RESEARCH REPORT

THE **MULTIDIMENSIONAL ORGANIZATION OF SPEECH:** SYNTACTIC AND PROSODIC STRUCTURE

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ABSTRACT

Much of our understanding of linguistic structure was necessarily first built up on the basis of isolated sentences, either constructed by analysts or speakers consulting their intuitions, or from written documents. The availability of corpora of unscripted speech is now allowing us to see what speakers actually do, opening up vast new areas for exploration. Some of the advantages described here are the access to prosody and context. The question addressed is how closely traditional syntactic structures, particularly constituent structures, are matched by prosodic structures. Points are illustrated with corpus material from Mohawk, a language indigenous to the North American Northeast.

RESUMO

Muito do nosso entendimento sobre a estrutura linguística foi construído inicialmente a partir de frases isoladas, propostas por especialistas ou por falantes, tendo por base suas intuições, ou a partir de documentos escritos. A disponibilidade de corpora de fala espontânea agora nos permite observar o que os falantes realmente fazem, abrindo novas áreas para investigação. Algumas das vantagens descritas aqui são o acesso à prosódia e ao contexto. A questão abordada neste artigo diz respeito a como as estruturas sintáticas tradicionais, particularmente as estruturas constituintes, são correspondidas por estruturas prosódicas. Os pontos são ilustrados com material de corpus do Mohawk, uma língua indígena do nordeste da América do Norte.

INTONATION UNITS

As is now generally recognized, speech is typically not produced in a continuous stream, but rather in spurts, termed variously intonation units, prosodic phrases, tone units, etc. Such units are generally identifiable by a convergence of cues. The cues used here are those set forth by Chafe in a series of works spanning the decades from the 1970's through the first two decades of the 21st century, listed at the end of this paper. They fall into three main categories.

(1) Intonation Unit Cues: Chafe 1994

Pitch   Coherent intonation contour
            Initial pitch reset
            Final boundary intonation

Timing   Potential pauses at boundaries
            Possible initial rush
            Possible final lag

Phonation Possible non-modal phonation
            Possible final creaky voice

1. MOHAWK

Mohawk is a member of the Iroquoian family indigenous to northeastern North America. There are six main Mohawk communities. Material cited here comes from a conversation between speakers from Kahnawà:ke, Quebec, Mrs. Josephine Kaieríthon Horne (JH), and Mrs. Charlotte Kaherákwas Bush Provencher (CB). They were discussing a funeral procession they had watched the day before, when the body of a lacrosse player was taken to his father's house for a traditional ceremony.

Mohawk is considered a prototypical example of a polysynthetic language. Words often contain many morphemes. It is holophrastic in a narrow sense: verbs can constitute complete sentences in themselves, with an obligatory pronominal prefix identifying the core arguments, a verb stem, and an aspect suffix.

(2) Mohawk Verb
     Wa'katia'tawi'táhsi'.
     wa'-k-at-ia't-a-wi-'t-ahsi-'
     FACTUAL-1SG.AGT-MIDDLE-body-LINKER-encircle-CAUS-REVERSIVE-PFV
     'I took my jacket off.'

(3) Mohawk Verb
Tiakote'serehtaién:tahkwe'.
t-iako-ate-'ser-e-ht-a-ient-ahkwe'
CISLOCATIVE-F.SG.PAT-MIDDLE-drag-NMLZ-LINKER-set-HAB.PAST
'She had her car parked there.'

Morphological verbs can also function as referring expressions, and are often lexicalized as such.

(4) Lexicalization
iakoia'takarénie's
iako-ia't-a-kareni-e'-s
NEUTER>INDEFINITE-body-LINKER-transport-STATIVE-DISTR
'it bodily transports one here and there' = 'bus'

Such words, tightly grammaticalized and often lexicalized expressions, package together elements of one concept: an event or state, complete with given participants, as in (2) and (3), or a referent, as in (4). If a significant new referent is to be introduced, additional words are used.

The prosody of single words is not manipulable for information structuring. Though one Mohawk verb may correspond to a multi-word sentence in languages like English, individual morphemes cannot be given extra prosodic salience. Pitch and rhythm are determined purely mechanically: stress is basically penultimate, with pitch contours and vowel length based on syllable structure, as described in Section 2.

It is easy to see matches between larger syntactic structures and prosodic structure. Consider the sentence in (5).

(5) Syntactic sentence = Prosodic sentence
Thó   ki'   iá:ken'   iahonwaia'ténhawe'.
There   in.fact   they.say   they took his body
'In fact they say they took him there.'

This sentence was bounded by pauses and showed a coherent pitch contour, with a high pitch reset at the beginning on *thó* 'there', then a relatively steady descent in pitch to a final, terminal fall, with a peaks on the stressed syllable *iá:* of the hearsay particle *iá:ken* and the stressed syllable *tén* of the verb *iahonwaia'ténhawe'* 'they took his body'. A pitch trace is in Figure 1.
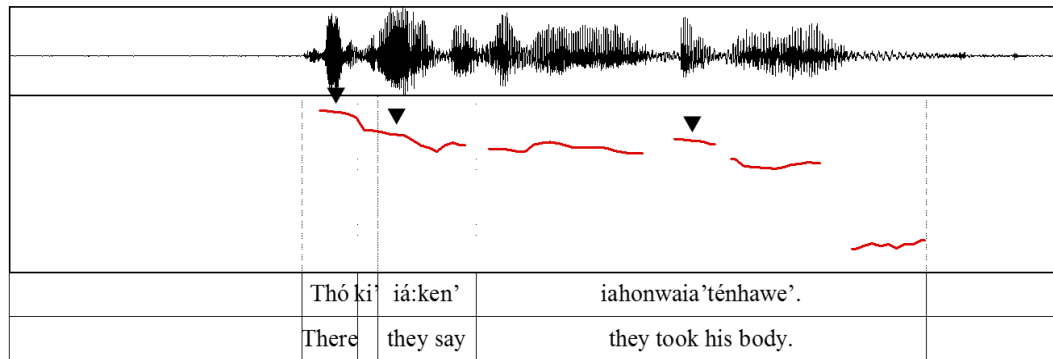
	Thó ki'	iá:ken'	iahonwaia'ténhawe'.	
	There	they say	they took his body.	

Figure 1. Pitch trace of sentence bounded by pauses (5).

The intensity, shown in Figure 2, also shows a gradual fall to the end.

