːp
      ‘LAUGH’
   e. bagiz
      aːdagaː
      ‘SWIM’

The V-initial variant is always preceded by a root morpheme, as shown by the restrictions indicated in (9).

(9) a. boːnapi
    ‘he stops laughing’
    bon-n-ːap-i
    ‘STOP-LAUGH-FINAL’

³ Every Ojibwa verb contains a morpheme that is traditionally classified as a final, but this morpheme is not always overt. The function of this class of morphemes is discussed below.
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b. *aːpi
aːp-i
‘LAUGH-FINAL’

The ill-formedness of (9b) is an indication that occurrences of the V-initial allomorphs in (8) are controlled by a subcategorization requirement; they may only occur to the right of a root morpheme. Under the usual assumption that the occurrence of allomorphs is governed by a set of disjunctively ordered choices, the vocabulary entry for a pair like /aːp/-/baːp/ ‘laugh’ would be as follows.

\[(10) /aːp/: \quad \text{[[ROOT]} — ]\]
\(/baːp/: \quad \text{[Elsewhere]}\]

The disjunctive ordering encoded in (10) disallows (9b); it also prohibits (11a) but permits (11b).

\[(11) a. \quad \text{*boːmbaːpi} \quad \text{‘he stops laughing’} \]
\(\text{boːn-baːp-i} \quad \text{‘STOP—LAUGH-FINAL’}\)

\[b. \quad \text{baːpi} \quad \text{‘he laughs’} \]
\(\text{baːp-i} \quad \text{‘LAUGH-FINAL’}\)

A hypothetical word like (11a) is phonologically well-formed, but the selection of \(/baːp/\) as the realization of the morpheme ‘laugh’ in this context is incompatible with the lexical entry in (10).

The control of allomorphy by lexical choices as encoded in (10) ensures that the V-initial forms in (8) always concede word-initial positions to their C-initial counterparts, thereby optimizing the onset requirement. However, the restriction on V-initial forms does not automatically ensure that onsetless syllables are avoided; an important consideration is the shape of the first element of a root–root construction. Conspiratorially, only C-final roots are attested in the first root position of Ojibwa root–root combinations. Hence, (9a) is typical of the realization of V-initial roots with C-initial counterparts; /boːn/ (with a final consonant) is the vocabulary item that realizes the morpheme ‘stop’.⁴

2.2. The occurrence of onsetless syllables

Although Ojibwa displays the usual signals of a preference for syllables with onsets, it also tolerates occurrences of syllables lacking such a constituent. Many Ojibwa words

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⁴ Significantly, some roots that may appear in the first position of root-root constructions have V-final and C-final variants. For example, /bibaː/ ‘around’ and /iniː/ ‘away’ are paired with /bibam/ and /inim/, respectively. However, the C-final forms are always followed by V-initial roots.
begin with V-initial root morphemes. The data in (12a) and (12b) are examples of such words.

(12) a. **V-initial nouns**

akweː 'woman'

ǔgam ː 'snowshoe'

ẽmikwaːn ː 'spoon'

ogimaː ː 'chief, leader'

b. **V-initial verbs**

ãkozi ː 'he is sick'

animizi ː 'he is in distress'

anokiː ː 'he works'

ǐʒaː ː 'he goes'

Words beginning with the 3rd Person prefix /o-/ provide other examples of initial syllables without onsets.

(13) a. owaːbamaːn ː 'he sees him/her'

o-waːb-am-ːaː-n ː '3P-see-Final-3obj-obv'

b. ogwis-an ː 'his son'

o-gwis-an ː '3P-son-obv'

The word-initial context is not the only location of vowel-initial syllables in Ojibwa, however. The complete picture must make reference to the morphological structure of verbs and nouns. Limiting the discussion to verbs, every verb contains at least two morphemes, a root and a category-defining affix called a final. The root and final may combine with other morphemes to form a verb stem. Inflectional endings, if any, follow the stem. A stem may be preceded by a set of verbal modifiers, traditionally labeled preverbs. Tense markers are usually assigned to this class, but it is more appropriate to treat them as members of a separate category, since they invariably precede any other preverb in the same construction. In the paradigm described in traditional Algonquian studies as the Independent Order, the only morpheme that may precede a tense marker is a pronominal prefix. The template in (14) therefore provides the appropriate picture of the components of an Ojibwa verb in the Independent Order.

