

Lesson 16

Tone

16.1 Overview

1. Tone, pitch, and intonation
2. Tone is contrastive
3. Tonal melodies have a degree of autonomy from speech segments

16.2 Some definitions

- Pitch: The frequency of vocal fold vibration.
- Tone: The use of pitch as a contrastive feature in the lexicon or morphology of a language.
- Intonation: The use of pitch at the level of the phrase or utterance to convey abstract meanings, usually about the information structure of the utterance.

16.3 Intonation

You are probably aware of some “tunes” that occur when speaking English. English statements and questions have their own signature “tunes” as shown in the figure.

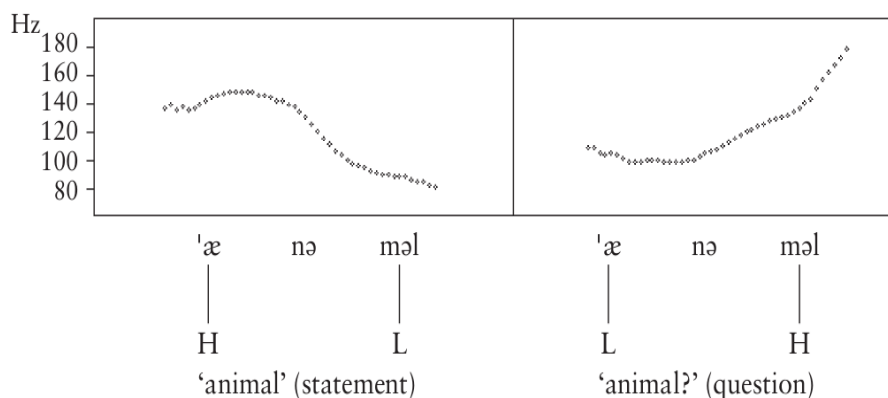


Figure 15.2 English intonation

Figure 16.1: English intonational contours (from Hayes 2009)

Note that these intonational contours are like melodies that can be added, or integrated with, any word, phrase or utterance. In other words, there is a sense these melodies are independent of the segmental make-up of the word, phrase, or utterance.

16.4 Tonal languages use pitch to make lexical contrasts.

16.4.1 Example: Igbo

Igbo is a Niger-Congo language spoken in Nigeria and has over 30 million native speakers. Pitch is contrastive in Igbo; in other words, distinctions in pitch may convey differences in meaning.

Some examples are shown below. In the figure, H and L refer to “High” and “Low” pitch, respectively.

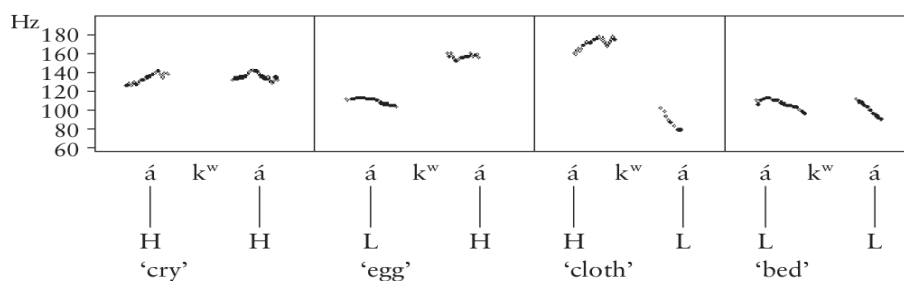


Figure 15.1 Phonemic tone in Igbo

Figure 16.2: Igbo words (from Hayes 2009)

As such, pitch is a distinctive feature in Igbo, but not in English. How might we think about representing these words in Igbo? If we represent these words as sequences of bundles of distinctive features, we could have something like this.

