DEFINING THE WORD IN CAYUGA (IROQUOIAN)[1]

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The Cayuga (Northern Iroquoian) word has been identified as a domain, (one relevant for pitch accent assignment [Chafe 1977:169]). The goal of this paper is to determine which linguistic constituent corresponds to the Cayuga word domain. This paper presents evidence that the Cayuga word domain does not correspond to the grammatical word, nor to the prosodic word; instead, it is coextensive with the Phonological Phrase domain. Several characteristics of words in polysynthetic languages fall out from this analysis.

[KEYWORDS: polysynthetic words, Cayuga (Iroquoian), prosodic domains]

1. Introduction. The Cayuga (Northern Iroquoian) word has previously been identified as the domain of pitch accent assignment (Chafe 1977:169). (The term CAYUGA WORD or CWD denotes the domain in question.) The goal of this paper is to determine which linguistic constituent corresponds to the Cwd domain. I argue that the Cwd domain cannot be identified with the grammatical word, nor with the Prosodic word. Instead, I provide evidence that the Cwd is coextensive with the Phonological Phrase.

In **2**, I show that the Cwd is the domain of reference for metrical structure, including feet, syllables, and syllable-related processes such as epenthesis; **2** establishes that the Cwd is a domain. In **3**, I show that the Cwd domain is complex, containing one or more instances of a smaller domain. I then identify the linguistic constituents that correspond to these domains. In **4**, I describe the morphosyntactic characteristics of Cwds; I show that the Cwd cannot be defined morphosyntactically. I then examine whether the Cwd domain is a prosodic one. In **5**, I present background assumptions (namely, that prosodic domains are derived from morphosyntactic ones). In **6**, I argue that the Cwd is coextensive with the Phonological Phrase (P-Phrase) domain containing one or more smaller Prosodic word domains. (The prosodic

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representation of the Cwd is further exemplified in Appendix A.) I present conclusions and consequences of the analysis in **7**.

2. The Cwd is a domain. In this section, I show that the Cwd is a domain. The domain is identified through processes that make reference to the beginning or end of the Cwd, and processes that take place within but not across Cwds. The processes examined are accent placement (a process that identifies the head foot or syllable of the word [**2.1.1**]), Laryngeal Metathesis (a process that identifies nonhead feet or syllables [**2.1.2**]), syllabification (a process that takes place within the Cwd [**2.2**]), and epenthesis (a process that takes place within the Cwd [**2.3**]).

2.1. The Cwd is the domain of footing. This section argues that the Cwd is the domain of footing. Evidence comes from accent placement and from a process known as Laryngeal Metathesis (LM).

2.1.1. Accent placement. Accent placement makes reference to both edges of the Cwd (Benger 1984, Chafe 1977:175–78, Doherty 1993, Dyck 1997; 1999, Foster 1974; 1982, Hayes 1995, Kager 1993, Michelson 1983; 1988, and Prince 1983). Cwds have a final accent (1*a*) when they are NON-utterance-final (Chafe 1977:170 and Foster 1974; 1982); in contrast, Cwds have a nonfinal accent (1*b*) when they are in isolation or when utterance-final. Final accent (1*a*) is discussed further, except to note that this type of accent pattern makes reference to the end of the Cwd.

(1) Accent in (non-)utterance-final Cwds[2]

(1*a*) Non-utterance-final Wd
aka:thǫ:té^{7} . . .

'I heard it . . .'

(1*b*) Accent in utterance-final Cwds and in Cwds in isolation
aka:thǫ:te^{7}

'I heard it'

[2] Unless otherwise noted, the data is from my fieldwork with Frances Froman, Alfred Keye, Lottie Keye, and other Cayuga speakers and is published in Froman et al. (2002). However, I use the linguistic orthography instead of the "Henry" orthography used in Froman et al. (2002). Cayuga phonemes include /t, ts, k, k^{w}, s, n, r, h/ and /^{7}/ (glottal stop), the vowels /i, e, a, o, u,/ and the nasalized vowels /ę, ǫ/. Syllable devoicing, due to a process known as Laryngeal Metathesis, is denoted by underlining the vowel in the relevant syllable: for example, ⟨e̲, o̲⟩ are devoiced. Syllables that are creaky voiced or glottalized (also due to Laryngeal Metathesis) are represented by SPELLING METATHESIS: for example, ⟨te^{7}⟩ (not creaky voiced) vs. ⟨t^{7}e⟩ (creaky voiced).

More examples of nonfinal accent are provided in (2). While details of accent placement are irrelevant for the present purposes, two main points are illustrated: accent placement refers to an "even" and "odd" count, which is calculated from the beginning of the Cwd. Even-numbered penults are always accented (2*aii*, 2*bii*, 2*cii*, and 2*dii*), while odd-numbered penults are only accented (2*ai*) if further conditions do not apply. If any of the conditions on odd-numbered penults apply, the antepenult is accented instead (2*bi*, 2*ci*, and 2*di*).

(2) Examples of Cwd accent

(2*a*) Open penults (not containing [a])

(2*ai*) Odd
aka:khékę[7]

'I saw them'

(2*aii*) Even
ahé:kę[7]

'I saw him'

(2*b*) Penults closed by a consonant cluster

(2*bi*) Odd
ę́háyętho[7]

'he will plant'

(2*bii*) Even
hayę́:thwahs

'he plants'

(2*c*) Penults closed by a laryngeal

(2*ci*) Odd
howę́kę̲hę:[7]

'it used to be his'

(2*cii*) Even
akawękę́hę:[7]

'it used to be mine'

(2*d*) Open penults containing [a]

(2*di*) Odd
akat̲o̲hswé⁷tanih

'I am hungry'

(2*dii*) Even
hotǫhsw⁷etá:nih

'he is hungry'

An accent-related process known as Tonic Lengthening applies to the accented syllable in (2*ai*), (2*aii*), (2*bii*), and (2*dii*). Another process, Pretonic Lengthening of the antepenult, also applies in (2*ai*). Both processes fail to apply if the potentially lengthened vowel is followed by a laryngeal (2*cii*).

Examples (1) and (2) show that the rules of main accent placement make reference to both Cwd edges. First, accent placement depends on the odd- vs. even-numbered count, which refers to the beginning of the Cwd. Second, accent placement also refers to penults or antepenults, or to the end of the Cwd. Third, final accent placement (1*a*) falls on the last syllable of the Cwd. Accent placement thus provides evidence that the Cwd is a domain.

2.1.2. Laryngeal Metathesis. While the primary foot of the Cwd is marked by pitch accent, secondary feet are abstract. Evidence that they exist includes (*a*) that even- vs. odd- count, described above, and (*b*) a process (mis-)named Laryngeal Metathesis (LM) (Lounsbury 1963:565–69, Foster 1974:260–65; 1982:68–71, and Chafe 1977:177–78).

LM affects the weak (first) syllable of an iamb (Foster 1974:260–65; 1982:68–71) and has been viewed as a type of iambic shortening (Hayes 1995:223). LM is illustrated in (3)–(5). As shown by the phonetic transcriptions in (3)–(5), LM is really a process of feature spreading, rather than metathesis (Mithun 1989:252–53 and Doherty 1993:276–94); LM of /h/ is realized as devoicing of the entire syllable in question, while LM of /ˀ/ is realized as glottalization or creaky voicing of the syllable in question.

The third and fifth syllables in (3*a*) have undergone LM, triggered by postvocalic [h]. LM here results in devoicing (denoted by underlining of the vowel; see n. 2). In contrast, the second and fourth syllables in (3*b*) have not undergone LM because they are even-numbered. (Periods denote syllable boundaries. Curly brackets represent foot boundaries; only noncontroversial foot boundaries are shown.)

(3) LM in syllables closed by [h][3]

(3*a*) *a^{7}ǫta̲hǫhto̲háe^{7}*
a^{7}-(y)ǫ-(a)t-ahǫht-oháe-^{7}
FACT-3FIA-ear-wash-PUNC
Feet: {a^{7}.ǫ} {ta̲h.ǫh} {to̲h.á} e^{7}
Phonetic: [a^{ʔ}.õ.tạ.õh.t$^{w̥}$.á.e^{ʔ}]

'she washed her ears'

(3*b*) *ǫtahǫhtóhae*
ǫ-(a)t-ahǫht-óhae
3FIA-SRF-ear-wash.STAT
Feet: {ǫ.tah} {ǫh.tóh} {a. e
Phonetic: [õ.dah.õh.dóh.a.e]

'she is washing her ears'

(Finally, LM fails to take place when the vowel is both preceded and followed by a laryngeal, as shown in the third syllable in 3*b*.)