(14) The Ojibwa verb complex

<table>
<thead>
<tr>
<th>Pronominal prefix</th>
<th>Tense marker</th>
<th>Preverb</th>
<th>Verb stem</th>
<th>Inflection</th>
</tr>
</thead>
</table>

The slots to the left of the verb stem are not always occupied by morphemes with phonetic substance. There is no overt present tense morpheme and no overt pronominal prefix in the 3rd Person form of an intransitive verb.
Within the verb complex, any morpheme occupying a preverb position must end in a vowel and the initial morpheme of a verb stem may begin with a vowel. A V-V sequence that emerges under such conditions is not required to undergo vowel deletion or consonant epenthesis.

(15) a. bi aːgamose:⁵ ‘he walks here in snowshoes’
    bi-aːgamose:-Ø
    ‘TOWARDS SPEAKER-WALK IN SNOWSHOES-Final’

   b. ini aːgamose: ‘he walks there in snowshoes’
    ini-aːgamose:-Ø
    ‘AWAY FROM SPEAKER-WALK IN SNOWSHOES-Final’

Heterosyllabic V-V sequences may also occur within the Ojibwa verb complex at the juncture between a tense marker and a following morpheme. The three tense marking morphemes are /giː/ (Past), /ga/ (Indefinite future) and /wiː/ (Definite future). The vowel-initial entity that follows a tense marker may be a verb stem (16a) or a preverb (16b).

(16) a. giː aːgamose: ‘he walked in snowshoes’
    giː-aːgamose:-Ø
    ‘PAST-WALK IN SNOWSHOES-Final’

   b. giː ini aːgamose: ‘he walked there in snowshoes’
    giː-ini-aːgamose:-Ø
    ‘PAST-AWAY FROM SPEAKER-WALK IN SNOWSHOES-Final’

There is obviously considerable tolerance for onsetless syllables within the Ojibwa verb complex, provided that these occur in one of the contexts identified in (17).

(17) Context for V-initial syllables
   a. Word-initially
   b. After a tense morpheme
   c. After a preverb

The challenge is to determine whether there is any unity to the above contexts. In the following section, I argue against one potentially unifying proposal.

2.3. The Ojibwa verb complex as a prosodic word

If tolerance for onsetless syllables in Ojibwa were regulated by ALIGN-L (1), we would have to postulate that the verb complex may contain more than one grammatical word and

⁵ In the citation of examples, a space is left after a preverb or tense marker for expository reasons only. This should not be construed as a word boundary.
more than one prosodic word. For example, each preverb would constitute a grammatical
word and a prosodic word, distinct from the grammatical word and prosodic word that
contains the verb stem. As we shall see in the next section, there are good reasons to
assign preverbs to a well-defined lexical category, and there is some sense in which they
qualify as grammatical words. However, they cannot be classified as prosodic words. Part
of the proof of the latter claim is provided by the location of primary stress.

Several analyses of Ojibwa stress are available (Kaye 1973; Piggott 1980b, 1983, 2004;
Halle & Vergnaud 1987; Hayes 1995). The location of stressed syllables is determined
by a left-to-right parsing of syllables into iambic feet. However, the analysis of the
placement of primary stress is still relatively controversial. Postulating that final syllables
are always stressed, Kaye (1973) and Piggott (1980b, 1983) describe the locus of primary
stress as invariably the antepenultimate foot in words containing more than two feet.
This description influences the analysis of Ojibwa stress proposed by Halle & Vergnaud
(1987: 184–189). In contrast, Hayes (1995: 218) argues for the possibility that, at least in
some cases, final syllables are phonetically prominent but not necessarily stressed. Such
a hypothesis yields an analysis in which the location of primary stress varies between
the penultimate and antepenultimate feet. For the present purpose, it is not necessary
to choose between alternative descriptions of the facts. It is sufficient to identify the
constituent within the verbal complex that is the location of the main stressed syllable.
In the data in (18), the most prominent syllable is marked with the acute accent. The
presentation of these data follows Hayes (1995) and identifies the final syllable as stressed
if it is heavy or part of a disyllabic foot.