Table 16.1: Mental representation of ‘cry’ in Igbo

Feature	a	k ^w	a
manner	vocalic	stop	vocalic
place	low and front	labio-velar	low and front
laryngeal	voiced	voiceless	voiced
pitch	high		high

Table 16.2: Mental representation of ‘egg’ in Igbo

Feature	a	k ^w	a
manner	vocalic	stop	vocalic
place	low and front	labio-velar	low and front
laryngeal	voiced	voiceless	voiced
pitch	low		high

However, we will see that there is reason to believe that, like intonational melodies, tonal features exhibit behaviors that are somewhat independent of the segmental material.

16.4.2 Degrees of Contrast and Common Notation

Some languages, like Igbo, only use pitch to contrast two levels of tone: high and low. If both these tones are realized on the same vowel (or syllable), they are called **contour** tones. If the contour begins low and goes high, it is called a **rising** tone. If it begins high and goes low, it is

called a falling **tone**. Igbo has contour tones in some words and phrases. However, it is generally recognized that only High and Low tones are contrastive, and the contour tones can be derived from the melodic sequence occurring in shorter span of time.

Accent	Name	Meaning	HL notation
á	acute	high	H
à	grave	low	L (or nothing)
â	circumflex	falling	HL
ǎ	caron	rising	LH

Here, H and L mean “High” and “Low” tones not heavy and light syllables.

Some languages use pitch to make additional distinctions. For example, Mwan, a Niger-Congo (Mande) language spoken in the Ivory Coast with about 20,000 speakers, recognizes three levels: High, Mid, and Low.

Accent	Name	Meaning	HLM notation
á	acute	high	H
à	grave	low	L
ā	macron	mid	M (or nothing)

Another Mande language spoken primarily in the Ivory Coast is Dan with about 1.6 million speakers. It has five level tones.

Accent	Name	Meaning	HLM notation
ǎ	double acute	extra high	xH
á	acute	high	H
ā	macron	mid	M (or nothing)
à	grave	low	L
ǎ	double grave	extra low	xL

This accent notation for tones is widely used, and is basically recognized in the IPA. The IPA also provides another notation shown below.

TONES AND WORD ACCENTS	
LEVEL	CONTOUR
é or ʘ Extra high	ě or ʘ Rising
é ʘ High	ê ʘ Falling
ē ʘ Mid	ě ʘ High rising
è ʘ Low	ě ʘ Low rising
è ʘ Extra low	ě ʘ Rising-falling
↓ Downstep	↗ Global rise
↑ Upstep	↘ Global fall

Figure 16.3: IPA for Tones

16.4.3 Example: Mandarin

Mandarin (Sino-Tibetan) is a tonal language with about 1 billion speakers. Unlike Igbo, it has four tones and its tonal inventory is not made up entirely of level tones. Its tones are shown below.

Segmental form	Tone	Gloss
ma	high level	‘mother’
ma	mid rising	‘hemp’
ma	low fall/rise	‘horse’
ma	high falling	‘scold’

There are many different notations in use.

Tone description	Chao tone numerals	Tone number	Pinyin	Gloss
High level	ma ⁵⁵	ma ¹	mā	mother
Mid rising	ma ³⁵	ma ²	má	hemp
Low dipping	ma ²¹⁴	ma ³	mǎ	horse
High falling	ma ⁵¹	ma ⁴	mà	scold

The Chao tone numerals range from 1 to 5 with 1 indicating the low end of the scale and 5 indicating the high end.

It remains an interesting question how to best think about the mental representations of Mandarin tones. On the one hand, we can imagine a very concrete representation such as the one below.

Table 16.8: More concrete mental representation of ‘horse’ in Mandarin

Feature	m	a
manner	stop	vowel
place	labial	low and central
laryngeal	voiced	voiced
nasality	yes	no
pitch		2 then 1 then 4

Table 16.9: More abstract mental representation of ‘horse’ in Mandarin. This would be accompanied by a phonological process that interprets tone number #3 as pitch level 2, followed by 1 followed by 4.