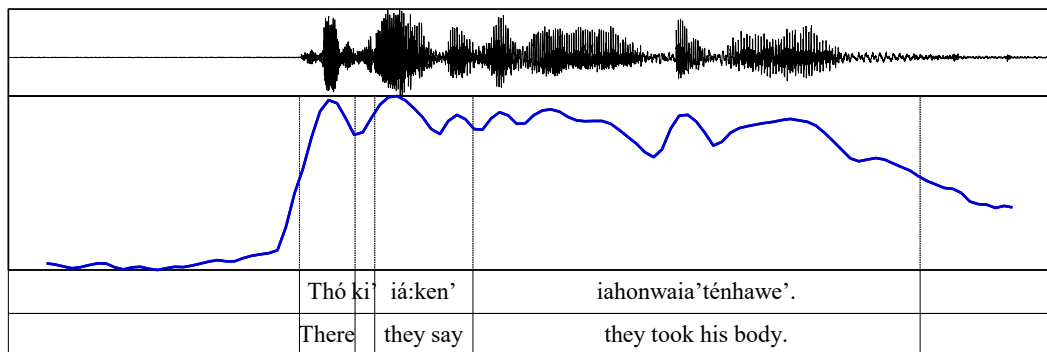|	Thó ki'	iá:ken'	iahonwaia'ténhawe'.	
	There	they say	they took his body.	

Figure 2. Intensity trace of sentence bounded by pauses (5).

It is important to note that the cues distinguishing intonation units are not categorical. Pitch, intensity, and rhythm all vary along continua. Pauses vary in length and may not even be present at all. The three sentences in (6) were spoken with essentially no pauses separating them. Mrs. Bush had just noted that the newspaper was forbidden from publishing a description of the service.

(6) Three intonation units
    JH   *Ónhka' iáh teiakothotá:ton?*
            who   not did one hear
            'Who didn't allow it?'

    CB   *Né:ne ro'níha   kí:kén:.*
            it is   his father this
            'It was his father.'

    JH   *A: né: wahánhe'.*
            ah   that one   he forbade it
            'Ah, he's the one that forbade it.'

    CB   *Mm.*

Nevertheless, the distinct intonation units are easily identifiable from the pitch contour. Each began with a pitch reset on a stressed syllable. (Mrs. Bush, who made the second comment, generally spoke on a higher pitch than Mrs. Horne, who made the first and third comments.)
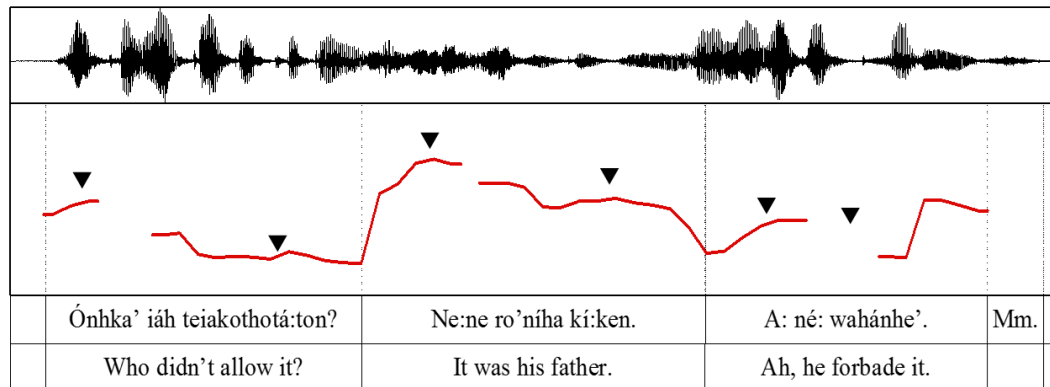

Ónhka' iáh teiakothotá:ton?	Ne:ne ro'níha kí:ken.	A: né: wahánhe'.	Mm.
Who didn't allow it?	It was his father.	Ah, he forbade it.	

Figure 3. Three intonation units with pitch resets (6).

Basic intonation units usually show decreasing pitch, or declination, over successive stressed syllables. Mohawk stress is basically penultimate. (Epenthetic vowels are not counted.) Stressed syllables show several pitch contours. In closed stressed syllables, which are short, there is simply high pitch, as in *ónhka'* 'who' in (6) above. In open stressed syllables, which are lengthened, the pitch rises through the duration of the syllable, as in *taiakothohtá:ton* 'one did not allow it'. Both are represented by an acute accent in the standard orthography. Vowel length is represented by a colon <:>. Before a glottal stop (represented by an apostrophe <'> in the standard orthography), stressed syllables have a distinctive pitch contour, represented by a grave accent: an initial steep rise then abrupt fall to below the baseline pitch, with vowel length, as in *nì:'í* 'myself, ourselves'. If the glottal stop would close the syllable, it disappears, but the pitch contour and length remain, as in *kahiatonhserà:ke* 'in the paper' (< *kahiatonhserá'ke*). If the stressed syllable is closed by *h* and the following syllable begins with a resonant (*n, r, w, y*, spelled <*ì*>), the syllable carries the same pitch contour and length, and the *h* disappears: *wakaterò:ron* 'I was watching' (< *wakateróhron*). When a word with rising pitch on an open stressed syllable is followed by another word, the pitch often continues to rise into the following syllable: *thaetiattó:kén' nì:'í* 'we wouldn't have noticed it ourselves'. (This continuing rise is not normally marked in the standard orthography.)

Declination over successive intonation units can be seen in the pitch trace in Figure 4. Stressed syllables are indicated with ▼.
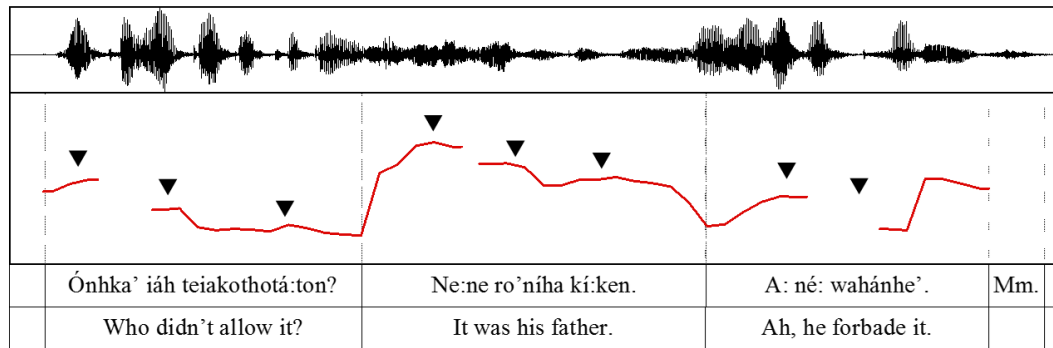
Ónhka' iáh teiakothotá:ton?	Ne:ne ro'níha kí:ken.	A: né: wahánhe'.	Mm.
Who didn't allow it?	It was his father.	Ah, he forbade it.	