The odd-numbered penult in (4*a*) has undergone LM, triggered by a postvocalic glottal stop [^{7}]. In this case, LM of [^{7}] results in creaky voicing (denoted by SPELLING METATHESIS; see n. 2). In contrast, the penult in (4*b*) has not undergone LM because it is even-numbered.

(4) LM in syllables closed by [^{7}]

(4*a*) *ẹhshéhw^{7}aehs*
ẹ-hshe-(ri)hw-a-^{7}ehs
FUT-2S:3S-matter-JOINER-hit.PUNC
Feet: {ẹh.shéh} {wa^{7}a.ehs
Phonetic: [ẽh.s^{h}éh.w̲ạ.ehs]

'you will blame someone'

[3] Morphological abbreviations include: CISL cislocative, DUAL dualic, FACT factual, FUT future, HABIT habitual, INSTR instrumental, MOD modalizer, NSF noun stem former, NOM nominalizer, OPT optative, PART partitive, PLUR pluralizer, PURP purposive, PROTH prothetic, PUNC punctual, REP repetitive, RFL reflexive, SRF semireflexive, STAT stative; person: 1, 2, 3; number: S singular, D dual, P plural; gender: FI feminine-indefinite, M masculine, ZN zoic-neuter; INCL inclusive and EXCL exclusive. The terms A Agent and P Patient refer to the thematic role that the pronominal prefixes have in active, transitive, verbs; no claims are implied about the roles of these prefixes in other types of verb. Morpheme breakdowns include deleted segments (shown in brackets) but do not show the effects of processes such as accent assignment, lengthening, and Laryngeal Metathesis. These processes are explained in the text as necessary.

(4*b*) *ahoi̲hwá^{7}ehs*
a-ho-(*r*)*ihw-a-^{7}ehs*
FACT-3MP-matter-JOINER-hit.PUNC
Feet: {ah.o} {i̲h.wá^{7}} ehs
Phonetic: [ah.o.i̲̥.wáʔ.ehs]
'he was blamed'

The examples in (5) illustrate that LM can affect the first syllable of the Cwd.

(5) LM in Cwd-initial syllables

(5*a*) *te̲hẹ́náǫ́ha^{7}*
te̲-hẹ́n-aǫ́-ha^{7}
DUAL-3MP-race-HABIT
Feet: {te̲h.ẹ́} {ná.ǫ́.ha^{7}
Phonetic: [tẹ̥́.hẽ.ná.õh.aʔ]
'they (males) are racing'

(5*b*) *tekẹ́náǫ́ha^{7}*
te-kẹ́n-aǫ́-ha^{7}
DUAL-3ZNPA-race-HABIT
Feet: {te.kẹ́} {ná.ǫ́h.a^{7}
Phonetic: [te.kẽ.ná.õh.aʔ]
'they (animals) are racing'

Nevertheless, LM fails to take place if the first syllable of the Cwd is onsetless; see (3*a*) and (4*a*) for examples.

Finally, LM fails to take place in Cwd-final syllables (3*a*). This is because the final syllable is an accentable head, as shown in example (1*a*); LM only affect nonhead syllables.

As shown in (6), LM (and the even- vs. odd- count discussed in **2.1.1**) provides evidence for abstract secondary feet within the Cwd. Odd-numbered syllables (σ̆) followed by a laryngeal potentially undergo LM, while even-numbered syllables (σ́) do not.

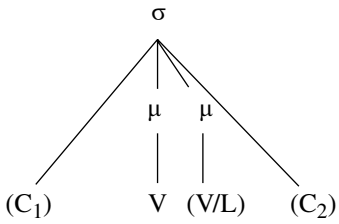
(6) Laryngeal Metathesis and foot structure
$[(\breve{\sigma}\ \acute{\sigma})_{\text{IAMB}}\ (\breve{\sigma}\ \acute{\sigma})_{\text{IAMB}}\ \ldots]_{\text{CWD}}$

In summary, diagnostics of foot structure—namely, accent and Laryngeal Metathesis—provide evidence that foot structure spans the Cwd and, thus, that the Cwd is the domain of footing.

2.2. The Cwd is the domain of syllabification. This section illustrates that the Cwd is also the domain relevant for syllabification.

The Cayuga syllable template is summarized in (7). The onset (C_1) and coda (C_2) optionally contain one consonant apiece. The nucleus contains either a vowel (V, which can be short or long), or a vowel and a laryngeal (L). For convenience, the maximal syllable template in (7) is referred to as a CVC syllable template; the term "CVC" only implies that the onset and coda contain at most one consonant.

(7) Cayuga syllable template



(for historical reasons, some syllables contain an underlying LONG vowel followed by a laryngeal; otherwise, however, vowels cannot be long when followed by a laryngeal [see the discussion under example 2]).

The main evidence for a CVC syllable template is that clusters such as [kr] and [tr] are heterosyllabic (coda + onset sequences) for the purposes of accent assignment. As shown in (8) (and 2*bi*), odd-numbered CLOSED penults cannot be accented; in such cases, the antepenult is accented instead. Examples (8*ai*) and (8*bi*) illustrate that odd-numbered penults closed by heterosyllabic [k.r] and [t.r] clusters cannot be accented. For comparison, (8*aii*) and (8*bii*) illustrate that the condition does not apply to even-numbered penults, which can be accented without condition (see also 2*aii*, 2*bii*, 2*cii*, and 2*dii*). (The highlighted consonants in 8*b* are extrasyllabic; see **3.4** for further discussion.)

(8) Evidence for a CVC template

(8*a*) Penults closed by [t]

(8*ai*) Odd
ę.héhs.nǫt.rę[7]
ę-hehs-hnǫtrę[7]
FUT-2S:3MS-follow.PUNC

'you will follow him'

(8*aii*) Even
hehs.nǫ́:t.rę[7]
hehs-hnǫtrę[7]
2s:3MS-follow
'you follow him!'

(8*b*) Penults closed by [k]

(8*bi*) Odd
*ak.yǫ́t.***K**.*rę́k.rę́ht*
a-k-yǫ-(*a*)*t-krę́krę́ht-*([7])
FACT-DUAL-3FIA-SRF-frown-PUNC
'she frowned'

(8*bii*) Even
*te.ya.kot.***K**.*rę́́k.rę́h.tǫh*
te-yako-(*a*)*t-krę́krę́ht-ǫh*
DUAL-3FIP-SRF-frown-STAT
'she is frowning'

Examples such as (8*ai*) and (8*bi*) demonstrate that [k.r] and [t.r] clusters are heterosyllabic. Cayuga therefore does not allow two-consonant onsets, and it has a CVC syllable template.

A CVC template predicts that Cwd-medial clusters are heterosyllabic and can contain at most two consonants. Although larger clusters apparently do occur, they can still be syllabified within a CVC template: this is because the continuant segments [h], [[7]], [s], and [w] can be underparsed and realized as secondary articulations (Dyck 1999). Consequently, the majority of surface consonant sequences contain at most two noncontinuant segments [t, k, n] plus a number of continuants [h, [7], s, w]. (Potential counterexamples, consisting of three noncontinuant segments in a row, concern the extrasyllabic segments discussed in **3**.)

Before I present examples of syllabification, a word about the status of [[7]] as a continuant is in order. I follow Chomsky and Halle (1968:303, 307) in classifying glottal stop [[7]] as well as [h] as nonhigh approximants or glides. Evidence from Cayuga is that glottal stop is realized as creaky voice, a continuant, in certain environments. In lengthening environments (i.e., in tonic or pretonic position), ". . . a sequence /V[7]/ is realized as [V̰V̰], i.e., as a long vowel with a change in voice quality from modal voice to creaky voice" (Doherty 1993:107).

Syllabification is exemplified in (9)–(11). Example (9) illustrates the syllabification of clusters containing laryngeals. Postvocalic laryngeals syllabify in the preceding nucleus (9*a*–9*i*), even when they are intervocalic (9*f*

and 9*g*) (Chafe 1970:76, Dyck 1999, Doherty 1993:122, and Michelson 1988:64, 118). In contrast, postconsonantal laryngeals syllabify either as fully parsed onset segments (9*d*, 9*h*, and 9*j*), or as underparsed secondary articulations to other segments (9*i* and 9*j*).

(9) Laryngeals

(9*a*) *ti^{7}.ti:^{7}*

'blue jay'

(9*b*) *o^{7}.néh.sa^{7}*

'sand'

(9*c*) *ka^{7}.ka:^{7}*

'crow; raven'

(9*d*) *ha^{7}.hó:.ti^{7}*

'he threw it'

(9*e*) *ǫ́:.kę^{7}t*

'it is visible'

(9*f*) *oh.á^{7}k.ta^{7}*

'soot'

(9*g*) *a^{7}.ǫ.ta̲h.ǫh.to̲h.á.e^{7}*

'she washed her ears'

(9*h*) *ko.yéht.ha^{7}*

'alarm clock'

(9*i*) *ehs.t^{h}a^{7}*

'she/someone uses it'

(9*j*) *ot.hé^{7}t^{h}.ra^{7}*

'flour; powder'

Example (10) illustrates the syllabification of clusters containing /w/. /w/ can be realized either as a fully parsed onset segment (10*a* and 10*b*) or as an underparsed, secondary articulation when larger clusters such as [t.k^{w}], [t.k^{hw}], and [s.k^{w}] (10*c*–10*e*) must be syllabified.

