

Investigating the intonational phonology of Tamil*

Background

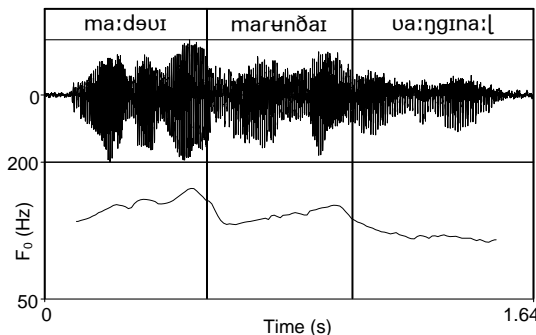
Tamil is a Dravidian language, spoken predominantly in the Indian state of Tamil Nadu. Last available Census of India figures (1991) indicate 53 million speakers within India; there are also large Tamil-speaking communities elsewhere, including Sri Lanka, Malaysia and Singapore.

Tamil has a long history as a written language, with a native tradition of grammatical analysis dating back at least as far as the early centuries AD (*Tolkāppiyam*). It was also one of the first South Asian languages to come to the attention of western scholars.

Intonation

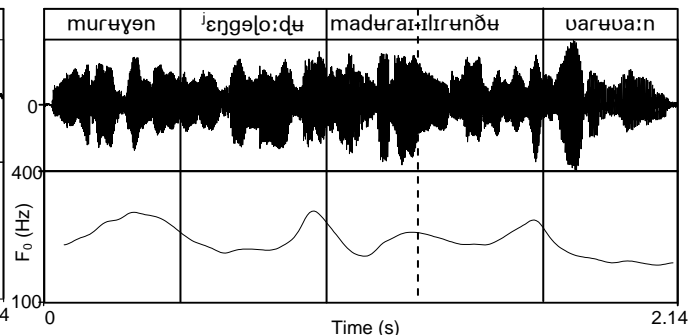
Examples of typical f_0 traces for declarative sentences:

Figure 1: Amplitude waveform and f_0 contour



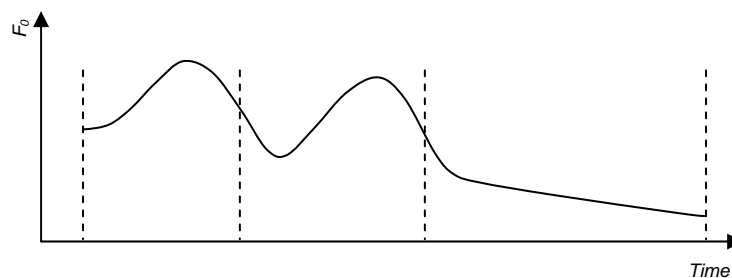
Maadavi marundai vaanginaal.
 Madavi medicine buy.past.3sf
 'Madavi bought medicine.'

Figure 2: Amplitude waveform and f_0 contour



Murugan eygaloodu Madurai-ilirundu varuvaan.
 Murugan we.assoc Madurai.abl come.fut.3sm
 'Murugan will come with us from Madurai.'

Figure 3: Schema of typical f_0 contour for 3-word declarative sentence (dashed lines mark word boundaries)

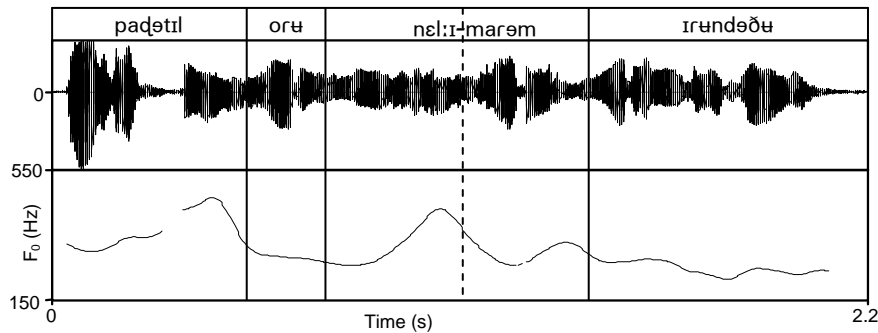


Distribution of (fall-)rise-falls

Typically each word except the last in the phrase bears a (fall-)rise-fall but ...

