Functions of Short Narrow-Pitch-Range Regions in Native and Non-Native English Dialog

Second-language learners find it hard to acquire native-like prosody. They may be taught aspects of segmental, lexical, and syntactic prosody, but for dialog-related prosody typically only a few well-understood patterns, for example for greeting and for focus. We are beginning a systematic investigation of English dialog prosody, and here report our first results.

Specifically, we describe how natives and learners use the "Bookended Narrow-Pitch Construction." This we discovered bottom-up, by applying Principal Components Analysis to a set of 78 prosodic features that characterize ongoing local prosodic activities, over 270,000 samples taken from 45 minutes of dialog data. This pattern is in the top ten in terms of variance explained, and is common in both native and learner data, both in isolation and in conjunction with other prosodic patterns.

This pattern includes three components: First a fairly loud region with wide pitch range and fast speaking rate; then a region of narrow pitch range lasting at least about 400 milli-seconds, often in creaky voice; then a region with wider pitch range. The initial wide-pitch region can be performed by either speaker.

To investigate the uses of this pattern, we examined places in dialog where it was strongly evident, as determined by an automatic process that scored the presence of the components. We did this for two sets of dialogs, one of native-native dialogs and one of learner-learner dialogs. The learners were all native speakers of Spanish. Each set had 40+ minutes of data, 4 dialogs, and 8 total speakers, all students. We examined the top 20 places in each set, noting the pragmatic functions that this pattern appeared with.

English-native speakers used this construction for three functions: in order of frequency: a) expressing a contrast to what came before (example 1), b) complaining (example 2), often with a relatively shorter narrow-pitch region, and c) expressing grudging appreciation when evaluating using personal knowledge (example 3).

The non-native speakers exhibited the same 3 uses, but contrast was much rarer and complaints more frequent. Complaints were often saliently different, culminating with a loud and lengthened syllable with nasalization and a high, convex pitch (example 4), which can sound whiney in English. Some non-native speakers in addition used narrow pitch range when d) proposing a course of action (example 5). However other non-natives appeared to use the bookended-narrow pattern only rarely.

Looking for possible L1 influences, we processed two Spanish-language dialogs and examined the 10 locations that best matched this pattern. These, matches, however, mostly appeared to reflect accidental conjunctions of unrelated features, without meaning, and this may explain why some learners seemed to have difficulty with this pattern: it is unfamiliar, phonetically, in their native language and thus probably hard to even notice. Also, we suspect that the convex-ending variant form results from superposing a sympathy-eliciting L1 pattern that dovetails with the bookended narrow pitch in both form and function.

In summary, this method enabled us to identify previously undocumented form-function prosodic mappings in English, and non-native speaker usage differences. We plan to use it to examine the other constructions of English.

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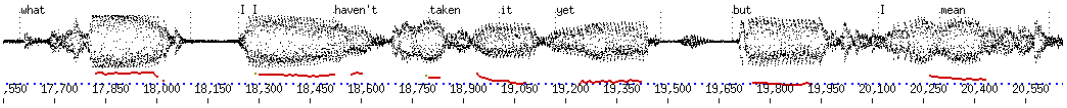
Example 1 (utep-social-04-right@267)



The speaker is using reduced pitch range from about 19.200 seconds to 20.000 seconds, as seen by the red pitch line. This occurs after the interlocutor has implied that she thinks the speaker has taken the class already.

To save space, below we indicate the region of reduced pitch range by underlining, like this:

left speaker: that's so interesting, huh
right speaker: what? I, I haven't taken it <u>yet, but.</u> I mean, the

Example 2 (utep-social-00-left@135)
left speaker: it's annoying <u>how much</u>, um, homework is given

Example 3 (utep-social-08-left@493)
right: alright
left: I mean, it, it does like, <u>it does everything</u>. As far as I've seen.

Example 4 (utep-social-15-right-9:34)
tsk <u>I guess so.</u> Matrix algebra, what's **that** (lengthened, high, and concave in pitch)

Example 5 (utep-social-19-right-10:04)
Okay. Tsk. So, <u>let's start</u> working.

Audio for these examples is available at www.cs.utep.edu/nigel/narrow-pitch/

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