(10) Syllabification of /w/

(10*a*) *wa̲h.tǫhs*

'it disappears'

(10*b*) *a.ah.ak.wé:.ni^{7}*

'he was able to do it'

(10*c*) *kat.k^{w}ę́^{7}.ta^{7}*

'wallet, purse, suitcase, etc.'

(10*d*) *ka.náhs.k^{w}a^{7}*

'tame animal, pet, domestic animal'

(10*e*) *te̲h.ę́.nat.k^{hw}a^{7}*

'they (m.) dance'

Example (11) illustrates the syllabification of clusters containing /s/. /s/ is realized either as a fully parsed segment in onset position (11*a* and 11*c*) or coda position (11*a* and 11*b*), or as an underparsed, secondary articulation (i.e., as part of an affricate [11*d*, 11*e*, and 11*f*]).

(11) Syllabification of /s/

(11*a*) *só:.wa:s*

'dog'

(11*b*) *ka.náhs.k^{w}a^{7}*

'tame animal, pet, domestic animal'

(11*c*) *ek.sá:^{7}.ah*

'girl'

(11*d*) *o.noh.ot^{s}.kę́^{7}.ęh*

'beech tree'

(11*e*) *t^{s}ah.kó:.wah*

'pigeon'

(11*f*) *ęhs.rih.wa.ne^{7}.ak^{s}.rǫ :^{7}*

'you will swear, use profane language'

(11*g*) *oh.óh^{s}k.ra^{7}*

'slippery elm'

It is not clear how to syllabify /s/ in clusters such as the one in (11*g*). The position taken here is merely that the syllabification of /s/ can be exceptional, as in other languages.

In summary, I have shown in **2.2** that domain-span rules such as syllabification take place within the Cwd. Such rules provide evidence that the Cwd is a type of domain.

2.3. The Cwd is the domain of epenthesis. This section shows that the Cwd is also the domain for epenthesis. The specific contexts requiring epenthesis are not described in detail here, since the topic is complex and irrelevant to the point at hand. Epenthesis is both phonologically conditioned (required for syllabification purposes) and morphologically conditioned (as described below).

There are two types of epenthesis in Cwds. E-epenthesis, shown in (12) and (13), inserts an [e] at the boundary between prefixes and a following verb or noun stem (Stm),[4] where required for syllabification purposes, as well as between /tt/ and /kk/ sequences. (12*a*) shows e-epenthesis (highlighted) between the "semireflexive" (SRF) morpheme and the following noun stem /trę́n/ 'odor'; for comparison, (12*b*) illustrates a parallel environment where e-epenthesis is not required.

(12) E-epenthesis between SRF and noun Stm

(12*a*) *o.tEt.rę.ná.i*[7]
o-(a)t-trę́n-a-i[7]
3ZNP-SRF-odor-be.stuck.to.something
'an odor'

(12*b*) *kat.rę.no.wá:.nęh*
ka-trę́n-owanęh
3ZNA-odor-big
'a big smell, odor, scent'

Example (13*a*) shows e-epenthesis between the pronominal prefix 'you (sg.)' and the following verb Stm, /ktǫ:/ 'examine'; for comparison, (13*b*) illustrates a similar environment where e-epenthesis is not required.

[4] Where necessary for clarity, the term ROOT denotes a lexical unit that does not take affixes and the term STEM denotes a lexical unit that takes affixes. Otherwise, the term STM will constitute a cover term for both stems and roots.

(13) E-epenthesis between pronominal prefix and verb Stm

(13*a*) *sEk.tǫ:*
s-ktǫ:
2s-examine
'examine it!'

(13*b*) *t^{w}ak.tǫ:*
twa-ktǫ:
1INCLP-examine
'let us all (inclusive) look'

A second type of epenthesis involves joiner-[a], shown in (14)–(16). The joiner vowel can be analyzed as an epenthetic vowel, since, in most cases, the presence of the joiner vowel is required for syllabification purposes between derivational morphemes and Stms. In other cases, the presence of a joiner vowel is morphologically conditioned. (See Michelson 1988:chap. 6 for an overview of the relevant conditions.) (14*a*) illustrates a joiner vowel, required for syllabification purposes, between the noun and verb Stms; for comparison, (14*b*) shows a parallel environment where the joiner vowel is not required.

(14) The joiner vowel ([a]-epenthesis) between the noun and verb stems

(14*a*) *tekatnǫ̲hsÁhsnyeh*
te-k-at-nǫhs-a-hsnye-h
DUAL-1sA-SRF-house-JOINER-clean.up-HABIT
'I am cleaning up the house'

(14*b*) *ka.nǫ́h.so:t*
ka-nǫhs-ot
3ZNA-house-be.standing
'a (standing) house'

Example (15*a*) illustrates a joiner vowel, required for syllabification purposes, between the verb Stm and a following derivational affix (the instrumental); for comparison, (15*b*) illustrates a parallel environment not requiring a joiner vowel.

(15) The joiner vowel ([a]-epenthesis) between a verb Stm and a derivational affix

(15*a*) *ǫ.ten.ya.t^{sh}ó.tA̲h.k^{hw}a^{7}*
ǫ-(a)t-nyatsh-ot-a-hkhwa^{7}
3FIA-SRF-braid-be.standing-JOINER-INSTR

'bobby pin; barrette'

(15*b*) *eh.yá.to̲h.k^{hw}a^{7}*
e-hyatǫ-hkhwa^{7}
3FIA-write-INSTR

'pen, pencil'

Finally, (16*a*) illustrates an environment where the presence of joiner-[a] morphologically conditioned; joiner-[a] is required at the juncture between an incorporated noun Stm and a following verb Stm; meanwhile, as (16*b*) and (16*c*) illustrate, an epenthetic vowel is not required between [(h)s] and [y] elsewhere.

(16) Morphologically conditioned joiner vowel ([a]-epenthesis)

(16*a*) *ę̨k.nǫh.sA.yę́:.to-^{7}*
ę̨-k-(^{7})nǫhs-a-yę̨tw-^{7}
FUT-1SA-onion-JOINER-plant-PUNC

'I will plant onions'

(16*b*) *s^{y}a^{7}.tóh.a.i*
s-ya^{7}t-ohai
2S-body-wash

'give it a bath!'

(16*c*) *ka̲^{h}s.yá.tak.ye^{7}*
ka-hsy-a-takye^{7}
3ZNA-herd-JOINER-be.standing.along

'a passing herd'

While (12)–(16) illustrate that epenthesis applies within the Cwd, (17) shows that epenthesis fails to apply between Cwds. In (17*a*), epenthesis fails to apply between two [k]'s belonging to separate Cwds. In contrast, as shown in (17*b*), epenthesis between two [k]'s is obligatory within Cwds.

(17) No epenthesis between words

(17*a*) *Awathǫkaík ke̲hsín^{7}akeh.*

a-wa-(a)t-hǫkai-k	*k-hsin-a^{7}keh*
FACT-3ZNA-SRF-stiffen-MOD	1SA-leg-on

'My leg stiffened up'

(17*b*) *ękɛka:kwé:ni*[7]
ę-k-ka:-kweni-[7]
FUT-1SA-price-be.able.to.do.something-PUNCT
'I will afford it'

In conclusion, the Cwd is the domain for epenthetic processes.

I have shown in **2** that the Cwd is a domain: accent placement refers to both edges of the Cwd; feet and syllables are assigned within the Cwd; and epenthesis only occurs within the Cwd.

While the Cwd is a domain, I provide evidence in the following section that the Cwd itself is complex, containing at least one smaller domain, which I call the CWD-1 domain.

3. Extrasyllabicity (prosodic characteristics of the Cwd-1 domain). In this section, I provide evidence for a smaller Cwd-1 domain which is internal to and distinct from the Cwd domain. (I argue in **5** that this smaller domain is the prosodic word domain.) The property that distinguishes the Cwd-1 domain from the Cwd domain is extrasyllabicity, or the presence of an unsyllabified consonant at the edge of a domain (Harris 1983 and Hayes 1995:57).