Figure 4. Decreasing pitch over successive stressed syllables (6).

Intonation units thus appear to match syntactic sentences.

2. TYPES OF INTONATION UNITS.

Chafe distinguished three basic types of intonation units.

(7) Basic types of intonation units: Chafe 1994
   a. Substantive: representing ideas of events, states, referents, etc.
   b. Regulatory: regulating interaction or information flow
   c. Truncated: units that never arrive at their terminal contours

Examples of each can be seen in the passage in (8). Each line represents a separate intonation unit. Punctuation here reflects pitch contours: comma for a non-terminal contour, period for a terminal contour, dash for truncation.

(8) Substantive, Regulatory, and Truncated intonation units

Thó ki' iaken' iahonwaia'ténhawe', 'They took him there,'	Substantive
tsi-- 'to--'	Truncated
tsi thonónhsote', 'to his house,'	Substantive
tanon', 'and,'	Regulatory
khe kati' kén::, 'I guess,'	Regulatory
wahaterén:náien', 'he prayed,'	Substantive

| khe kati' kén::, | Regulatory |
| 'I guess,' | |

| tsi nihatiiérha'. | Substantive |
| 'as they do.' | |

The passage in (8) consists of a single syntactic sentence 'They took him to his house and I guess he prayed according to their custom'. It was uttered in multiple intonation units, **but there was an overall prosodic coherence, with a declination in pitch over the whole**. Each successive intonation unit began with a small pitch reset rather than a full one, and the final unit ended in a terminal pitch contour.
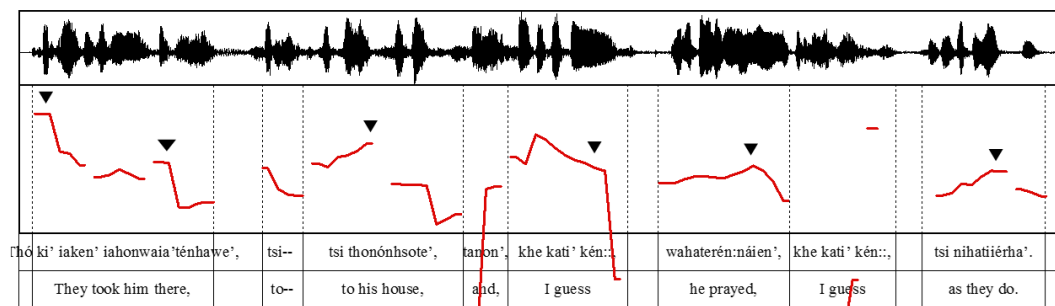

| Thó ki' iaken' iahonwaia'ténhawe', | tsi-- | tsi thonónhsote', | taɾon', | khe kati' kén::, | wahaterén:náien', | khe kati' kén::, | tsi nihatiiérha'. |
| They took him there, | to-- | to his house, | and, | I guess | he prayed, | I guess | as they do. |

Figure 5. Sub-units within sentential intonation unit (8).

In fact prosodic sentences consisting of multiple intonation units and ending in a final terminal contour are common. Example (9) was uttered in two intonation units, the first consisting of a conditional clause and the second the matrix clause.

(9) Conditional clause
Né: ki'   nonkwátshi   iáh   thiakoiakèn:'en,
it is in fact   our friend   not   not had she gone out
'If our friend hadn't gone out,'

iáh   ki'   thé: thaetiat--
not   in fact   anything   not would we--
'we wouldn't--'

thaetiattó:kén'   nì:'ï.
not would we two have noticed   us
'we ourselves wouldn't have noticed anything.'

The pitch trace is in Figure 6, with an initial high pitch reset, then a smaller pitch reset at the beginning of the following main clause, declination over the whole, and a final terminal contour.
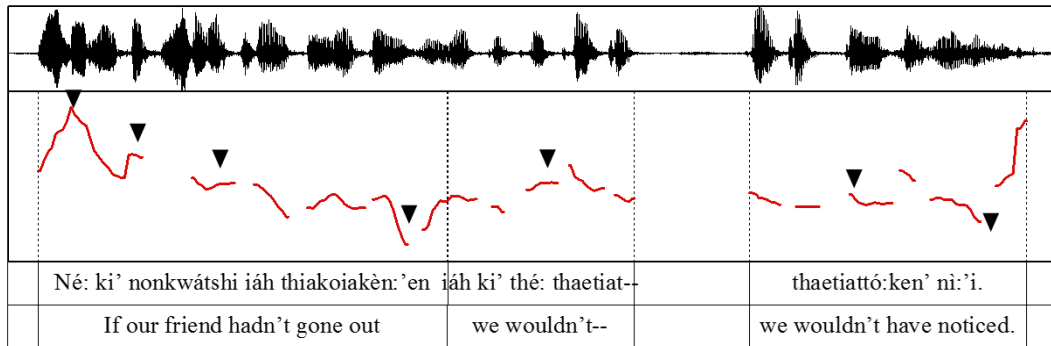
Figure 6. Conditional clause (9).

A similar intonational structure can be seen in a sentence with an adverbial clause in (10).

(10) Adverbial clause
Wahatikwatá:kó',
'They fixed it,'

ki: ó:nen   wakaterò:ron.
this   when   I was watching
'while I was watching.'

This sentence began with an initial full pitch reset on the stressed syllable *tá:* of the matrix clause *wahatikwatá:ko'* 'they fixed it', followed by a small pause and smaller pitch reset on the first stressed syllable *ó:* of *ó:nen* 'while' in the adverbial clause 'while I was watching'. Following the frequent pattern, the rising pitch on the stressed syllable *tá:* continued into the following syllable *kó'*. The characteristic contour of a steep rise followed by a rapid plunge can be seen on the stressed syllable *rò:* in the last word *wakaterò:ron* 'I was watching'.
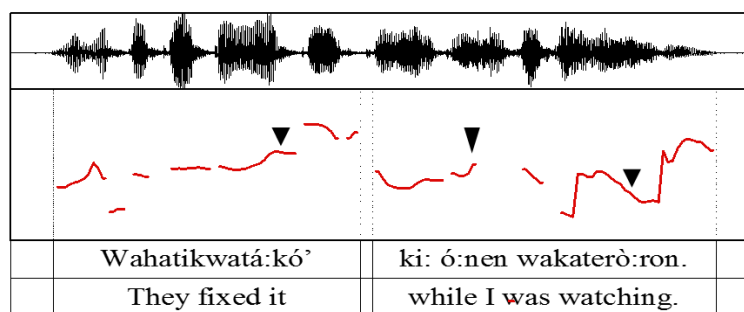

Figure 7. Adverbial clause (10).

