

English Intonation from a Dutch Point of View

N.J. Willems

Eindhoven, the Netherlands

1. Introduction

This paper presents a short account of an experimental-phonetic investigation, described in full in Willems (1982), which attempts to characterize and describe the melodic (intonational) aspects of non-nativeness in English pitch contours produced by Dutch native speakers, with the aim of developing a course of melodic pronunciation precepts for Dutch students of English.

Up to now the teaching of British English intonation in the Netherlands has either been neglected or largely restricted to repeated imitation (drill-method). One of the very drawbacks of this drill method is that students are incapable of generating new instances, since they will not acquire any insight into underlying rules.

Instead of drill methods it could be more profitable to make students conscious of intonational structures of the target language by providing them with an explicit experimentally based description in the form of a rule based intonation course and by training them in analytic listening to pitch phenomena.

Our working method is largely based on the pioneering intonation research of the 'Dutch school' (Cohen and 't Hart, 1967), which describes quasi-continuous pitch contours as sequences of discrete stylized pitch movements (straight-line approximations), the perceptual relevance of which has been established in listening tests.

2. Acoustic measurements of fundamental frequency curves

An extensive comparison was made between about 600 instrumentally analysed fundamental frequency curves produced by a dozen speakers of either language, who were asked to read out an English prose text. Electroglossographic signals were recorded and were subsequently analysed by means of a computerized F_0 -analysis program. The following properties of the pitch movements were established: direction, magnitude, slope, duration and position of the pitch movement with respect to vowel onset.

The analysis showed that pitch contours in English can adequately be described by means of three parallel declination lines (low-mid-high). For most contours a full range of 10 to 14 semitones was found.

The Dutch native speakers showed in their English the following major systematic deviations from the corresponding manifestations of pitch movements produced by the native speakers of English:

1. The Dutch native speakers (DNS) replaced more than one tenth of the falls produced by the English speakers (ENS) by a simple rise.
2. The size of the pitch movements produced by the DNS was considerably smaller in most cases.
3. DNS tended to exaggerate a final rise.
4. A gradually rising pitch movement (inclination) on unaccented words preceding a fall was often lacking in the case of the DNS.
5. By and large the ENS started an utterance on the mid level, whereas DNS showed a clear tendency to start at the low level.
6. Following a prosodic boundary ENS often resumed a contour by a virtual jump from the low level to the mid level (reset). The DNS tended to use the low level again.

3. Perception experiments

In these tests we have tried to avoid interferences from deviations other than those in pitch by asking subjects to evaluate only sentences produced by English native speakers with artificially imposed variations in pitch contours.

In our first perception test we used a synthetic speech sample. English listeners were asked to assess the acceptability of stepwise variations in magnitude of the excursion and position of the pitch movement in the syllable with respect to vowel onset. The outcome of this experiment showed that the preferred size for the averaged excursion of English pitch contours should be at least twice as large (12 semitones) as the standard excursion used for Dutch (4-6 ST). The position of the most common English pitch movement, a prominence-lending fall, was found to be early to mid in the syllable (0-150 ms after vowel onset). In a second perception test the perceptual relevance of the deviations brought to light by the instrumental analysis was established by experimentally manipulating the original pitch contours.

These contours were stylized and superimposed on utterances produced by the native speakers of English by means of LPC-resynthesis. The outcome of this experiment showed that linguistically naive English native speakers were quite capable of judging the acceptability of native language pitch contours and of making clear distinctions between correct and incorrect contours: two groups participating in our experiments - students and office employees - agreed overwhelmingly and scored in a very consistent way. Moreover the English native speakers considered the stylized versions of original pitch contours to be very acceptable, which means that the stylization method is also suited to describe British English intonation.

Deviations in pitch movements which were nearly always considered to be unacceptable were a reverse direction (mainly replacement of the characte-

ristic English pitch falls by rises), too small an excursion, and a combination of the two. The English mid level may be taken as a 'neutral' starting and restarting point for the majority of the contours and appears to be a striking characteristic of English intonation. Nevertheless deviations of the Dutch native speakers at this point, who tend to start and continue at the low level, did not appear to be conspicuous in all cases. Also the omission of a gradual rise (inclination) was not always considered to be unacceptable by the English subjects.

In a final experiment we corrected the pitch movements produced by a Dutch speaker of English according to a few provisional precepts mainly with respect to direction, excursion and restarting level. Results showed high acceptability scores for the corrected contours, suggesting the potential effectiveness of the pronunciation precepts.

4. Discussion: towards an intonation course

From our experiments, specifications for the realization of the most frequent 'tone group' in English, tone 1 (Halliday, 1970), have come to the fore. The 'main' pitch accent (nucleus) is realized by means of a full fall varying from about 8 to 20 semitones, or, in our standardized three level system, by a fall of 12 ST. This fall must start early in the syllable. figure 1 presents a few possible realizations of tone 1, with one and with two accents.

Our results suggest that continuation of this study will allow the design of an intonation course for British English. In contrast with most existing English intonation courses, the instructions in this course would be based on experimental evidence and as such stand a better chance of representing an explicit and consistent survey of the language's melodic structures. Moreover the notational system of straight-line contours is straightforward and easy to comprehend (cf. figure 1). The results obtained by van Geel (1981) with such a course for Dutch intonation by Collier and 't Hart (1981) proved most promising. His subjects - laryngectomees using an electrolarynx with semi-automatic pitch control - were made aware of pitch contours in their native language (Dutch) by means of this course and were found to be quite able to produce acceptable pitch contours by triggering the built-in pitch movements at the right moment.

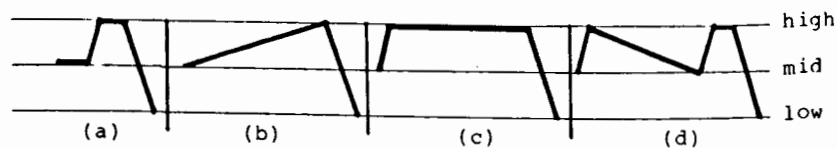


Figure 1. Examples of possible realizations of tone 1: (a) one accent: a fall with an optional half rise (b) one accent: a fall with a preceding gradual rise (c) two accents: half rise and fall; high declination in between (d) two accents: half rise, followed by an optional half rise and a fall, and a gradual fall in between.

The success of the stylization method for English gives reason to have every confidence in a similarly profitable effect of such a course for learners of English in general.

Acknowledgements

This study was carried out at the Institute of Phonetics, Utrecht University, and was funded by its Faculty of Arts.

References

- Cohen, A. and J. 't Hart (1967). On the anatomy of intonation. *Lingua*, 19, 177-192.
 Collier, R. and J. 't Hart (1981). *Cursus Nederlandse intonatie*. Acco, Leuven.
 Geel, R.C. van (1981). Intonatie in kunstlarynxpraak. *Logopedie en Foniatrie*, 53, 315-319.
 Halliday, M.A.K. (1970). *A course in spoken English: intonation*. Oxford University Press, Oxford.
 Willems, N.J. (1982). *English intonation from a Dutch point of view*. Foris, Dordrecht.