The discussion in this section is divided into two parts: extrasyllabicity in SMALLER Cwds (nouns, verbs, and particles) is described in **3.1–3.3**, and extrasyllabicity in LARGER Cwds is discussed in **3.4**. Smaller Cwds are essentially coextensive with Cwd-1 domains, and it is logically possible that any properties displayed by smaller Cwds are actually properties of Cwd-1 domains. I argue this to be the case. In contrast, the beginning of larger Cwds does not coincide with the beginning of Cwd-1 domains. By examining the location of extrasyllabic segments, it is possible to demonstrate that the Cwd and Cwd-1 domains are distinct.

3.1. Nouns and extrasyllabicity. The examples in (18) illustrate that nouns can begin with an extrasyllabic consonant (in boldface).

(18) Cwd-initial extrasyllabic consonants in nouns

(18*a*) ***ʁ***tak*ǫ*[7]
'squirrel' (defective noun with one root)

(18*b*) ***ɾ***kw*ę*htsiá[7]k*e̲*ha:*[7]
'warbler' (defective noun with one stem)

(18*c*) ***s***n*ę*tshá[7]keh
'(on) your arm' (inalienable noun with one stem)

The Cwd-initial [k], [t], and [s] in (18) have the same sonority (18*a* and 18*b*) or nearly the same sonority (18*c*) as the following segment. The Cwd-initial clusters in (18*a*) and (18*b*)—and, arguably, in (18*c*)—cannot form part of a complex onset (*a*) because the template in CVC (**2.2**), and (*b*) on independent grounds, because of the Minimal Distance Constraint, which requires a steeper rise in sonority between the first and second consonant of a complex onset than what is shown in (18*a*) and (18*b*) (see Clements 1990). The Cwd-initial segments in (18) are thus extrasyllabic.

3.2. Verbs and extrasyllabicity. Like nouns, verbs can also begin with a Cwd-initial extrasyllabic consonant.

(19) Cwd-initial extrasyllabic consonants in verbs

(19*a*) *ʁtakse*^{7}
k-takse^{7}
1SA-run.PURP
'I am running'

(19*b*) *ʇkahe:*^{7}
t-ka-he:^{7}
CISL-3ZNA-sit.STAT
'it is sitting over there'

(19*c*) *ʂnakái*
s-nakai
2SA-whistle
'whistle!'

The initial [k], [t], and [s] in (19) are extrasyllabic, for the same reasons outlined in **3.1**.

3.3. Particles and extrasyllabicity. Unlike nouns and verbs, particles generally cannot begin with extrasyllabic consonants. Some apparent counterexamples are shown in (20). While the particles in (20) begin with ORTHOGRAPHIC clusters, such as ⟨kw⟩ and ⟨hn⟩, these orthographic clusters represent single segments with secondary articulations (see **2.2**). The examples in (20) thus begin with a single onset consonant.

(20) No Cwd-initial extrasyllabic consonants in particles

(20*a*) *kʷahs ǫ́:weh*
'really' (literally: intensifier really)

(20*b*) *ʰné:ˀ*

'in fact'

(20*c*) *nʸoh*

'you're welcome'

(20*d*) *tˢʰǫ́:*

'just; only'

(20*e*) *tˢʰǫh, sʰǫh*

'that'

One true exception, however, is the particle in (21), which begins with an extrasyllabic initial consonant, ⟨th⟩ [tʰ], followed by an [r]. Although the initial [tʰr] cluster in (21) is an acceptable complex onset in other languages, Cayuga only permits single-consonant onsets (**2.2**).

(21) An exception
tʰrehs

'more than usual; because'

The particle in (21) is treated as an isolated exception.

Two other possible exceptions are the particles in (22), which begin with an extrasyllabic [s] (22*a*) or [t] (22*b*).

(22) Cwd-initial extrasyllabic consonants in two larger particles

(22*a*) ***s****ka*ho*ˀtǫ́:ˀǫh*

'something'
possibly: *s-ka-h-oˀtǫ-:ˀǫh*
REP-3ZNA-empty.noun-be.a.kind.of-DIMINUTIVE

(22*b*) ***t****kwǫhǫ:ˀ*

'sometimes'
possibly related to: *okwǫhǫ́:kyeˀ* 'now and again; now and then'

While these Cwds are heuristically classified as particles (because they are neither nouns nor verbs), they do not otherwise resemble most particles. In fact, such Cwds could have been verbs historically (possible analyses of their Cwd-internal structure are suggested in 22). If so, the presence of a Cwd-initial extrasyllabic segment could be viewed as historical residue. The words in (22) are treated as principled exceptions.

In summary, unlike other small Cwds, particles fail to support initial extrasyllabic consonants. There are several possible reasons this would be

the case. First, as discussed in **2**, noun and verb Cwds are stems, while particle Cwds are uninflected roots. Inflection, a potential source for extrasyllabic segments, is not available for particles. Second, examples (18) and (19) illustrate that noun and verb Cwds preceded by extrasyllabic segments are disyllabic. Moreover, the exceptionally large particles in (22) which support extrasyllabic segments are also disyllabic, while all other particles are monosyllabic. There is possibly a minimal disyllabic size requirement for structures supporting extrasyllabic segments. The latter possibility is not pursued further, however, on the grounds that the lack of inflection is a sufficient explanation for the lack of extrasyllabic word-initial segments in particles.

In summary, smaller Cwds can support Cwd-initial extrasyllabic segments. However, for independent reasons, extrasyllabicity is not an option for particles.

It is tempting to conclude that the Cwd domain in general can support an initial, extrasyllabic segment. However, an alternative analysis is that a smaller CWD-1 DOMAIN licenses an initial, extrasyllabic segment, while the potentially larger CWD DOMAIN inherits the property of extrasyllabicity by virtue of being nearly coextensive with the Cwd-1 domain. Larger Cwds, discussed next, argue in favor of the latter interpretation, that is, that a smaller Cwd-1 domain, not the Cwd domain, an license an initial, extrasyllabic consonant.

3.4. Extrasyllabicity in larger Cwds. In larger Cwds, the Cwd-1 domain occurs further to the right, rather than in absolute Cwd-initial position. This is due to obligatory prefixation. I show in this section that extrasyllabic segments are Cwd-internal and are located at the beginning of the Cwd-1 domain. Thus, larger Cwds demonstrate that extrasyllabicity is a property of the Cwd-1 domain, rather than the Cwd domain.

Examples of larger Cwds are provided in (23). An extrasyllabic [k] (in boldface) occurs at the beginning of an incorporated noun Stm in (23*a*) and at the beginning of a verb Stm in (23*b*)–(23*f*).

(23) Extrasyllabic segments within the verb Cwd

(23*a*) *ę́t.**ĸ**.nę́:t.sʰí:.ne*^{7}
ę́-t-k-nę́tsh-ine-^{7}
FUT-DUAL-1SA-arm-lead-PUNC
'I will lead it by the arm'

(23*b*) *it.**ĸ**.ta*^{7}*k*
i-t-k-ta^{7}*-k*
PROTH-CISL-1SA-stand.up-MOD
'I was standing there' (Mithun and Henry 1982:567)

(23*c*) *ta.wá:t.ʞ.ri:k*
t-a-wa-(*a*)*t-kri-*(*ʔ*)*-k*
CISL-FACT-3ZNA-SRF-wrinkle-PUNC-MOD
'it pulled back, flinched, shrank'

(23*d*) *ot.ʞ.ríhs.rǫʔ*
o-(*a*)*t-kri-hsr-ǫʔ*
3ZNP-SRF-wrinkle-NOM-PLUR
'wrinkled clothes; it is wrinkled up'

(23*e*) *te̲h.ot.ʞ.rę̨k.rę́h.tǫh*
te-ho-(*a*)*t-krę̨kręht-ǫh*
DUAL-3MSP-SRF-frown-STAT
'he is frowning'

(23*f*) *tahs.ʞʰ.rǫ́h.waʔs*
ta-hsk-hrǫhwaʔs
CISL-2S:1S-wait
'wait for me!'

The highlighted [k] in each of the examples in (23) cannot be incorporated into the adjacent coda or onset, which is already filled by other segments. The [k] is therefore extrasyllabic.

One detail needs to be explained before extrasyllabic segments are discussed further: while only extrasyllabic [k] is attested in Cwd-medial position (23), a wider range of extrasyllabic segments—[t], [k], and [s]—are attested initially in smaller noun Cwds (18) and verb Cwds (19). However, the difference is accidental; or rather it is due to the arbitrary distribution of epenthetic [e]. As shown in (24), epenthetic [e] occurs between two identical noncontinuant consonants.

(24) Epenthetic [e] between identical consonants

(24*a*) [V.tet.CV]
o.tɛt.rę̨.ná.i:ʔ
o-(*a*)*t-trę̨n-a-iʔ*
3ZNA-SRF-smell-JOINER-stick.onto.STAT
'an odor'

(24*b*) [V.kek.CV]
a.ké́k.wa.ot
ak-kw-a-ot
1SP-bump-JOINER-be.attached
'I have a sty'

Epenthetic [e] also occurs within /kt/ clusters (25*a*). In contrast, however, epenthetic [e] fails to occur within /tk/ clusters (25*b*) (see also 23*a*–23*e*).