(18) a. bíndigè:batò:  ‘he runs inside’
    mąngimínågìzi  ‘he is big and round’
    wá:binà:gozì  ‘he looks pale’
    b. minwà:bamínå:gozì  ‘she looks beautiful’
    ni:gá:nigå:bawì  ‘she stands first in line’
    wì:kwå:bò:zo  ‘he is carried along by the current’

Described in terms of the template in (14), the primary stressed syllable in (18) occurs
within the verb stem.

The words in (18) contain no overt pronominal prefixes, tense morphemes or
preverbs. However, the window in which main stress is assigned may include a tense
morpheme (19a), one of the preverbal modifiers (19b), or combinations of both (19c).

(19) a. gí: namàdabì  ‘he sat’
    b. bímì gì:wè:  ‘he is on his way home’
    c. gí: iʒì ajà:  ‘he was in a certain state’

The fact that tense markers and preverbs may bear the main stress cannot be attributed
to any inherently stress-attracting feature of these morphemes. In the following examples,
none of the representatives of these morphemes bears the main stress.
It is obvious from (19) that the location of primary stress is computed over elements that may include tense markers and preverbs. However, the words in (20) show that the inclusion of the latter categories in the domain for assigning primary stress is phonologically controlled; the most prominent syllable in a word may be followed by no more than two stressed syllables. Since main stress marks the location of the head of a prosodic word (Selkirk 1995), we must conclude that the array of elements that make up the full verb complex constitutes a single prosodic word. This conclusion holds significant implications for the description of the occurrence of onsetless syllables. We cannot claim that such syllables are restricted to the left edge of a prosodic word; they obviously occur word-internally. Hence, enforcement of a constraint like Align-L (1) would be insufficient to capture the contexts in which Ojibwa tolerates V-initial syllables.⁶

3. The context of V-initial syllables

I have demonstrated that occurrences of V-initial syllable in Ojibwa cannot be defined in phonological terms. In the following section, I provide an overview of the syntactic structure of words that is the source of insight into where the sub-optimal (V-initial) syllables are sanctioned.

3.1. Lexical categories within words

Demonstrably, Ojibwa root morphemes are not lexically marked as verbs or nouns. These categories are determined by the attachment of suffixes referred to earlier (footnote 3) as finals, which therefore have the status of functional heads. In verb formation, finals provide not only the category label but also information about transitivity and the gender (animate/inanimate) of one of the arguments of a verb (Piggott 1985). For example, the Ojibwa root *wa:*b, which probably has the more basic meaning ‘light reflection’, appears in an intransitive verb (21a) with an animate agent; this type is called an AI verb. The same root appears in a transitive verb (21b) with an animate theme, a traditional TA verb.

(21) a. wa:bi
   wa:b-i
   ‘see’

b. wa:bi
   wa-bi
   ‘see-AI Final’

⁶ The claim that preverbs do not have the status of prosodic words entails that they are not subject to a word-minimality requirement. The minimal word in Ojibwa must be bimoraic (Piggott 1980a). However, the preverb set includes monomoraic /bi-/ ‘towards speaker’.
b. waːbam
  waːb-am
  'see-TA Final'

In addition to their category-defining function, finals may also contribute more concretely to the meaning of a verb. For example, Bloomfield (1957: 98) assigns the gloss ‘by hand’ to the TA final /-in/; it appears in verbs such as gaːdin ‘push someone’, daŋgin ‘touch someone’ and waŋin ‘bend someone’.

In a recent paper, Brittain (2003) presents an analysis of Algonquian verbs in the framework of Distributed Morphology (DM) (Halle & Marantz 1993). She associates finals with category-defining little-\(v\). She also suggests that at least some abstract finals have the status of light verbs. From such a perspective, the two verbs in (21) have the properties illustrated in (22a) and (22b), respectively, where finals c-command roots.