Similar patterns can be seen with complement clauses. The sentence in (11) contains a complement clause within a complement clause, each in a separate intonation unit.

(11) Complements within complements
Kahiatonhserà:ke kahiá:ton   tsi,
paper place   it is written   how
'It says in the newspaper how,'

iáh   teha--
not   not did he
'he didn't--'

iáh   thothontá:ton   ne:,
not   not did he allow   the
'he wouldn't allow that,'

akwé:kon   ahatiká:raraste'   nahò:ten',
all   they would tell   what
'they would tell everything,'

tsi   na'á:wen'ne'   thetén:re.
how   it happened   yesterday
'that happened yesterday.'

The sentence shows an overall coherent pitch contour with declination, small pauses and small pitch resets on each intonation unit within it.
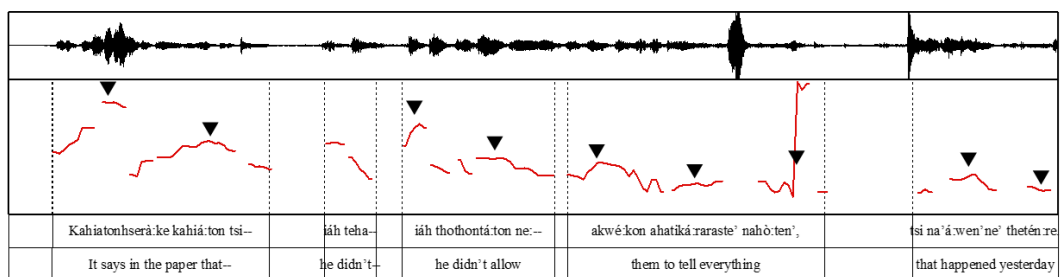

Figure 8. Complement clauses (11).

A similar pattern can be seen with relative clauses. Sentence (11) above ended with a relative clause 'that happened yesterday', visible in the last unit on the pitch trace in Figure 8. The sentence in (12) ended with a relative clause 'who came here' modifying 'children'.

(12) Relative clause
CB   *Tóka' ki'   né:'   ne   kí: iakoia'takarénie's,*
       maybe in fact it is   the   this   it transports one here and there
       'Maybe a bus'

       thotiia'ténha'   wáhi',
       it bodily carried them here TAG
       'brought them here didn't it,'

JH   *Mm.*

CB   *kí: ratiksa'okòn:'a,*
            these   children
            'these   children,

JH   *Mm.*

CB   *thoné:non   kèn:'en.*
            they have come   here
            'that came here.'

Here, too, the relative clause was uttered as a separate intonation unit within the overall prosodic sentence, set off by an initial pause and small pitch reset.
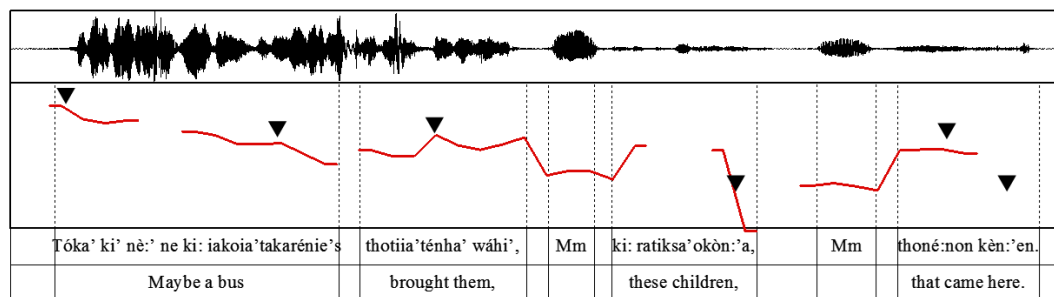

Tóka' ki' nè:' ne ki: iakoia'takarénie's	thotiia'ténha' wáhi',	Mm	ki: ratiksa'okòn:'a,		Mm	thoné:non kèn:'en.
Maybe a bus	brought them,		these children,			that came here.

Figure 9. Relative clause (12).

Prosodic structures thus appear to match syntactic structures, with a separate intonation unit for each clause. Smaller constituents are also uttered in separate intonation units. In Figure (9) the bus was introduced in one intonation unit, followed by the verb 'brought them' in a second, and the children in a third. A similar pattern can be seen with the adverb 'to his house' in (13).

(13) Adverb
Thó   ki'   iá:ken'   iahonwaia'ténhawe',
there   in fact   they say   they took his body there
'They say they just took him'

tsi--
to--

tsi   thonónhsote',   . . .
to   there he house stands
'to his house . .'

The adverb 'to his house' began after a pause with an initial smaller pitch reset.

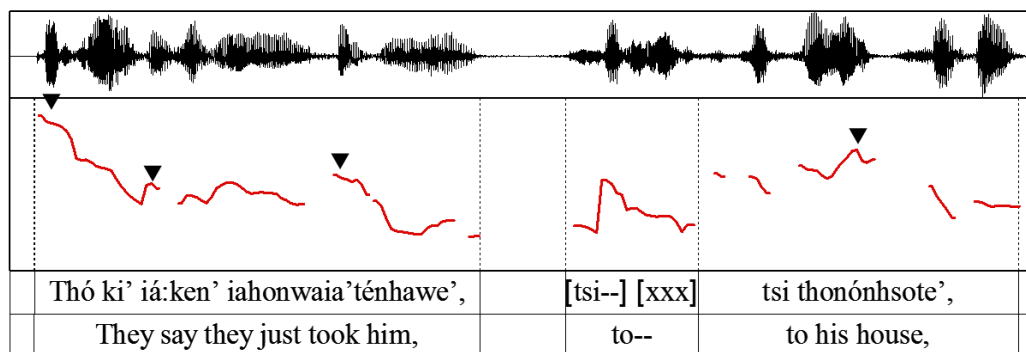| Thó ki' iá:ken' iahonwaia'ténhawe',	[tsi--] [xxx]	tsi thonónhsote',
They say they just took him,	to--	to his house,

Figure 10. Adverb (13).