(25) Epenthetic [e] between /k/ and /t/ but not between /t/ and /k/

(25*a*) [V.ket.CV]
a.kɛ́t.k^{w}7ę.ta^{7}
ak-tkwe^{7}t-a^{7}
1sP-wallet-NSF

'my wallet'

(25*b*) [Vt.k.CV]
ak.yǫ́t.k.rę́k.rę́ht
a-k-yǫ-(a)t-krę́krę́ht-(^{7})
FACT-DUAL-3FIA-SRF-frown-PUNC

'she frowned'

The presence of epenthetic [e] prevents /t/ or /k/ from being extrasyllabic in cases like (25*a*). In contrast, an extrasyllabic [k] is possible in cases like (25*b*), where e-epenthesis does not occur.

In conclusion, the difference between the TYPE of extrasyllabic consonants occurring Cwd-initially ([t, k, s]) vs. Cwd-medially ([k]) is an accidental consequence of the distribution of epenthetic [e] in noncontinuant clusters. What needs to be explained, then, is the environment for extrasyllabic segments in general. This topic is addressed next.

At first glance, the presence of Cwd-internal extrasyllabic segments is problematic because of the well-motivated claim that extraprosodic elements occur at the EDGES of prosodic domains (the Peripherality Condition) (Harris 1983 and Hayes 1995:57). However, as shown in (26), both Cwd-initial and Cwd-medial extrasyllabic consonants occur at the beginning of the Cwd-1 domain. (The Cwd-1 domains in 26 are motivated in **5.1**; for now they are just assumed; they are largely coextensive with the Stm or prosodic word.) As shown in (26*a*) and (26*b*), the beginning of the Cwd-1 domain can coincide with the beginning of smaller Cwd domains. Meanwhile, the Cwd-1 domain can also occur further to the right in larger Cwds (26*c*–26*g*). In such cases, an extrasyllabic consonant can occur Cwd-initially. In the latter case, extrasyllabic segments occur internal to the Cwd domain but still at the beginning of the Cwd-1 domain.

(26) Extrasyllabic segments at the beginning of Pwds
(26*a*) [***s*** (*nę.ts^{h}á^{7}.keh*)$_{\text{Cwd-1}}$]$_{\text{Cwd}}$ (cf. 18*c*)
(26*b*) [***k*** (*tak.se^{7}*)$_{\text{Cwd-1}}$]$_{\text{Cwd}}$ (cf. 19*a*)
(26*c*) [*ęt.**k*** (*nę́:t.s^{h}*)$_{\text{Cwd-1}}$ (*ɛ́:.ne^{7}*)$_{\text{Cwd-1}}$]$_{\text{Cwd}}$ (cf. 23*a*)
(26*d*) [*it.**k*** (*ta^{7}k*)$_{\text{Cwd-1}}$]$_{\text{Cwd}}$ (cf. 23*b*)

(26*e*) [*ta.wá:t.*K (*rik*)$_{\text{Cwd-1}}$]$_{\text{Cwd}}$ (cf. 23*c*)
(26*f*) [*ot.*K (*ríhs.rǫ*^{7})$_{\text{Cwd-1}}$]$_{\text{Cwd}}$ (cf. 23*d*)
(26*g*) [*te̲h.ot.*K (*rę́k.ré́h.tǫh*)$_{\text{Cwd-1}}$]$_{\text{Cwd}}$ (cf. 23*e*)

The presence of Cwd-internal extrasyllabic segments (26*c*–26*g*) is thus not a counterexample to the Peripherality Condition. As shown in (26), all extrasyllabic segments occur at the beginning of the Cwd-1 domain, a domain that is smaller than the Cwd domain.

There are two instances where extrasyllabic segments do not systematically occur at the beginning of Cwd-1 domains. The first case, that of particles, was explained in **3.3** above. The second case is that extrasyllabic segments do not occur at the beginning of verb Stms (a type of Cwd-1 domain) which are preceded by incorporated noun Stms (a type of Cwd-1 domain) in larger Cwds.

Larger sequences of noncontinuants cannot occur between an incorporated noun and a following verb Stm due to the presence of joiner-[a]. As shown in (27*a*), an underlying /kt-k/ sequence is prevented by joiner-[a], which occurs at the end of the incorporated noun. In addition, (27*b*) illustrates that joiner-[a] prevents two-consonant sequences such as [tk], which occur elsewhere in the Cwd (see 32*c*).

(27) No extrasyllabic segments when verb Stms follow an incorporating noun

(27*a*) *otnaktʌkǫ́:nyǫhs*
o-(*a*)*t-nakt-a-kǫnyǫ-hs*
3ZMA-SRF-seat-JOINER-pure-HABIT
'an important or prestigious seat or place'

(27*b*) *akya*^{7}*tʌkę́hé:yǫ:*
ak-ya^{7}*t-a-kę́heyǫ:*
1SP-body-JOINER-be.weak
'I am physically weak, slow' (cf. actual [tk] cluster in 32*c*)

It is not possible to have an extrasyllabic segment at the beginning of any verb Stm, when the latter is preceded by an incorporated noun. This fact, however, is not a counterexample to the claim that Cwd-internal extraprosodic segments occur at the beginning of the Cwd-1 domain; it is a consequence of the distribution of joiner-[a].

In summary, I have shown in **3** that the Cwd-1 domain and Cwd domain are distinct: the smaller Cwd-1 domain licenses extrasyllabic segments, while the Cwd is the domain of syllabification. There are parallels in other languages. To illustrate, compare the Canadian French example in (28*a*) to an analogous Cayuga example in (28*b*). (The boldface T in 28*a* is ambisyl-

labic; other segments in boldface are extrasyllabic; see figure 1 for a more detailed representation.)

(28) Canadian French (after Kenstowicz 1994:280–81) vs. Cayuga

(28*a*) [*ʏn.***P** (*tsɪ.*)$_{\text{PWD1}}$ (***ᴛ****a.mi*)$_{\text{PWD2}}$]
[*yn ptit ami*/
'une petite amie'
'a girlfriend'

(28*b*) [*ę***t.K** (*nę:t.s*^{h})$_{\text{CWD-1}}$ (*ɨ:.ne*^{7})$_{\text{CWD-1}}$] (cf. 26*c*)

The Canadian French phrase shown in (28*a*) is a domain "[ ]" of resyllabification, identified as the Clitic Group domain in French. The final [t] of Pwd$_1$ closes the syllable (*tsɪ*), resulting in laxing of the underlying /i/ of /ptit/. (Laxing affects high vowels in closed syllables in Canadian French.) The same [t] also forms on onset to the following word (i.e., to the syllable *ᴛa*). Finally, within the Clitic Group domain, an extrasyllabic [p] occurs at the beginning of Pwd$_1$.

The Canadian French example (28*a*) and the Cayuga example (28*b*) are analogous in that both display an extrasyllabic consonant WITHIN a domain of syllabification. Differences between the two examples are that (*a*) the relevant domain is the Cwd in Cayuga but the Clitic Group in French, and (*b*) the relevant process is basic syllabification in Cayuga but resyllabification in French. These examples illustrate that it is possible to claim that the Cwd is the domain of syllabification in Cayuga, notwithstanding the presence of extrasyllabic consonants Cwd-internally. See **5** below and Appendix A for discussion of how the structures in (28) are represented.

To this point, I have shown that the Cwd is a complex domain, containing a smaller prosodic domain identified as the Cwd-1 domain.[5] The main question

[5] Now that larger Cwds have been introduced, a brief discussion of Cayuga compounds is in order: Cayuga has several types of compounds, including the ones shown in (43), and two-Cwd compounds, such as the one illustrated in (*i*):

(*i*) Two-Cwd compounds

ohstǫ:thrá^{7}	*anaháǫthra*^{7}
straw	hat

'straw hat'

In many languages, compounds display distinctive phonological properties. However, this is not the case in Cayuga: for example, the compounds in (43) contain only one Cwd domain, not two; similarly, the Pwd domains posited in (43) only display properties (discussed in **3**) typical of any other Cayuga Pwd. Finally, two-Cwd compounds such as the one in (*i*) have the same phonological properties as any phrase consisting of two Cwds. In conclusion, there is nothing exceptional to explain about the phonology of Cayuga compounds.

of this paper can now be rephrased as follows: which linguistic constituents correspond to the Cwd domain and which to the Cwd-1 domain? Morphosyntactic candidates are considered next.