Feature	m	a
manner	stop	vowel
place	labial	low and central
laryngeal	voiced	voiced
nasality	yes	no
pitch		#3

What kind of evidence can bear on these options?

16.5 Representation of Tone: Tone is Autosegmental

Importantly, tone appears to be *independent* of segments. ‘Autosegmental’ means ‘being autonomous from segments’. Some reasons to think so are:

1. Morphemes may contain only tonal material, not segmental material (Efik).
2. When vowels delete, their tones may not (Ogbia).
3. If a tone changes, it can affect a whole span of segments, not just one (Shona).

We will use “autosegmental diagrams” to represent tone theoretically. For example, the two words for Igbo above could instead be represented as follows.

$$\begin{array}{c} \text{H} \\ / \quad \backslash \\ \text{ak}^{\text{w}}\text{a} \\ \text{‘cry’} \end{array}$$

$$\begin{array}{c} \text{L} \quad \text{H} \\ | \quad | \\ \text{ak}^{\text{w}}\text{a} \\ \text{‘egg’} \end{array}$$

$$\begin{array}{c} \text{H} \quad \text{L} \\ | \quad | \\ \text{ak}^{\text{w}}\text{a} \\ \text{‘cloth’} \end{array}$$

$$\begin{array}{c} \text{L} \\ / \quad \backslash \\ \text{ak}^{\text{w}}\text{a} \\ \text{‘bed’} \end{array}$$

For now, this is just an idea for which we have presented no evidence. That is the purpose of the next examples.

16.6 Summary

1. Different pitches can be used to convey different lexical meanings in language.
2. Languages which use pitch to contrast lexical items are tonal languages.
3. We are going to argue that representing tones with features is more complicated than representing them autosegmentally.

16.7 Case Study: Efik

Efik is a Niger-Congo language with between 1-2 million speakers spoken in Nigeria and Cameroon. It has two level tones Low and High.

		a.	b.	c.	d.	e.	f.
		‘buy’	‘live’	‘think’	‘put’	‘go’	‘run’
(1)	1sg.pres	ńdèp	ńdù	ńkèrè	ńdòrì	ńkà	ńfèhè
(2)	2sg.pres	èdèp	òdù	èkèrè	òdòrì	àkà	èfèhè
(3)	3sg.pres	édèp	ódù	ékèrè	ódòrì	ákà	éfèhè
(4)	1sg.fut	ńjédép	ńjédù	ńjékéré	ńjédòrì	ńjékà	ńjéfèhé
(5)	2sg.fut	èjédép	èjédù	èjékéré	èjédòrì	èjékà	èjéfèhé
(6)	3sg.fut	éjédép	éjédù	éjékéré	éjédòrì	éjékà	éjéfèhé
(7)	1sg.pst	ńkédép	ńkódù	ńkékéré	ńkódòrì	ńkákà	ńkéfèhé
(8)	2sg.pst	èkédép	òkódù	èkékéré	òkódòrì	àkákà	èkéfèhé
(9)	3sg.pst	ékédép	ókódù	ékékéré	ókódòrì	ákákà	ékéfèhé
		‘lay’	‘dig’	‘walk’	‘come’	‘pass’	‘show’
(10)	1sg.fut	ńjésín	ńjédòk	ńjésàṅá	ńjétó	ńjébě	ńjéwút
(11)	3sg.fut	éjésín	éjédòk	éjésàṅá	éjétó	éjébě	éjéwút
(12)	1sg.pst	ńkésín	ńkódòk	ńkásàṅá	ńkótó	ńkébě	ńkówút
(13)	3sg.pst	ékésín	ókódòk	ákásàṅá	ókótó	ékébě	ókówút
		‘come’	‘kill’	‘pray’	‘cover’	‘fly’	‘be called’
(14)	1sg.pst	ńkédí	ńkówòt	ńkòbóṅ	ńkékíbí	ńkéfě	ńkékèrè
(15)	3sg.pst	ékédí	ókówòt	ókòbóṅ	ékékíbí	ékéfě	ékékèrè

The main lesson here is that morphemes may contain tones without segments!