A more complex construction is in (14), with a matrix clause followed by a complement clause which contains an adverbial clause which itself contains another adverb.

(14) Complex sentence
láh   ki'   tewakaterièn:tare',
not   actually   not do I know
'I don't actually know,'

tó: nikarì:wes,
how   so the matter is long
'how long it was'

tsi niió:re'   ionshón:néwe',
at   so it extends   they arrived back there
'until they got back'

ne   raotinónhskon.
the   their house interior
'to their house.'

The declination over the whole sentence is clear, with smaller pitch resets on each intonation unit, in some cases separated by a pause. The stressed syllable *ièn:* of the verb *tewakaterièn:tare'* 'I don't know' in the first clause shows the distinctive sharp rise then fall in pitch characteristic of the falling tone (though the fall itself was not picked up in the pitch trace), as does the stressed syllable *rì:* of the verb *nikarì:wes* 'so it was long' in the second. The rising pitch on the stressed open syllable *hón:* in the verb *ionshón:néwe'* 'they returned' was carried over into the following syllable *né.* (The digraphs <en> and <on> represent single nasalized vowels in the standard orthography; *hón:* is an open syllable.)
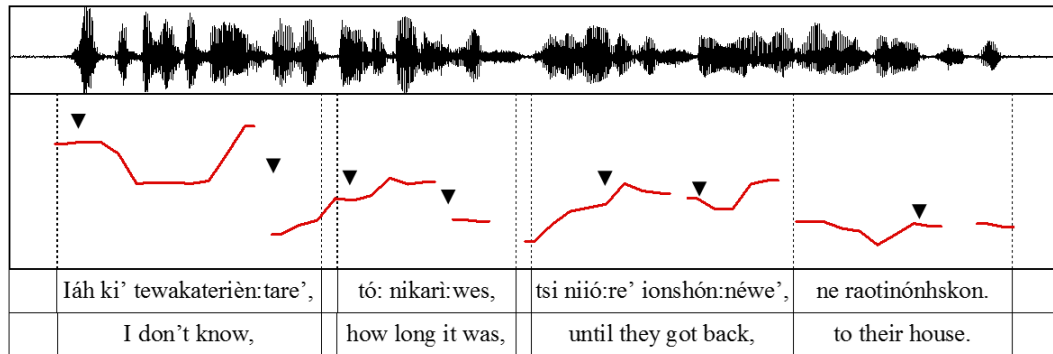
Iáh ki' tewakaterièn:tare',	tó: nikarì:wes,	tsi niió:re' ionshón:néwe',	ne raotinónhskon.
I don't know,	how long it was,	until they got back,	to their house.

Figure 11. Complex sentence (14).

On the basis of these examples, it appears that even elaborate syntactic constituent structure is perfectly reflected in prosodic structure.

3. INFORMATION PACKAGING

Further examination reveals that prosodic structure does not actually always match syntactic structure. The sentence in (15) was pronounced as a single intonation unit, with no pauses or pitch resets, though it contains multiple constituents.

(15) Apparent subject and object
Tóka'   ótia'ke   ákte'   nihatiia'titáhkhe'.
maybe   some   other   so they were bodily going along in it
'Maybe some of them were riding in another car.'

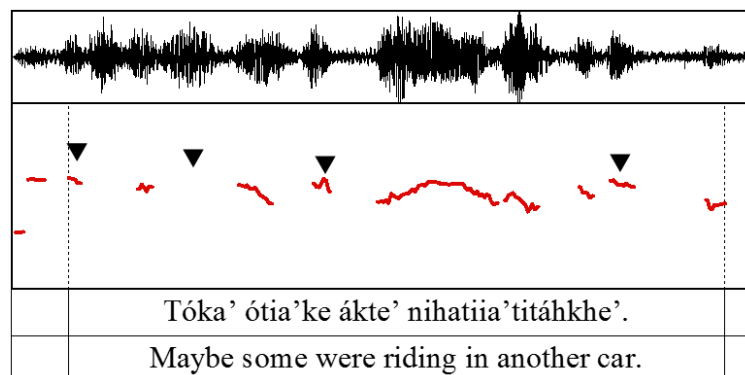| Tóka' ótia'ke ákte' nihatiia'titáhkhe'. |
|---|
| Maybe some were riding in another car. |

Figure 12. Apparent subject and object (15).

The sentence in (16) contained an adverb in addition to the verb, but unlike the clause with an adverb in (13), it, too, was pronounced in a single intonation unit.

(16) Verb and adverb

Wa'kewístoske'   norhón'ke   ostòn:ha.
I got cold   dawn time   a bit
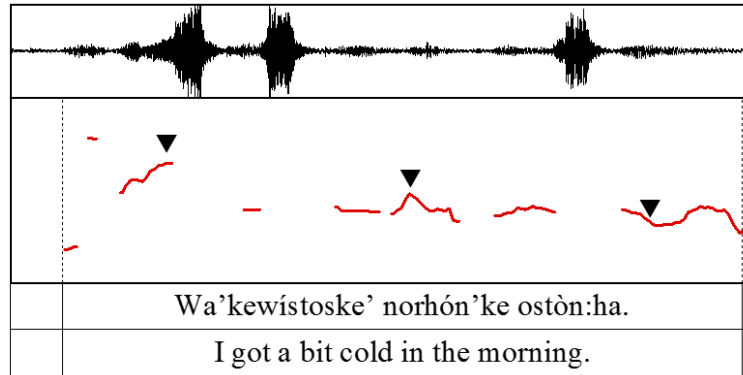'I got a bit cold in the morning.'

Wa'kewístoske' norhón'ke ostòn:ha.

I got a bit cold in the morning.

Figure 13. Verb and adverb (16).

The sentence in (17) contained conjoined adverbial clauses.

(17) Matrix with conjoined adverbial clauses

Kí: saion'wé:sen'   ni'
this   it is pleasant again   too
'It's more pleasant too'

tsi   ioráhkote' wáhi'   tanon' iáhten kwáh   teio'taríhen'.
 as   sun is out isn't it and   not   quite   not is it warm
'now that the sun is out and it's not quite warm.'

Even this complex sentence was pronounced as a single, simplex intonation unit.