- some words simply have a gradually declining f_0 trace, particularly function words, e.g. *oru* 'a' in figure 4
- morphologically complex words may have a double fall-rise-fall, e.g. *nelli-maram* 'Indian gooseberry (type of tree)' in figure 4, also *Madurai-ilirundu* 'from Madurai' in figure 2
- phrase-final nouns may bear a fall-rise-fall, e.g. *valaiyam* 'bracelet' in figure 5

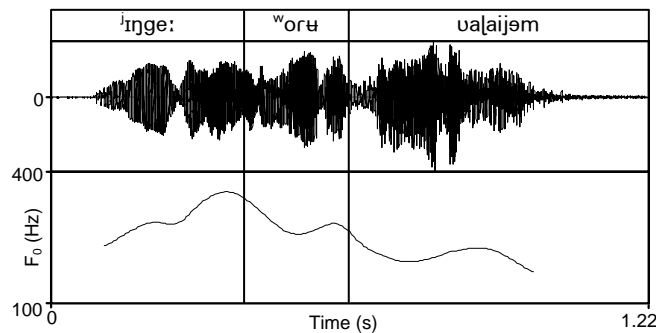
*The support of a British Academy Overseas Conference Grant is gratefully acknowledged.

Figure 4: Amplitude waveform and f_0 contour

paḍattil oru nelli-maram irundadu.

picture.loc a type-tree be.past.3sn

'In the picture there was an Indian gooseberry (type of tree).'

Figure 5: Amplitude waveform and f_0 contour

iṅge oru vaḷaiyam

here a bracelet

'Here is a bracelet.'

Phonological characterization of (fall-)rise-falls

A first pass: LH pitch accent assigned post-lexically (there are no minimal pairs distinguished by pitch, and the same lexical item can occur with and without a fall-rise-fall).

Position of lexical accent in Tamil?

- no minimal pairs distinguished by stress
- native speakers have no strong intuitions about which syllable, if any, is stressed (Balasubramanian 1980)

... but word-initial syllables in Tamil are special in some respects:

- evidence of weak phonetic prominence
 - qualitative vowel reduction – tokens of /a/, /i/ & /u/ have significantly different spectral characteristics from their counterparts in non-initial syllables (Keane 2003)
 - duration – some indications that vowels in initial syllables are longer than their counterparts in non-initial syllables (Keane 2003 but cf. Keane 2006b), but no evidence that the vowels of initial syllables are significantly louder (Keane 2006b, in line with Balasubramanian 1972)
- distributional asymmetries – greater range of vowel contrasts found in initial syllables than elsewhere in the word

The low f_0 turning-point occurs consistently within the word-initial syllable (Keane 2006b, 2007), so it seems reasonable to designate the low tone with a star, i.e. L*.

Possible points of reference for the H tone:

- preceding L tone, i.e. H would be the trailing tone of a bitonal L*H pitch accent
- the end of the word/morpheme, i.e. H would be associated with the boundary of a low-level phonological constituent (maximally the prosodic word)

The predicted consequences for its phonetic alignment are not entirely clear: the suggestion that a trailing tone may be separated from the starred tone by 'a given time interval' (Pierrehumbert 1980) has been challenged (e.g. Arvaniti, Ladd & Mennen 2000; Dilley, Ladd & Schepman 2005).

Hypothesis under test (Keane 2007): if H is a boundary tone, the distance between the low and high turning-points will increase as word length increases, cf. if H is a trailing tone, the high turning-point will stay further forward in the word.

Results: not entirely conclusive, although more support for H being a boundary than a trailing tone.