4. Morphosyntactic characteristics of the Cwd. In this section, I describe the morphosyntactic characteristics of the three classes of Cwds (nouns, verbs, and particles). I then argue that morphosyntactic criteria are not sufficient for defining the Cwd.

4.1. The grammatical word. Potential morphosyntactic candidates for the Cwd domain are listed in (29).

(29) The syntactic hierarchy
XP (syntactic phrase)–X^0 (lexical stem + affixes)

The syntactic phrase (XP) consists of a lexical item (i.e., a noun, verb, or particle) plus optional functional modifiers (i.e., affixes or function words). I argue in **6** that the Cwd is not an XP, although it resembles one.

The lexical stem (or X^0; henceforth, the Stm) plus affixes constitutes the grammatical word in many languages. However, I argue in this section that the Cwd cannot be equated with the grammatical word.

4.2. Syntactic characteristics of nouns. There are four types of nouns in Cayuga: basic nouns, inalienable nouns, deverbal nouns, and defective nouns. Basic nouns consist of a 3ZN pronominal prefix such as /ka-/ or /o-/, a stem, and the noun stem former (NSF) suffix /-a^7/ (30).

(30) Basic nouns

(30*a*) *kanǫ́hsa^7*
ka-nǫhs-a^7
3ZNA-house-NSF
'house(s)'

(30*b*) *o^{7}nhǫ́hsa^7*
o-^{7}nhǫhs-a^7
3ZNP-egg-NSF
'egg(s)'

Inalienable nouns consist of pronominal (agentive) prefix, a noun Stm, and the locative suffix /-a^{7}keh/ 'on' (31). (In context, a location is not necessarily implied when /-a^{7}keh/ 'on' is present, as shown in 17*a*; for this reason, '(on)' is in brackets in the glosses.)

(31) Inalienable nouns

(31*a*) *snętshá^{7}keh*
s-nętsh-a^{7}keh
2sA-arm-on
'(on) your arm'

(31*b*) *sa̲hsí^{7}t^{7}akeh*
s-ahsi^{7}t-a^{7}keh
2sA-foot-on
'(on) your foot'

Deverbal nouns minimally consist of a pronominal prefix, a verb Stm, and a nominalizer (32*a* and 32*c*) or instrumental (32*e*) suffix. For illustration, verbs related to these deverbal nouns are shown in (32*b*), (32*d*), and (32*f*).

(32) Deverbal nouns

(32*a*) *ka̲hyát o̲hsra^{7}*
ka-hyatǫ-hsr-a^{7}
3ZNA-write-NOM-NSF
'paper'

(32*b*) *ehyá:tǫh*
e-hyatǫ-h
3FIA-write-HABIT
'she/someone writes'

(32*c*) *katkí^{7}thra^{7}*
ka-tki^{7}-thr-a^{7}
3ZNA-be.ugly-NOM-NSF
'junk'

(32*d*) *otki^{7}*
o-tki^{7}
3ZNO-be.ugly.STAT
'it is ugly, dirty, soiled'

(32*e*) *e^{7}níkhǫhkwa^{7}*
e-^{7}nikhǫ(:)-hkwa^{7}
3FIA-sew-INSTR
'something used for sewing'

(32*f*) *á:knikhǫ:ˀ*
a:-k-(ˀ)nikhǫ:-ˀ
OPT-1SA-sew-PUNC
'I should, might sew'

Finally, defective nouns consist of a synchronically unanalyzable root (33) with no affixes.

(33) Defective nouns

(33*a*) *kwíhskwis*
'pig'

(33*b*) *só:wa:s*
'dog'

As shown in this section, all nouns have in common the presence of a Stm. Further observations are made in **4.5** below.

4.3. Syntactic characteristics of verbs. There are many types of verbs in Cayuga. Rather than describe each type, I provide the template in (34). Verbs require a pronominal prefix (34*b*), a verb Stm (34*d*), and an aspectual suffix (34*e*) (Chafe 1960; 1967:11), with the exception that imperatives do not have an aspectual suffix.

(34) Cayuga verb template
(34*a*) Prepronominal prefixes (various functions)
(34*b*) Pronominal prefixes (obligatory)
(34*c*) Incorporated noun Stm
(34*d*) Verb Stm (obligatory)
(34*e*) Aspectual suffixes (obligatory, except in imperatives)
(34*f*) Postaspectual suffixes (various functions)

Examples of nonimperative verbs were provided in (32*b*), (32*d*), and (32*f*), and imperatives in (8*aii*), (13), (16*b*), (19*c*), and (23*f*).

As shown in (34*c*), several types of Cayuga verbs allow (and some require) noun incorporation. An example of incorporation is provided in (35*a*). For comparison, (35*b*) and (35*c*) illustrate the unincorporated form of both the noun and the verb.

(35) Incorporation

(35*a*) *ę́knǫhsayę́:thoˀ*
ę́-k-(ˀ)nǫhs-a-yę́thw-ˀ
FUT-1SA-onion-JOINER-plant-PUNC
'I will plant onions'

(35*b*) *o⁷nǫ́hsa⁷*
o-⁷nǫhs-a⁷
3ZNP-onion-NSF
'onion'

(35*c*) *ę́kyę́:tho⁷*
ę-k-yęthw-⁷
FUT-1SA-plant-PUNC
'I will plant'

In summary, all verbs minimally contain a pronominal prefix and a Stm. Further discussion follows in **4.5**.

4.4. Syntactic characteristics of particles. In contrast to nouns and verbs, particles are uninflected roots with diverse functions. The PARTICLE is a cover-term for nonnominal and nonverbal lexical categories, including question words (36*a*), adverbs (36*b*, 36*c*, and 36*e*), and words with various discourse functions (36*c* and 36*d*).

(36) Particles

(36*a*) *kę́h*
'yes/no question'

(36*b*) *wa⁷ne⁷*
'today; now'

(36*c*) *ti⁷*
'so; then'

(36*d*) *kwé:*
'well! (surprise; sarcasm); hi'

(36*e*) *tshǫ́:*
'just; only'

What all particles have in common is the presence of a root and the lack of any affixes.

4.5. Cwds cannot be defined syntactically. Sections **4.1–4.4** show that the Cwd cannot be identified with a grammatical word: first, it is true that all Cwds contain a Stm; however, while the presence of a Stm is a necessary condition for Cwd status, it is not a sufficient condition. For example, it is not possible to say that the Cwd begins or ends with a Stm: only defective nouns (33) and particles (36) begin with a Stm, and only imperative verbs

(19*c*) end with a Stm. Similarly, it is not possible to say that the Cwd begins or ends with inflectional affixes: some Cwds have no such affixes (cf. 33 and 36), while others require them (cf. 30, 31, 32, and 34). In conclusion, the Cwd domain cannot be identified morphosyntactically. Additional arguments concerning the syntactic phrase are presented in **6**.

5. Prosodic domains. So far, I have shown that the Cwd is a complex domain containing one or more Cwd-1 domains (**2–3**), and that the Cwd domain cannot be defined morphosyntactically (**4**). I now explore whether any prosodic or metrical units (domains) can be identified with the Cwd and Cwd-1 domains. First, I present background assumptions about prosodic and metrical units (**5.1**). I then discuss how prosodic units are derived from, but are not identical to, morphosyntactic units (**5.2**).

5.1. The prosodic and metrical hierarchies. The prosodic hierarchy is listed in (37). The Intonational Phrase (IP) roughly corresponds to a root sentence, the P-Phrase to a syntactic phrase, and the Prosodic word (Pwd) to the Stm. The Stm, in turn, is a lexical unit, as opposed to a functional one (see **4.1**).

(37) The prosodic hierarchy (after Selkirk 1978, McCarthy and Prince 1986 [1999], and Nespor and Vogel (1986)

Intonational Phrase–Phonological Phrase–Prosodic Word

(Not shown are the Utterance—the highest unit in the prosodic hierarchy—and the clitic group; the latter, proposed by Nespor and Vogel 1986, occurs between the Phonological Phrase and the Pwd.)

Units within the prosodic hierarchy conform to principles such as the Strict Layering Hypothesis and Exhaustive Parsing (Selkirk 1984); however, these principles are violable. (That is, unparsed or incompletely parsed structures, recursive structures, and skipping of levels are possible; see Booij 1999, Peperkamp 1996; 1997, and Selkirk 1993 for arguments concerning such structures.) I assume principled violations for the prosodic structure of Cwds (see Appendix A).

The metrical hierarchy is shown in (38). The foot consists of one or more syllables; the syllable contains up to two moras. The mora is a weight unit; syllables with two moras are heavy, while syllables with one mora are light.