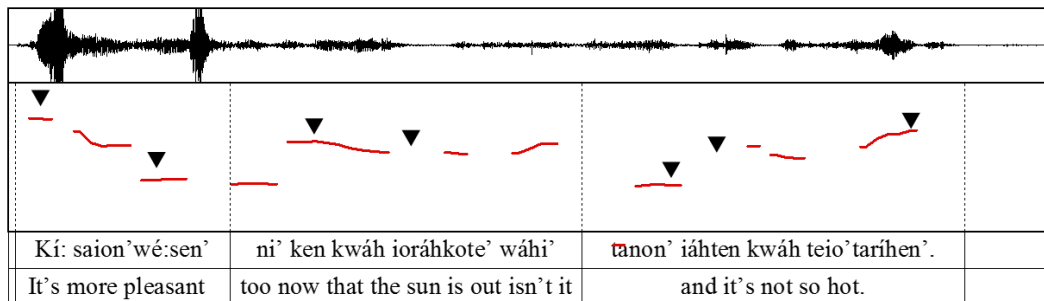| Kí: saion'wé:sen' | ni' ken kwáh ioráhkote' wáhi' | tanon' iáhten kwáh teio'taríhen'. | |
| It's more pleasant | too now that the sun is out isn't it | and it's not so hot. | |

Figure 14. Matrix with conjoined adverbial clauses (17).

The long sentence in (18), consisting of a conditional clause, a matrix clause, and a complement clause, was similarly pronounced as a single intonation unit.

(18) Conditional clause, matrix, and complement

Tóka' ki: *aontaki'terón:táke'*   *ki'*   *ni'*
if   this   I had been home   in fact   myself
'If I'd been home'

thaonkwattó:ken'   *tsi*   *na'á:wen'ne'*   *wáhi'.*
not would I have noticed   how   so it happened   TAG
'I wouldn't have noticed what happened you know.'

Tóka' ki: aontaki'terón:táke' ki' ni'

If I'd been home

thaonkwattó:ken' tsi na'á:wen'ne' wáhi'.

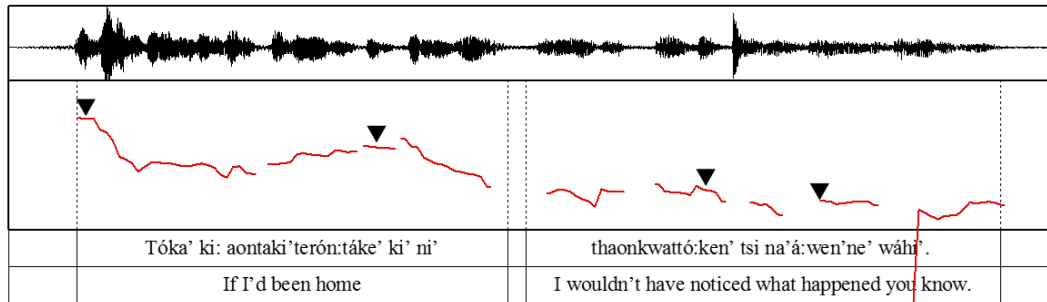I wouldn't have noticed what happened you know.

Figure 15. Conditional clause, matrix clause, complement (18).

The sentence in (19), consisting of a matrix clause and a complement clause with conditional clause, was also pronounced as a single intonation unit.

(19) Matrix clause and complement clause with conditional clause

láh   *ki'*   *tó:ske*   *thaiesattó:ken*   *naontahsi'terón:take'.*
not   in.fact   truly   not would you have noticed   the you were home.
'It's true you wouldn't have noticed if you were home.'

Iáh ki' tó:ske thaesattó:ken' naontahsi'terón:take'.

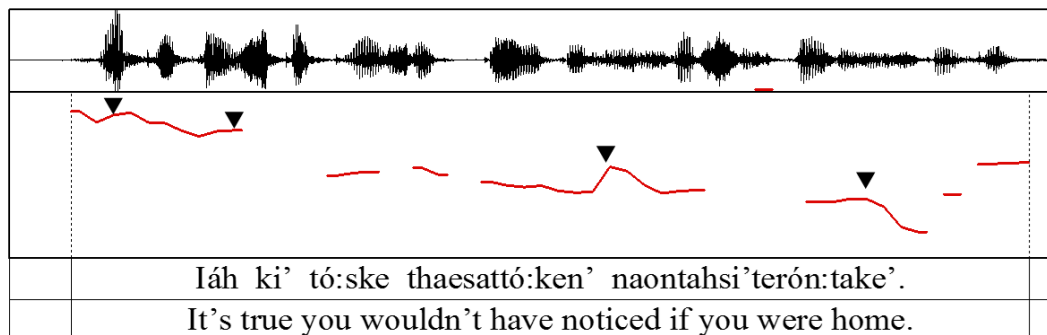It's true you wouldn't have noticed if you were home.

Figure16. Matrix and complement with conditional clause (19).

The patterns make sense given Chafe's observations that intonation units generally represent one new idea at a time, a single focus of consciousness, be it an event, state, referent, or something else. He distinguished three main types of ideas.

a) given (active in consciousness, generally because they are currently under discussion or otherwise present)

b) accessible (semi-active in consciousness, either part of previous discussion or related to something or someone under discussion)

c) new (inactive in consciousness).

A single intonation unit may include one or more given ideas (a) and/or accessible ideas (b), but no more than one new substantive idea (c). The prosodic phrasing seen in the previous examples becomes understandable once we examine the contexts in which they were uttered, now easily accessible with spoken language corpora.

The sentence in (15) 'Maybe some of them were riding in another car', with both a verb and separate core arguments, occurred in the context seen in (20). (The full conversation was in Mohawk, but just the free translations are given here for context.)

(20) (15) with context
CB   Maybe a **bus** brought **the children** that came here.
JH   I saw **some** that turned back, while we were standing outside.
CB   Yes.
JH   I guess then **they** didn't all go there.

CB   *Tóka'*   *ótia'ke*   *ákte'*   *nihatiia'titáhkhe'.*
      maybe   **some**   other   **so they were bodily going along in it**
      'Maybe **some of them were riding in** another **car**.'

As can be seen, the children were already part of the ongoing discussion, mentioned in the three immediately preceding comments. Riding in another vehicle was accessible from the mention of the children being brought in in a bus.

The sentence in (16) earlier, 'I got a bit cold in the morning,' with verb and adverb in the same intonation unit, occurred in the context in (21).

(21) (16) with context
JH   Say, **it's turned much cooler**, after we just had it so warm.
CB   I just changed my jacket. This one is warmer.
JH   Yes.

CB   *Wa'kewístoske'* *norhón'ke* *ostòn:ha.*
      I got cold   dawn time   a bit
      '**I got a bit cold** in the morning.'