(22) a. Intransitive verb

\[
\begin{array}{c}
\sqrt{P} \\
\uparrow \\
\mathbf{v} \\
| \\
\mathbf{FIN} \\
\sqrt{P} \\
\uparrow \\
\mathbf{i} \\
\sqrt{P} \\
\uparrow \\
\mathbf{am} \\
\mathbf{see} \\
\mathbf{waːb} \\
\end{array}
\]

b. Transitive verb

\[
\begin{array}{c}
\sqrt{P} \\
\uparrow \\
\mathbf{v} \\
| \\
\mathbf{FIN} \\
\sqrt{P} \\
\uparrow \\
\mathbf{am} \\
\mathbf{see} \\
\mathbf{waːb} \\
\end{array}
\]

The root phrase (\(\sqrt{P}\)) may contain more than one morpheme, as is shown by the verb stem boːkoniːkeʃkaː ‘have a broken arm’, containing the two roots boːkw ‘break’ and niːkeː ‘arm’ followed by the AI final /-ʃkaː/.

(23)

\[
\begin{array}{c}
\sqrt{P} \\
\uparrow \\
\mathbf{v} \\
\uparrow \\
\mathbf{FINAL} \\
\sqrt{P} \\
\uparrow \\
\mathbf{ʃkaː} \\
\sqrt{P} \\
\uparrow \\
\mathbf{am} \\
\sqrt{P} \\
\uparrow \\
\mathbf{see} \\
\mathbf{boːkw} \\
\mathbf{niːkeː} \\
\end{array}
\]

Inflectional endings, provided for by the template in (14), follow the finals. For the purpose of this paper, I assume that all post-final elements occur within the \(vP\) (in Independent verb forms).

Consider next the preverbal component. Direct evidence that some preverbs are morphologically complex is readily available. For example, the root that appears in the intransitive and transitive verbs in (21) may also be part of the preverb waːbi, the latter usually glossed as ‘white, gray’. Compare the two verbs in (24).
As mentioned earlier, every preverb ends in a vowel. Even a cursory survey of sources (e.g. Baraga 1853, 1878; Bloomfield 1957; Piggott & Grafstein 1983) reveals that the vowel /i/ is the most common termination for this category. The following examples may be added to those already encountered.

(25) a. nitami ‘first’ e. boni ‘stop’
b. dimi ‘deep’ f. matdi ‘start’
c. ginibi ‘quickly’ g. gitʃi ‘big, great’
d. ombi ‘upwards’ h. agaʃi ‘small’

The privileged status of final /i/ in preverbs makes sense if it is the exponent of a morpheme. The preverb boni in (26a) is obviously derived from the bare root bon that occurs in (26b).

(26) a. boni mawi ‘he stops crying’
b. bonapi ‘he stops laughing’

The constituent that follows a preverb is always a well-formed verb stem, capable of occurring independently.

I infer from the evidence that a preverb contains a root and a category-defining morpheme identified as little–a.

The little–a element is assumed to project a category that subsumes both adverbs and adjectives. The same modifier may appear as a preverb (28a) or a prenoun (28b).

(28) a. gitʃi-inenim ‘think highly of someone’
gitʃi-naja:bi ‘have keen eyesight’
b. gitʃi-ogima: ‘great chief/leader’
gitʃi-mokoma:n ‘big knife, American’

7 Note that the hypothetical word boni baapi ‘he stops laughing’ is well-formed. I assume that some blocking principle favours bonapi (26b).
In Ojibwa and, perhaps, other Algonquian languages, there is no formal difference between elements that would be informally described as adverbs and adjectives.

Prima facie, the combination of a preverb and a verb stem forms a compound. However, these are not root-root compounds; each immediate constituent of a preverb-verb compound contains a category-defining little-x.

\[
(29) \quad vP \\
\quad aP \quad vP \\
\quad \sqrt{P} \quad a \quad \sqrt{P} \quad v \\
\quad \sqrt{} \quad \sqrt{} 
\]

Notice that the structure in (29) is right-headed, reflecting a constraint that applies to all Ojibwa words. Preverb-verb combinations have some resemblance to English compounds like ‘dry-clean’, ‘cold-rinse’ and ‘half-close’, but the Ojibwa pattern is more productive.