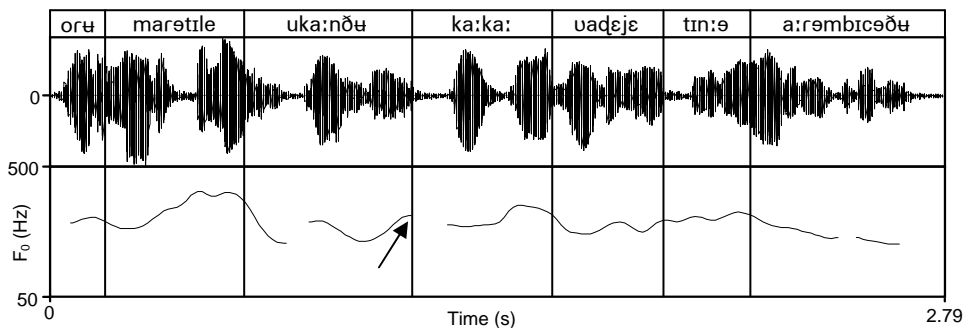
Phrase-final intonation

Typically the phrase-final constituent of a declarative has flattish or gradually declining f_0 (see figures 1, 2 & 4), consistent with an L% boundary tone.

Clear final rises, reflecting an H% phrase-boundary tone, are found in contexts including:

- continuation rises in the middle of an utterance, as indicated by the arrow in figure 6

Figure 6: Amplitude waveform and f_0 contour



oru marattile ukkarndu, kaakkaa vadaye tinna aarambiccatu
 a tree.loc sit.vbp crow vadai.acc eat.infin begin.past.3sn
 'Having sat in a tree, the crow began to eat the vadai (savoury doughnut).'

- some types of interrogative – echo questions, tags and some yes-no questions, but not usually in *wh*-questions

Sentence offset f_0 is significantly higher in *wh*-questions than in the corresponding declaratives (Keane 2006a).

Some outstanding issues

- scaling – appears to play an important role in signalling relative semantic weight, e.g. f_0 peaks are raised in question words (Keane 2006a)
- focus – relative part played by intonation vs. focus particles

Methodology

Intonational database collected in the field in Tamil Nadu, modelled in part on the IViE database of British English dialects (<http://www.phon.ox.ac.uk/IViE/>).

Other languages have significant regional variation in intonation (Gilles & Peters 2004) and Tamil is probably the same, so speakers were selected to be maximally homogeneous.

Speakers:

- 24 (half male, half female)
- 15 to 17-years-old
- lifelong residents of Madurai (city in southern central Tamil Nadu)
- all spoke Tamil in the home
- recorded in same-sex pairs within schools

Database design:

- set of 137 sentences designed to investigate three issues:
 - alignment (Keane 2007)
 - interrogativity - *wh*- (Keane 2006a), echo, tag and yes-no questions (partially analysed)
 - focus (not yet analysed)
- short story (*Teru Viḷakku* 'The street light' by Pudumaippittan)
- questions and answers - translations of materials used in a crosslinguistic study of deaccenting (Cruttenden 2006)
- fable (*Kaakkaavum Nariyum* 'The crow and the fox')
- retelling of the fable
- Tamil version of the map task (Brown et al. 1983)
- free conversation on a given topic (marriage customs for the girls, cricketing heroes for the boys)

A tricky issue...

Diglossia - there are significant differences in syntax, lexis, morphology and even segmental phonology between formal and colloquial Tamil (e.g. Britto 1986). Contexts of usage include:

- formal Tamil - news broadcasts, church liturgy, public meetings, etc. and writing
- colloquial Tamil - everyday oral communication. There are no standards for writing it down.

The challenge: eliciting any kind of controlled speech in colloquial Tamil.

Previous (largely unsuccessful) tactics:

- present speakers with a text in standard spoken Tamil (Schiffman 1998) and tell them to use it only as a guide (Keane 2006c)
- ask speakers to respond to a pre-recorded question on the basis of a picture, thus avoiding a written representation altogether (Asher & Keane 2005)

More successful tactics:

- using younger speakers
- recording in a familiar environment, with the presence of a class-mate
- using a graded sequence of tasks, with those designed to elicit colloquial speech at the end

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