The cooler weather was already under discussion. The final sentence in (21) above was followed by the longer sentence in (22) below (seen earlier in (17)), containing a matrix clause followed by conjoined adverbial clauses, 'It's more pleasant too now that the sun is out and it's not quite warm.', all pronounced as a single intonation unit. It continued the discussion of the cooler weather.

(22) (17) with context
JH   Say, **it's turned much cooler**, after we just had it so warm.
CB   I just changed my jacket. This one is warmer.
JH   Yes.
CB   **I got a bit cold** in the morning.

Ki:	*saion'wé:sen'*	*ni'*	*ken*	*kwáh*	*ioráhkote'*
this	it is pleasant again	too	here	right	sun is out

'It's more pleasant too now that the sun is out'

tanon'	*iáhten*	*kwáh*	*teio'taríhen'.*
and	not	quite	not is it warm

'**and it's not quite warm**.'

The sentence seen earlier in (18) 'If I'd been home I wouldn't have noticed what happened, occurred in the context in (23).

(23) (18) with context
JH   If our friend hadn't gone out **we wouldn't have noticed anything**.
CB   No. She just came running to tell us
JH   Yes.
CB   what was going on.
JH   Yes. And a lot of cars went by.
CB   Yes, a lot.

Tóka'	*ki:*	*aontaki'terón:take'*	*ki'*	*nì:'i*
if	this	I would have been home	in fact	myself

'If I'd been home'

[iáh]	*thaonkwattó:ken'*	*tsi*	*na'á:wen'ne'*	*wáhe'.*
not	not would I have noticed	how	so it happened	TAG

'**I wouldn't have noticed what happened**.'

The possibility of not noticing had just been mentioned. The new contribution was 'If I had been home'.

The sentence seen earlier in (19), 'It's true you wouldn't have noticed if you were home' immediately followed.

(24) (19) with context
'**If I'd been home I wouldn't have noticed what happened,** you know.'

láh	*ki'*	*tó:ske*	*thaiesattó:ken*	*naontahsi'terón:take'.*
not	in. fact	truly	not would you have noticed	the you were home

'It's true **you wouldn't have noticed if you were home.**'

In all of these passages, each intonation unit represents just one significant *new* idea.

4. INFORMATION STRUCTURE

Much can be learned about grammatical structure from the written word, but some things can be missed. The sentence in (25) appears to consist simply of a subject and predicate.

(25) Simple sentence?

Tanon'	*kí:*	*Tiohren'shá:ká:*	*thó*	*kwi'*	*rotiia'ten'tòn:ne'*	*wáhi'.*
and	this	dawn people	there	just	they were bodily hanging	TAG

'And these White people were following weren't they.'

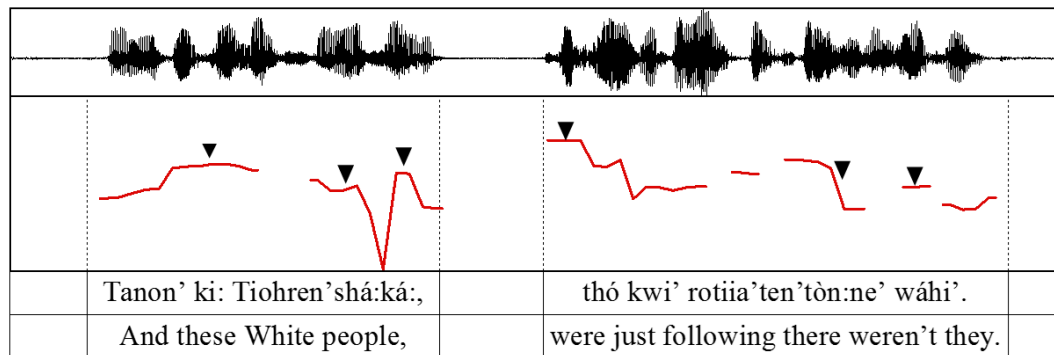It is immediately clear from the prosody, however, that it has quite a different structure.

	Tanon' ki: Tiohren'shá:ká:,		thó kwi' rotiia'ten'tòn:ne' wáhi'.	
	And these White people,		were just following there weren't they.	

Figure 22. Topic shift (25).

The construction shows a distinctive, recognizable prosodic pattern, with an initial referential expression 'these White people', followed by a pause then a full pitch reset on the following nuclear clause 'they were following weren't they'. It is a topicalization construction, signaling a shift in topic to 'these White people'. The preceding context was seen earlier in (8), 'His father prayed in the way they do in their tradition, according to their custom'.

The same construction topic shift construction can be seen in (26). When just seen in print, it would appear to consist of two simple sentences.

(26) Two simple sentences?

Hátskwi	*nonkwátshi Dorris*	*iáh ki:*	*teiotòn:'on*	*ontaiakoiakèn:'en*	*kí:kén:.*
say	our friend	not this	was it possible	for her to leave	this

'Say our friend Dorris couldn't come out.'

Wa'ontatenatahré:náhse'.
one visited her
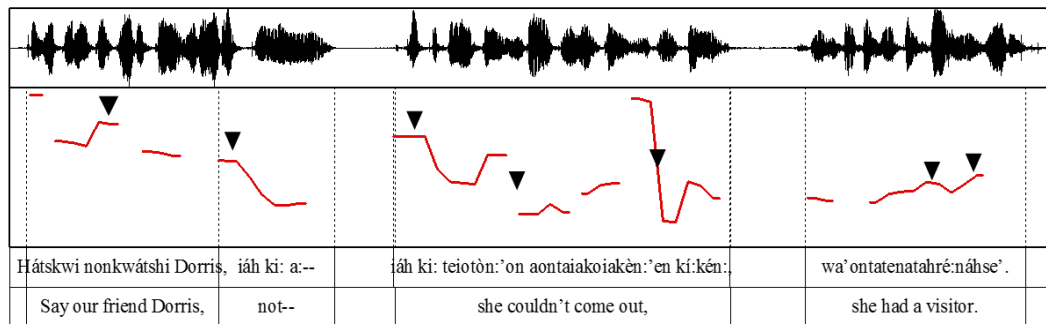'She had a visitor.'

The prosody shows a different structure.

Figure 23. Topic shift (26).

The sentence began with a full pitch reset, then continued with a pause and another full pitch reset on the following clause. The characteristic steep rise then sharp fall of the tone marked with a grave accent can be seen on the verb *aontaiakoiakèn:'en*. In addition, there was no terminal fall before the last intonation unit, which did not itself begin with a pitch reset. As the speakers later made clear, this last intonation unit was part of the same sentence, a reason clause, though there was no overt marker of its dependent status.