(38) Metrical hierarchy

Foot–syllable(σ)–mora(μ)

It is often assumed that the prosodic hierarchy in (37) includes the metrical units in (38), below the Pwd level (see, e.g., McCarthy and Prince 1986

[1999]). The main prediction entailed by this assumption is that metrical units such as feet can only occur within Pwds; a foot cannot span two Pwds, for example. However, this prediction does not hold up cross-linguistically: for example, in Chi Mwi:ni (Bantu), a trochaic foot occurs at the right edge of the P-Phrase domain; in this position, the foot can span several Pwds (Selkirk 1986:379ff.). In Chi Mwi:ni, then, the foot takes the P-Phrase, and not the Pwd, as its domain.

I follow Inkelas (1989; 1993) in claiming that the prosodic (37) and metrical (38) hierarchies should be viewed as independent.[6] I do claim in **6** that in Cayuga, the foot, syllable, and mora take the P-Phrase, and now the Pwd, as their domain.

5.2. Prosodic units are derived from morphosyntactic units. There is ample cross-linguistic evidence that prosodic units (such as the Pwd) are similar to, but not coextensive with, morphosyntactic units (such as the grammatical word). To account for the similarities and differences, I assume that the prosodic units in (37) are derived from the morphosyntactic units in (29) (Selkirk 1978; 1984; 1986). Details follow below.

The Stm and the Pwd are nearly coextensive, as formalized in the following language universal.

(39) The Stem = Pwd Homology (after McCarthy 2000:169): the lexical stem OR X^0 (AND AFFIXES) constitutes a Pwd.

The Stem = Pwd Homology claims that a Pwd domain exists wherever there is a lexical Stm. The domains are not exactly alike, however: ALIGNMENT constrains how such prosodic and syntactic units correspond to one another (Selkirk 1986 and McCarthy and Prince 1993). In general, any prosodic structure has to align with either the left or right edge of a morphosyntactic constituent, but not with both edges. In Cayuga, the left edge is relevant: the beginning of a Stm corresponds to the beginning of a Pwd (40).

(40) Left-edge alignment: the Stm and the Pwd are aligned at the left edge.

From (40), it follows that the beginning of a Pwd can also mark the end of a previous Pwd; examples are provided shortly.

[6] Inkelas (1993:76–80) argues that metrical constituents do not adequately characterize the domains of lexical rules. She instead proposes that lexical prosodic constituents are derived from morphological constituents. It is worthwhile to quote her conclusions at greater length: "Metrical structure exists in a hierarchy distinct from p-structure. It is a different level of representation, and its units obey different constraints from those that govern p-structure. Just as phrasal stress is assigned by rules applying within the phonological phrase, so metrical constituents are built by phonological rules applying within p-constituents. Metrical constituents are built by phonological rules, whereas p-constituents are built by morphologically sensitive algorithms . . ." (1993:80).

Prosodic structures do not align with functional morphemes such as inflectional affixes (Selkirk 1984; 1986; 1993, Inkelas 1989, and Selkirk and Shen 1990:320). Such affixes are dealt with in the manner shown in (41). If left-edge Alignment is assumed, then affixes between two Pwds form a unit with the first Pwd (41*a*). Affixes not preceded by a Pwd (i.e., prefixes) can remain outside of the Pwd (41*b*), in violation of Exhaustive Parsing.

(41) Incorporation of affixes into adjacent Pwd domains

(41*a*) Left-edge alignment: $(\text{stem}_1$ affix $(\text{stem}_2$
Resulting prosodic structure: $(\text{stem}_1$ affix$)_{\text{pwd1}}$ $(\text{stem}_2)_{\text{pwd2}}$

(41*b*) Left-edge alignment: affix (stem
Resulting prosodic structure: affix $(\text{stem})_{\text{pwd}}$

(There are several proposals for prosodifying examples such as 41*b*. See Hall and Kleinhenz 1999 for an overview; see also examples 48 in **6** for further discussion.)

The prosodic domains predicted for various types of Cwds are illustrated in (42) and (43). Square brackets "[ ]" denote the Cwd domain (not yet defined). Parentheses "( )" denote the posited Pwd domains. Smaller Cwds (42) are listed separately from larger Cwds (43), for reasons discussed in **3** above.

Smaller Cwds contain either a root (42*a*) or a stem with affixes (42*b*).

(42) Smaller Cwds

(42*a*) Monomorphemic Cwd domain (e.g., defective nouns [33] and particles [36]):
$[(\text{root})_{\text{pwd1}}]_{\text{Cwd}}$

(42*b*) Cwd domain containing a stem and affixes (e.g., basic nouns [30]):
$[\text{affixes } (\text{stem} + \text{affixes})_{\text{pwd1}}]_{\text{Cwd}}$

Larger Cwds contain several stems, with affixes (43*a*) or without affixes (43*b*).

(43) Larger Cwds

(43*a*) Cwd domain containing several stems and affixes (e.g., complex verbs containing an incorporated noun and a verb Stm [35]):
$[\text{affixes } (\text{stem})_{\text{pwd1}} (\text{stem} + \text{affixes})_{\text{pwd2}}]_{\text{Cwd}}$

(43*b*) Cwd domain containing two Stms (e.g., particle groups [to be discussed later]):
$[(\text{root})_{\text{pwd1}} (\text{root})_{\text{pwd2}}]_{\text{Cwd}}$

The type of word-internal prosodic structure proposed in (42*b*) and (43) is not without precedent. For example, in Bantu languages, the verb word is analyzed as a domain containing a smaller prosodic domain which is coextensive with the stem; Downing (1999) refers to this domain as the P-STEM domain. Moreover, in Salishan languages such as Nxa'amxcín (Moses-Columbia Salish), words contain smaller PROSODIC ROOT domains; the latter display phonological characteristics distinguishing them from the larger word domain (Czaykowska-Higgins 1998).

Such observations are consistent with the Stem = Pwd Homology (39) and with the claim of this paper: the Cwd is a domain containing one or more smaller (Cwd-1) domains. Given the assumptions presented so far, the Cwd-1 domain can now be identified as the Pwd/Stm domain.

6. Defining Cwds. So far, I have shown that the Cwd domain is prosodically complex in (**3** and **5**) and that it cannot be identified with the grammatical word (**4.5**) or with the Pwd/Stm domain (**3**). Other candidates for the Cwd domain include the P-Phrase and syntactic phrase (XP) domains. I now argue that the Cwd domain is equivalent to the P-Phrase but not to the syntactic phrase. Several background assumptions about the syntactic structure of polysynthetic verbs are relevant at this point.

Verbs in polysynthetic languages such as Cayuga have been analyzed as syntactic phrases containing both functional and lexical elements (see Chomsky 1989 and Pollock 1989). The syntactic structure proposed in (44) is tentative, but it illustrates that the Cayuga verb word can be viewed as a type of syntactic phrase, in this case consisting of various functional phrases or affixes (FPs), an incorporated noun Stm, and a verb Stm.

(44) Syntactic structure of the Cayuga verb

(44*a*) *ętkǫnętshí:ne*^{7}
ę-t-kǫ-nętsh-ine-^{7}
FUT-DUAL-1S:2S-arm-lead-PUNC

'I will lead you by the arm'

(44*b*) $[[ę]_{FP}\ [[t]_{ADV}\ [[k]_{FP}\ [[ǫ]_{FP}\ [[[nętsh_i]_N\ [ine_j]_V]_V\ [[^7]_F,\ [[t_j]_v\ [t_i]_{NP}]_{VP}]_{FP}]_{FP}]_{FP}]_{ADVP}]_{FP}$

Ed: F' ok or prime?

In a similar vein, noun Cwds can be analyzed as syntactic phrases: for example, basic nouns (30) and inalienable nouns (31) take pronominal prefixes which are indistinguishable from the prefixes found on intransitive verbs. (There is one exception: the 3ZNA prefix is /wa-/ for verbs but /a-/ for nouns.) Such nouns thus require agreement (functional) phrases, like verbs. Moreover, some nouns can take a limited range of verbal suffixes, such as the /-kęhę:^{7}/ FORMER suffix.

(45) Nouns taking verbal affixes

(45*a*) *o^{7}nhǫhsa^{7}*

'egg(s)'

(45*b*) *o^{7}nhǫhs^{7}akę́h ę:^{7}*

'it used to be an egg' (said, for example, when seeing a broken robin's egg)

Nouns, then, also constitute syntactic phrases.

Particle groups (46) provide additional evidence that the Cwd domain corresponds to a syntactic phrase. Particles in isolation (citation forms) constitute Cwd domains: for example, they are eligible for pitch accent (see 36*d* and 36*e*). In contrast, particles in context are prosodically dependent: they do not necessarily have a pitch accent, and speakers often write such units as single words (a practice employed in 46). Particle groups, then, fall under the traditional definition of the Cwd as a pitch accent domain (see **2**). The Cwd domain or particle group is similar to a syntactic phrase: for example, (46*a*) can be analyzed as a verb phrase consisting of a verb and an adverb. Similarly, (46*b*) can be analyzed as a relative clause consisting of a relative pronoun (*shę* 'that') and a verb. (46*c*) can be analyzed as an adverbial phrase consisting of a specifier and an adverb. Finally, (46*d*) resembles a small clause.