In the template for the Ojibwa verb (14), the slots to the left of the preverb position are occupied by the tense morphemes and pronominal prefixes. According to McGinnis (1995), tense markers are syntactically generated in a tense phrase (TP). Therefore, (30b) indicates the relevant properties of the structure of (30a).

\[
(30) \quad a. \text{ gi: boni mawi} \quad \text{‘he stopped crying’} \\
b. \text{ TP} \\
\quad DP \quad T' \\
\quad \emptyset \quad T \\
\quad \text{PAST} \quad \text{gi:} \\
\quad \sqrt{P} \quad a \quad \sqrt{P} \quad v \\
\quad \sqrt{} \quad \text{FIN} \quad \sqrt{} \quad \text{FIN} \\
\quad \text{STOP} \quad \text{CRY} \\
\quad \text{bon} \quad \text{maw} 
\]

For the present purpose, it is significant that the position occupied by tense markers is not internal to the lexical categories \( aP \) or \( vP \).\(^8\)

\(^8\) Note also that tense morphemes are not realizations of bare roots (\( \sqrt{} \)). They appear in the head of tense phrases.
Consider next the morpho-syntactic status of the pronominal prefixes /ni-/ (1st Person), /gi-/ (2nd Person) and /o-/ (3rd Person). These entities look like agreement morphemes, because they are obligatory elements of the Ojibwa verb, even when a co-referential noun phrase is present. Compare well-formed (31a) with ill-formed (31b).

(31) a. ogima: ogi: wa:bama:n makon
   ‘chief he-past-saw-him bear’
   ‘The chief saw a bear’

b. *ogima: gi: wa:bama:n makon
   ‘chief past-saw-him bear’
   ‘The chief saw a bear’

The verb ogi: wa'bama:n in (31a) begins with the 3rd Person prefix for which the co-referent is the noun ogima; the agreement marker is missing in ill-formed (31b). A pronominal prefix is obligatory even when the referent is an overt pronoun. However, when a pronoun and a co-referring prefix appear in a sentence, the pronoun has a focus interpretation. According to McGinnis (1995), pronouns (and other DPs) that are co-referents of pronominal affixes occupy a position outside the verb complex proper in an adjunct phrase, while the affixes are assigned to the [Spec, CP] position. The representation in (32b) gives a rough idea of the structure attributed to (32a).

(32) a. ni:n nigi:we:
   ‘As for me, I am going home’

b. AdjunctP
   DP
   ni:n
   CP
   TP
   ni
   T
   T
   Pres
   Ø
   √P
   vP
   FIn
   √ Ø
   gi:we:

The proposal to locate pronominal prefixes in the [Spec, CP] position is not challenged in this paper. However, I do not consider them to be in such a position in surface representations. In other words, the representation in (32b) corresponds to an intermediate stage of a derivation. I claim that pronominal prefixes are moved from the position where they are syntactically generated and cliticized to a host morpheme.

---

9 Ojibwa word order is relatively free. Hence, on the surface, the co-referent of a ‘subject’ prefix may occur in a pre-verbal or post-verbal position.
To understand why cliticization must occur, a comparison between full pronouns and pronominal prefixes is helpful. From a segmental perspective, the 1st and 2nd Person prefixes are transparently related to corresponding pronouns that occur in citation form as /nin/ (1st Person) and /gin/ (2nd Person), respectively. The relatedness of the 3rd Person prefix /o/ to the corresponding pronoun /win/ can be brought into line with the others when it is observed that many instances of the vowel [o] in Ojibwa are phonetic realizations of /w/ plus a short vowel. The similarity between a pronoun and the corresponding prefix is not completely accidental; they contain the same root morpheme, specified for person features. Pronouns, however, also contain a category-defining morpheme, the exponent of which is the final nasal and a preceding vowel (i.e. /-Vn/ (abstracting away from vowel length, which can be readily accounted for).

The determination that pronominal prefixes are bare roots is very significant. It underlies the explanation for the cliticization strategy. I have already established that Ojibwa root morphemes cannot occur independently; they must be immediate constituents of a construction that contains a head. Consequently, if McGinnis (1995) is correct in identifying [Spec, CP] as the syntactic location of pronominal prefixes, they cannot be realized in such a position. Their realization would be assured, if they were parasitic on morphemes that are in legitimate positions; cliticization achieves this result. The process attaches a pronominal prefix to the morpheme that follows it in a word. The following schemata illustrate host positions for a pronominal prefix.