16.8 Case Study: Ogbia

Ogbia is a Niger-Congo language with about 400,000 speakers in Nigeria.

	Unsuffixed	tonal melody	Definite	tonal melody	Gloss
(1)	àdírí	L . H . H	àdířà	L . H . HL	‘book’
(2)	àtúrú	L . H . H	àtúrê	L . H . HL	‘nail’
(3)	àwúdfúm	L . H . H	àwúdfúmê	L . H . H . HL	‘life’
(4)	àdè	L . L	àdê	L . L	‘farm’
(5)	àbèdì	L . L . L	àbèdê	L . L . L	‘monitor lizard’
(6)	àgbùdùm	L . L . L	àgbùdùmê	L . L . L . L	‘bush cow’
(7)	àpùsí	L . L . H	àpùsê	L . L . HL	‘cat’
(8)	àdùmó	L . L . H	àdùmê	L . L . HL	‘riddle’
(9)	àpíkò	L . H . L	àpíkê	L . H . L	‘feather’
(10)	émú	L . H	èmê	L . HL	‘head’
(11)	àgòl	L . HL	àgòlê	L . H . L	‘gold’

The main lesson here is that deletion of a vowel does not mean deletion of its tone! The phenomenon of a vowel deleting and its tone remaining is called “tonal stability”.

16.9 Case Study: Shona

Shona is a Niger-Congo language with over 10 million speakers and is spoken in Zimbabwe and Mozambique.

	Word/Phrase	Melody	Gloss
(1)	mbwá	H	‘dog’
	né # mbwà	H # L	‘with a dog’
(2)	hóvé	H . H	‘fish’
	né # hòvè	H # L . L	‘with a fish’
(3)	mbúndúdí	H . H . H	‘army worms’
	sé # mbùndùdì	H # L . L . L	‘like army worms’
(4)	hákàtà	H . H . L	‘diviners bones’
	sé # hàkàtà	H # L . L . L	‘like diviner’s bones’
(5)	bàdzá	L . H	‘hoe’
	né # bàdzá	H # L . H	‘with a hoe’
(6)	chàpúpù	L . H . L	‘witness’
	sé # chàpúpù	H # L . H . L	‘like a witness’
(7)	béńzíbvúnzá	H . H . L . H	‘inquisitive fool’
	sé # bèńzíbvúnzá	H # L . L . L . H	‘like an inquisitive fool’
(8)	fárái	H . H	‘personal name’
	nà # Fáraí	L # H . H	‘with Farai’
(9)	mbwá	H	‘dog’
	sá-mbwá	H-H	‘owner of a dog’

The main lesson here are that changing a tone can result in whole span changing! This suggests a span of tones is better represented as a single tone with multiple associations!

16.10 Case Study: Margi

Margi is an Afro-Asiatic language spoken in Nigeria, Cameroon and Chad.

	Word	Gloss	Word	Gloss
(1)	sál	'man'	sálàrì	'the man'
(2)	kùm	'meat'	kùmàrì	'the meat'
(3)	ʔí.mí	'water'	ʔím.já.rì	'the water'
(4)	kú	'goat'	kwàrì	'the goat'
(5)	tágú	'horse'	tágwàrì	'the horse'
(6)	fèré	'court'	fèrèrì	'the court'
(7)	tóró	'threepence'	tóròrì	'the threepence'
(8)	éncàlá	'calabash'	éncàlárì	'the calabash'
(9)	tì	'morning'	tjà.rì	'the morning'
(10)	hù	'grave'	hwàrì	'the grave'
(11)	úʔù	'fire'	úʔwàrì	'the fire'
(12)	cédè	'money'	cédèrì	'the money'
(13)	fà	'farm'	fàrì	'the farm'

Like Ogbia, tones persist even when their underlying vowels do not!