(27) Topic shift and reason clause
Hátskwi   nonkwátshi Dorris,
say   our friend
'Say our friend Dorris,'

iáh ki: a:--
'not --'

iáh   ki: teiotòn:'on   aontaiakoiakèn:'en kí:kén:,
not   this   was it possible   she would come out   this one
'she couldn't come out,'

wa'ontatenatahré:náhse'.
one visited her
'(because) she had a visitor.'

Similarly, in print the sentence in (28) appears to be a simple question.

(28) Simple question?
Né: ken   wa'kóniake'?
that one   Q   she married
'Did she get married?'

The prosody shows a different structure. It is a focus construction. It began with an extra high pitch on the initial focused element ('that one'), immediately followed by the remainder of the clause, with no pause or pitch reset. The pitch pattern can be seen in the last intonation unit in Figure 24, along with that of the preceding context.
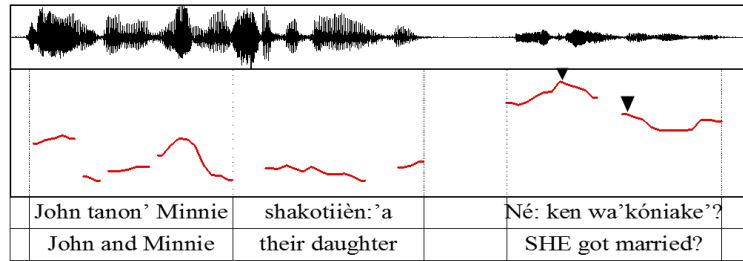
Figure 24. Focus construction (29).

(29) Focus construction with context
    CB   'She'd just returned from a wedding.'
            'I don't know which one got married.'

    JH   *John tanon' Minnie shakotiièn:'a.*
            'It was John and Minnie's daughter.'

    CB   *Né:*   ken   *wa'kóniake'?*
            that one   Q   she married
            '**SHE** was the one that got married?'

In print (30) appears to be a simple sentence, with what appears to be a subject, 'his father', at the end.

(30) Simple sentence?
    Ostòn:ha kí: iotéha'   tsi   nahá:iére'   ne: ro'níha.
    a little   this   it is a shame   how   so he did   that   he is father to him
    'It was sort of a shame the way his father did things.'

This sentence, too, was pronounced with a distinctive prosodic pattern. It consisted of three intonation units. But the last showed no pitch reset. It was pronounced with a low, flat pitch contour.

(31) Antitopic construction
    Ostòn:ha kí:,
    a little   this
    'It was sort of'

    iotéha'   tsi   nahá:iére'   ne:,
    it is a shame   how   so he did   that one
    'a shame the way he did things'

    ro'níha.
    '**his father**.'

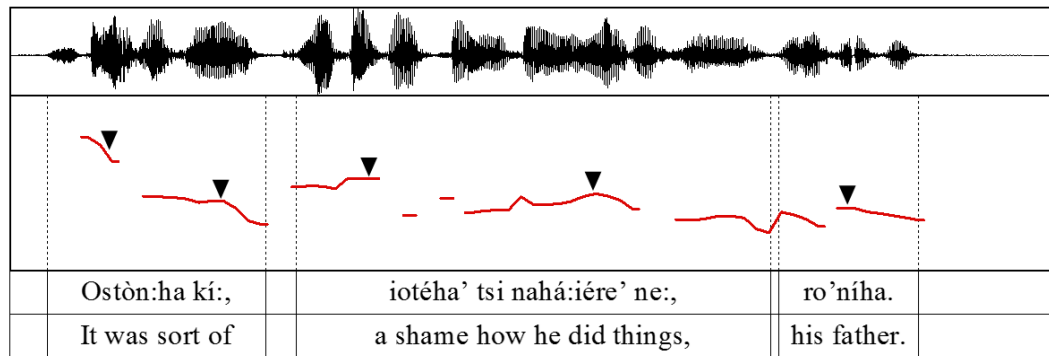The pitch contour can be seen in Figure 25.

Figure 25. Antitopic construction (31).

This is an antitopic construction. The final nominal, here 'his father', serves to confirm the identity of an ongoing topic, a given or accessible participant, especially when multiple participants are in play. These speakers had been discussing the procession leading to the father's house, where the father was going to pray in the traditional way.

5. CONCLUSION

Both syntax and prosody are structured. They often work in concert, but not always. Syntactic structure is more categorical than prosodic structure. Words are in one order or another; markers of subordination and other relations are present or absent. Prosody, by contrast, involves continua of pitch, intensity, and timing.

The two show different degrees of crystallization. Morphological structure is highly crystallized: in Mohawk, morphemes are strictly ordered, and word-level prosody is completely determined by phonological structure: stress occurs basically on the penultimate syllable, and pitch and rhythm depend on the syllable structure.

Syntactic structure is still conventionalized, but slightly less so than morphology. In Mohawk, basic constituent order reflects information structure, with more newsworthy information appearing early in the clause, followed by successively less important and peripheral information. In complement constructions, however, matrix clauses precede their complements, and various kinds of subordinate clauses are usually, though not always, identified by overt markers. Prosodic sentences, ending in a full terminal contour, usually, though again not always, match syntactic sentences.

Information structure in the narrower sense is signaled by both constituent order and conventionalized prosodic structure. Topic shift constructions consist of an initial constituent identifying the topic, pronounced with a full pitch reset, followed by a pause then the nuclear clause, which also begins with a full pitch reset. Focus constructions consist of an initial constituent identifying the focus, pronounced with an extra-high pitch reset,

followed immediately by the nuclear clause with not pause or pitch reset. Antitopic constructions, which reiterate the identity of topic already under discussion, consist of a clause followed by a constituent identifying the topic, with no pitch reset and generally a flat pitch, often slower speed, and sometimes creaky voice.

Finally, information packaging in the wider sense (including managing the flow of information beyond considerations of topic and focus) is accomplished with prosodic structure. Intonation units present one new idea at a time. Intonational sentences, which may consist of multiple intonation units showing declination over the whole and ending in a final terminal contour, generally present a single event or state. Intonation units may correspond to syntactic constituents, but not necessarily.

In the end, prosody can tell us things syntax does not, often more directly reflecting the knowledge state of the speaker and what the speaker assumes to be the knowledge state of the hearer.

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