(33) a. nigi: bimi gïwe: ‘I was on the way home’
   [[ni-gi: [[bimi a],[gïwe: v],p],p],TP]...CP

b. nibimi gïwe: ‘I am on the way home’
   [[[ni-bimi a],[gïwe: v],p],p]...CP

c. nigi:we: ‘I go home’
   [[ni-gïwe: v],p]...CP

In (33a), the host morpheme is the past tense prefix, and the clitic is therefore a constituent of TP. Attachment to the preverbal element in (33b) makes the clitic a constituent of aP. Finally, the pronominal affix is attached to the verb stem in (33c) and becomes a constituent of vP. In essence, I claim that Ojibwa morphology licenses the occurrence of the pronominal prefix (cum root) in (33c) under the conditions reflected in (34); it is c-commanded by the category-defining little-x.

(34)

```
  vP
     \      /
      \    /  v
        \  / FINAL
          \/
           \          Ø

  1P    GO HOME
ni      gïwe:
```
Cliticization of pronominal affixes is a morphological imperative in Ojibwa, but my analysis also requires the host of a clitic to have phonetic substance. Hence, in present tense forms such as (33b) and (33c), the head of TP cannot be a host, because it is phonetically null.¹⁰

Pronominal affixes in noun forms are also regulated by cliticization. Assuming that obligatory prefixes in possessive constructions are syntactically generated in the [Spec, DP] position, they must be moved to an available host position. Hence, after cliticization, the 1st Person affix is a constituent of nP in (35a) and of aP in (35b).

(35) a. ni-dʒi:ma:n 'my boat/canoe'
   [[ni-dʒi:ma:n-Ø],DP]

b. ni-giʃi dʒi:ma: 'my big boat/canoe'
   [[[ni-gitʃi],[dʒi:ma:n-Ø],aP],DP]

The characterization of pronominal affixes as clitics does not apply to words indicating inalienable possession. The latter construction has special morpho-syntactic properties that are not discussed in this paper because of space limitations.

3.2. The phonological integrity of the phase

From the analysis in the preceding section, the unity that underlies occurrences of V-initial syllables in Ojibwa can be readily captured. They may occur at the beginning of a lexical categories (i.e. nP, vP, aP) and at the beginning of words. Crucially, these domains have no phonological counterparts. We have established earlier that they are not prosodic words.

To understand why Ojibwa tolerates both word-internal and word-initial onsetless syllables, we must consider how phonological substance is assigned to the abstract morpho-syntactic structure of Ojibwa words. As indicated in the introduction, I adopt a theory of cyclic derivation of words requiring chunks of abstract structure, constituting phases, to be transferred to the PF-component of the grammar for interpretation. Following Marvin (2002), Newell (2004) and others, I assume that there are not only ‘strong’ phases like CP but also so-called ‘weak’ phases that encompass lexical categories. From the perspective of Distributed Morphology, the spell-out (or interpretation) of a phase at the PF interface must involve a process of vocabulary insertion. The representations that emerge from this process are the inputs to the phonology proper, which must ensure that the outputs contain well-formed segments, syllables and, where appropriate, feet. This characterization of spell-out entails that every segment, syllable and foot within a phase must be well-formed. The hypothesis that phonological well-formedness is determined

¹⁰ The imposition of a phonological/phonetic condition on the host of a clitic is not unprecedented. For example, McCarthy and Prince (1995: 341), based on original data from Hale and Lacayo Blanco (1989), require that the 3rd Person suffix in the Nicaraguan language, Ulwa, be cliticized to a stress foot.
within each phase entails that, if a V-V sequence emerges within such a domain, the parsing of the adjacent vowels into distinct syllables would not be sanctioned by the Onset constraint. To satisfy this constraint, Ojibwa employs the strategies of vowel-deletion (2) or consonant-epenthesis (4), phase-internally.¹¹

Let us now consider why V-initial syllables are tolerated at the beginning of phases. In principle, it would be possible to avoid such sub-optimal entities by adopting one of the following strategies.

(36) a. Changing the exponent of the first morpheme from V-initial to C-initial by consonant epenthesis
b. Changing the exponent of the first morpheme from V-initial to C-initial by vowel deletion

Ojibwa does not employ either of these strategies, thereby ensuring that surface forms directly reflect the lexical options for the expression of the first morpheme in a phase. In the OT framework, preservation of phase-initial vowels would be attributed to the dominance of a constraint like the following.

(37) AlignPhase-L

The left edge of the vocabulary item at the beginning of a phase must be aligned with the left edge of a syllable.