(46) Particles in context

(46*a*) *hatat^{7}itré^{7}tshǫ:*
ha-(*a*)*tat-i^{7}tre^{7}* *tshǫ:*
3MSA-RFL-drag just

'he was just riding'

(46*b*) *shęniyó:we^{7}*
shę(*h*) *ni-yowe^{7}*
that PART-3ZNA-be.a.certain.distance

'how much, how many, how far, until'

(46*c*) *k^{7}itshǫ́:*
ki^{7} *tshǫ:*
just, really only, just

'just . . .'

(46*d*) *nek^{7}itshǫ́:*
ne(*·^{7}*) *ki^{7}* *tshǫ:*
it is just, really only, just

'it's just that . . .'

The examples provided so far illustrate that Cwd domains are largely coextensive with syntactic phrases. It is tempting to conclude that Cwd domains ARE syntactic phrases. However, a (fatal) problem is that it is not possible to characterize the type of syntactic phrase more precisely. For example, verbs can begin with a mood marker, while nouns typically begin with an agreement marker; verbs and nouns thus begin with different types of functional projections (FPs or affixes). Meanwhile, particles do not have any functional projections. Similarly, verbs, nouns, and particles end with different types of functional projections, if any. It is therefore not possible to specify which type of syntactic phrase corresponds to the Cwd domain. It is only possible to say that the Cwd corresponds to an unspecified syntactic phrase domain, XP.

The loss of information implied in the latter statement suggests that the relevant domain is prosodic. This is because the derivation of prosodic units from syntactic ones entails a loss of syntactic information, as explained in **5.2**. For example, Alignment in (40) turns diverse syntactic units, including nouns and verbs, into a single type of prosodic unit, the Pwd. Similarly, all types of XPs correspond to a single prosodic unit, the P-Phrase.

As with the Pwd, the P-phrase domain is derived through alignment of morphosyntactic and prosodic structures. To illustrate, a revised version of Alignment (40) is provided in (47). As summarized in (47*b*), P-phrases are left-aligned with syntactic phrases (XPs) in Cayuga.

(47) Left-Alignment (final version)
(47*a*) The Stm (X^0) and the Pwd are aligned at the left edge (40).
(47*b*) The phrase (XP) and the P-Phrase are aligned at the left edge.

An example of the type of structure resulting from Alignment (47) is provided in (48). (See also example 26, where the Cwd domain can now be understood as the P-Phrase domain.)

(48) Prosodic structure of the Cayuga verb

(48*a*) *ęt-kǫ-nętsh-ine-^{7}*
ę-t-kǫ-nętsh-ine-^{7}
FUT-DUAL-1S:2S-arm-lead-PUNC

'I will lead you by the arm'

(48*b*) (Repeated from 44*b*)
[[*ę*]$_{FP}$ [[*t*]$_{ADV}$ [[*k*]$_{FP}$ [[*ǫ*]$_{FP}$ [[[*nętsh*$_i$]$_N$ [*ine*$_j$]$_V$]$_V$ [[^{7}]$_F$, [[t_j]$_v$ [t_i]$_{NP}$]$_{VP}$]$_{F'}$]$_{FP}$]$_{FP}$]$_{FP}$]$_{ADVP}$]$_{FP}$

(48*c*) Left edge Alignment: [*ęt.kǫ* (*nęt.s^h*(*í:.ne^{7}*

(48*d*) Resulting prosodic structure: [*ęt.kǫ* (*nęt.s^h*)$_{Pwd/Stm}$ (*í:.ne^{7}*)$_{Pwd/Stm}$]$_{P\text{-}PHRASE}$

The nested syntactic phrases in (48*b*) correspond to a single P-phrase domain "[ ]" in (48*c*) and (48*d*); the prosodic structures are not nested, however, because prosodic structures are not recursive. In addition, the prefixes (FPs) in (48*b*) cannot form separate P-phrases (or Pwds, for that matter) because the resulting units would be subminimally sized P-phrases such as (*ę*), (*t*), and (*kǫ*). Also, the P-phrase in (48*c*) is the only type of prosodic phrasing that will permit items lexically specified as PREFIXES to fulfill their lexically listed prosodic specifications. As shown in (48), then, the P-phrase domain derived by the algorithm in (47*b*) ultimately corresponds to a verb with its associated FPs (affixes). The Cwd domain thus corresponds to a P-Phrase domain.

It is now clear why both citation forms and (smaller) syntactic phrases constitute Cwd domains in Cayuga: both are derived through Alignment of a P-phrase with a syntactic phrase (XP). The Cwd is thus a prosodically complex entity: it is a P-Phrase containing one or more Pwds, plus any affixes that cannot be incorporated into the latter.

7. Conclusions and consequences. Two important characteristics of polysynthetic languages fall out from the proposed analysis. The first is that the polysynthetic word does not correspond to any single type of syntactic constituent: for example, both citation forms (30–33, 35, and 36) and small phrases (46) count as Cwd domains. The second is that relative word size falls out from this account. In languages such as Cayuga, where the Cwd domain is the P-phrase, words tend to be longer and more syntactically complex (and sentence-like) than in other languages.

In conclusion, this paper has also demonstrated that a definition of the Cwd domain is possible: the Cwd corresponds to the P-Phrase. This claim, in turn, crucially hinges on separating the prosodic (37) and metrical (38) hierarchies.

APPENDIX A
REPRESENTING DOMAIN

The structures proposed in (28*b*) and (48*b*) are not possible within the standard view which assumes that the metrical hierarchy is part of the prosodic hierarchy. However, as discussed in **5.1**, a main claim of this paper (following Inkelas 1993, etc.) is that the prosodic and metrical hierarchies are separate and need not align. (For precedents in the literature, see the discussion after example 38 in **5.1**, the discussion after example 42 in **5.2**, and n. 6.) This claim creates a challenge, namely, conceptualizing the structures that result when the prosodic (37) and metrical (38) hierarchies do not align in Cayuga. For this reason, the structures for the examples in (28) are further exemplified in figure 1 and figure 2. In the structures in figures 1 and 2, Ft = foot, X = an unspecified prosodic constituent (analyses vary as to how this syllable

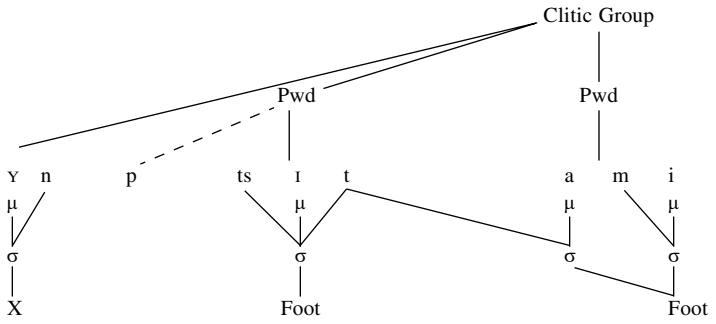


FIG. 1.—Structure in (28*a*): French.

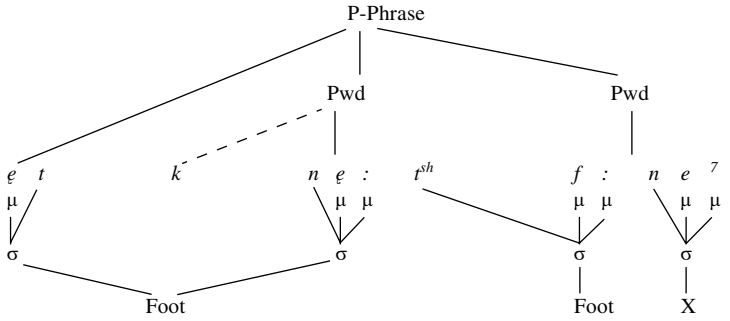


FIG. 2.—Structure in (28*b*): Cayuga.

is incorporated into prosodic or metrical structure), solid lines denote constituents, and dashed lines denote a licensing relationship. Finally, the initial syllables in these figures violate the Strict Layering Hypothesis.

As shown in figure 1, one of the domain(s) of syllabification in French is the clitic group; in contrast, the relevant domain in Cayuga is the P-Phrase (figure 2).

In order to constrain the types of structures resulting from the mismatch between the prosodic (37) and metrical (38) hierarchies, I hypothesize that cross-linguistic differences in word size and structure are a consequence of limiting the domain of syllabification and footing to the P-word, the clitic group, or the P-Phrase.

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