

# ACTL phonology tutorial 2

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## 1 Some tools for investigating pitch contours

All of the following (freely available) software packages contain tools for displaying, labelling, and querying  $F_0$  tracks:

- **PRAAT**: <http://www.praat.org>
- **Wavesurfer**: <http://www.speech.kth.se/wavesurfer/>
- **Speech Filing System (SFS)**: <http://www.phon.ucl.ac.uk/resource/sfs/> (program created and maintained at UCL)
- **EMU**: <http://emu.sourceforge.net/>

## 2 Other resources

- **ToBI** (TOnes and Break Indices) is a framework for the transcription of intonational and prosody based on autosegmental-metrical prosodic analysis. ToBI(-style) transcription conventions exist for (standard varieties of) English, German, Japanese, and Dutch. The main ToBI website is located at <http://www.ling.ohio-state.edu/~tobi/>. The ToBI-English labelling guide (Beckman & Ayers, 1997) and related material including sound-files can be obtained from <http://www.ling.ohio-state.edu/~tobi/ame.tobi/>
- **IViE** (Intonational Variation in English) is a project devoted to the analysis of dialectal variation in the intonation pattern of British English. The IViE transcription framework is based on the autosegmental-metrical approach, but differs from ToBI-English in various ways. The IViE labelling guide, and the complete corpus (36 hours of speech material!) can be downloaded from <http://www.phon.ox.ac.uk/~esther/ivyweb/>

## 3 Basics of Autosegmental-Metrical Pitch Modelling

The AM approach models (linguistic aspects of) the pitch contour of any utterance using:

- A string of (phonological) level *tones*,  $H$ , ( $M$ ),  $L$ , corresponding (roughly!) to turning points in  $F_0$  tracks:
  - Starred tones ( $T^*$ )** Relatively stable phonetically (timing, truncation)
  - Trailing tones ( $\dots + T$ )** Less stable targets following a  $T^*$
  - Leading tones ( $T + \dots$ )** Less stable targets preceding a  $T^*$  (cf. Grice 1995)
- A number of devices controlling the *tonal space* (Ladd, 1996), the range within which tonal targets may be realised

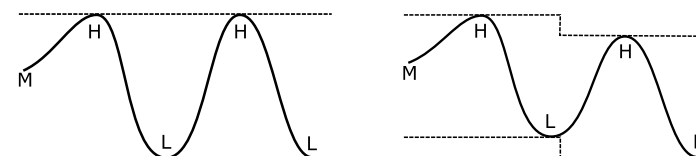


Figure 1: Realisation of the same tonal string in different tonal spaces (schematic).

## 4 Modelling tonal space

A distinction needs to be made between:

**Physiological factors** Gender, age, lowering of transglottal pressure differential during an utterance

**Factors under speaker control** e.g., paralinguistic, sociolinguistic factors and, at a more local level:

- Declination
- Downstep
- Final lowering
- ...

## 5 Declination

A global downtrend/compression of the space for all tonal targets within (part of) an sentence, utterance or a series of utterances. May be nested (Ladd, 1996). Declination is rooted in the physiology of voice production, but is at least partly under linguistic control.

For example, studies of Danish (cf. Gussenhoven 2004: section 6.2) have shown declination to be dependent on sentence type:

1. **Declaratives** show a relatively great amount of declination
2. **Syntactically unmarked interrogatives** exhibit virtually no declination
3. **Syntactically marked interrogatives** show an intermediate amount of declination

## 6 Basic phonetics of downstep

A more local tone-to-tone downtrend/compression of the tonal space, superimposed on any effects of declination. AM modelling of downstep in intonation contours owes a lot to studies of African tone languages.

There are at least two broad types of downstep, phonetically speaking:

1. **Automatic downstep** a.k.a. *downdrift*: [H L !H L...]
2. **Non-automatic downstep** [H !H...]

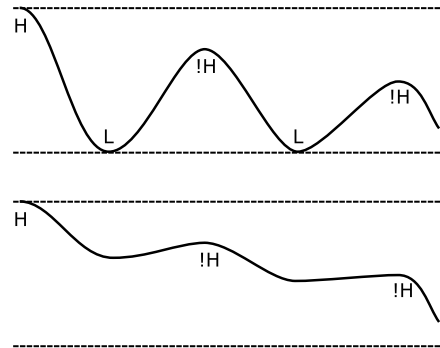


Figure 2: Automatic downstep (top) and non-automatic downstep (bottom).

## 7 Phonological analyses of downstep in tone languages

Sometimes there are good phonological reasons for assuming that phonetic [H !H] is underlyingly /H L<sub>F</sub> H/, i.e., has a *floating* low tone intervening between the two Hs.

- (1) Floating low tones in Kanakuru

/jímù dádáú/ [jím <sup>1</sup>dádáú] 'We used to play'  
 /kùrè mónó/ [kùré <sup>1</sup>mónó] 'my corn'

- (2) Floating low tone in Bambara

- a. [jírí] 'a tree'  
[jírí] 'the tree'
- b. [jírí tɛ́] 'It is not a tree'  
[jírí <sup>1</sup>tɛ́] 'It is not the tree'

## 8 Phonological analyses of downstep in intonation systems

Evidence for floating L tones is often hard to find in intonation contours (though see [Pierrehumbert 1980](#) on English), and so in the absence of any phonetic reflex of trailing or leading L it's better to regard downstep as a (phonetic implementation rule) affecting sequences of Hs. The analysis of French intonation presented by [Gussenhoven \(2004\)](#) is an example.

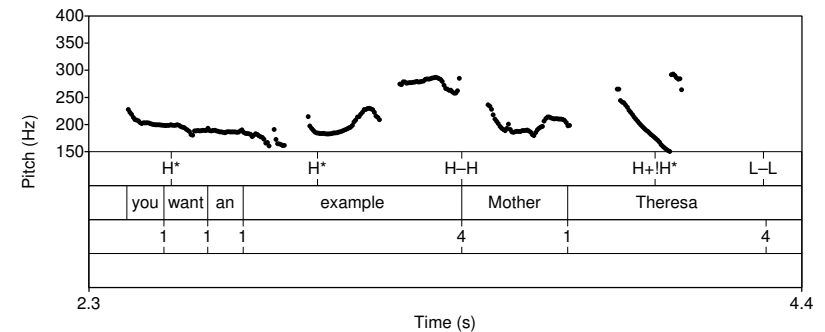


Figure 3: Downstep without overt L in English. Example drawn from the material accompanying the *Guidelines for ToBI Labelling* ([Beckman & Ayers, 1997](#)) (see copyright notice below).

- (3) a. French *prenuclear* accents:

H\* L  
H\*

- b. French *nuclear* accents ([Gussenhoven 2004](#), p. 255 example 25):

H\* L<sub>i</sub> fall 'declarative'  
 H\* H<sub>i</sub> high rise 'interrogative'  
 H\* }<sub>i</sub> (plain) rise 'continuative'

- c. French downstep rule:

H\* → !H\* / H... (L<sub>i</sub>)

But why not treat !H\* as L\* ?

1. L\* would be purely allophonic
2. A downstep rule is needed for French H\* sequences anyway
3. !H\* is not realised near the bottom of tonal space, it does not 'sound low'

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## References

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