The vocabulary item is the inserted exponent of a morpheme. Consonant-epenthesis would introduce an element that is not part of the inserted item, and vowel-deletion would remove a piece of the item. Hence, the satisfaction of AlignPhase-L ensures that the consonant or vowel that is at the beginning of the first morpheme of vP, nP or aP must be parsed at the beginning of a syllable during spell-out. Notice also that constituents of syllables and feet are not expected to span phases. If vocabulary insertion introduces a V₁-V₂ sequence across the juncture between two phases, the phonology of Ojibwa could not require the deletion of V₁ to ensure that the Onset requirement is satisfied, because V₂ would then not be at the left edge of a syllable. Consequently the word-initial vowel and the medial V-V sequence in (38a=15b) are permitted.

(38) a. ini aːgamose: 'he walks there in snowshoes'
   b. [... [ini_aː][aːgamose: vP]...CP]

By preserving the initial segments of the aP and vP categories in (38b), their integrity as phases is maintained.

In the derivation of Ojibwa words, phonological well-formedness is also imposed on the output of cliticization. The morphology demands the latter, and the phonology

¹¹ A determination of the conditions under which the two strategies are employed is very important, but it is not addressed in this paper.
accommodates the structure that emerges. The derivational stages appropriate to (39a) are illustrated in (39b–d).

(39) a. nidini agamose: ‘I walk there in snowshoes’
    b. [ni[Ø[[ini],agamose:ap,]TP]CP] (Syntax)
    c. [...]Ø[[ni-ini],agamose:ap,]TP]CP] (Morphology)
    d. [...]Ø[[nidini],agamose:ap,]TP]CP] (Phonology)

The representation in (39b) reflects the syntactic requirement that agreement morpheme be in [Spec, CP]. I argue above that (39c) must follow to ensure the proper licensing of the prefix (cum root). Since cliticization makes the prefix a constituent of the aP phase, phonological well-formedness requires that some strategy be employed to avoid a heterosyllabic V-V sequence (39c).

My explanation for the tolerance of V-initial syllables in Ojibwa is still not complete. An analysis in the OT framework requires that the demands of the Onset constraint be overridden to ensure that AlignPhase-L is satisfied. Onset is obviously a fairly robust constraint in Ojibwa. However, it must be subordinated to the constraint that sanctions the occurrence of V-initial syllables. This precedence relation is captured in an OT grammar by requiring that AlignPhase-L outrank Onset. The following tableau illustrates the effects of this ranking.

(40)

<table>
<thead>
<tr>
<th>Input: [[ni-ini],agamose:ap,]</th>
<th>AlignPhase-L</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [[ni-ini],agamose:ap,]</td>
<td>**!</td>
<td></td>
</tr>
<tr>
<td>b. [[nidini],da:agamose:ap,]</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>c. [[nidini],agamose:ap,]</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

Two candidates (40b, c) contain epenthetic consonants (in boldface), but the epenthesis between the preverb and the verb stem in (40b) incurs a fatal violation of AlignPhase-L. The dominance of the latter constraint ensures that an epenthetic consonant is tolerated only between V-V sequences that do not span phases. Both (40a) and (40c) satisfy AlignPhase-L but the former loses to the latter on the basis of the number of Onset violations. The winning candidate (40c) contains an epenthetic [d] between the pronominal prefix and the preverb to satisfy Onset but incurs an inconsequential violation of Onset at the beginning of the verb stem to ensure that AlignPhase-L is satisfied.

4. Some implications and conclusions

This paper contains three important messages for the development of an explanatory theory of phonology. First, I have demonstrated that the internal syntax of words may control phonological output. Since phonology spells out properties of words,
phonological analysis should always explicitly acknowledge the conception of word structure that underlies the analysis. Secondly, this paper constitutes a challenge to the phonetic determinism that characterizes some of the recent literature. It demonstrates that explanations for some phonotactic phenomena cannot be functionally linked to requirements imposed by either the speech perception or speech production system. What is the phonetic functionality of ALIGNPHASE-L? Finally, the paper also demonstrates that it is crucial for constraint-based theories to devote more attention to getting the constraints right. Only when this goal is attained can arguments about the arbitrariness of constraint ranking be entertained.

References


