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# INTRA-SYLLABIC PITCH MOVEMENT IN COMMUNICATIVE AUSTRALIAN ENGLISH UTTERANCE MORPHEMES

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One of the fundamental characteristics of M. A. K. Halliday's system of describing British English (RP) intonation is a recognition of pitch movement as a feature of intonation.<sup>1</sup> All of the five tones of his primary system, and most of those of his secondary systems, exhibit pitch movement of some kind. Halliday moreover relates the description of intonation to that of rhythm; but rhythm is for him a complex conception, resting on a distinction between 'strong' and 'weak' syllables, where strength and weakness depend not merely on intensity. What in British English are usually called "four degrees of stress" are rather "structurally identified syllable classes whose exponents are marked by contrast not only (if indeed at all) in intensity but also in pitch and duration." Halliday also recognizes that intonation may be grammatically (and therefore meaningfully) relevant.

Early descriptions of American English intonation are in general based upon the recognition of relative contrastive pitch levels, termed 'tonemes', and terminal contours. The description of intonation is related to other phonological characteristics — rhythm, pause, length and tempo of articulation.

The recognition of relative contrastive pitch levels is useful to the linguist for describing intonation. Too great emphasis upon it may tend to obscure the important phenomenon of pitch movement. This is evident in the hypothesis of Trager and Smith that "pitch as used in language is heard around a limited number of points rather than as a continuum".<sup>2</sup> Trager does indeed, after recognizing four pitch phonemes, admit the existence of "variations within" the four levels of pitch, which he terms allophones and describes by means of diacritic symbols.

How can instrumental analysis elucidate the problems of the auditory linguistic analysis of intonation, in relation to loudness and length? How is the auditory perception of these complex features related to the communication of meaning?

The investigation of these problems for the purposes of this paper was confined to the study of the prosodic features of phonemic syllables constituting monosyllabic

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<sup>1</sup> M. A. K. Halliday, "The Tones of English," *Archivum Linguisticum*, 15, 1 (1963), 1—28.

<sup>2</sup> G. L. Trager and H. L. Smith, *An Outline of English Structure* (Washington: American Council of Learned Societies, 1957. Original edition, 1951), p. 41.

utterance and sentence level morphemes in continuous communicative utterances spoken at normal conversational tempo (e.g. affirmatives such as *yes*, introducers such as *oh*, and intensifiers such as *pretty*), and to certain simple phrasal combinations in which these occurred (e.g. *pretty good*).<sup>3</sup> These items were particularly suitable for the purpose, because they were more easily segmentable from the continuous communicative utterances in which they were studied, and because they are characteristically intonation bearers.

After a rigorous grammatical and lexical analysis of all the utterances, an auditory analysis of the pitch, loudness and length characteristics of the particular items in their utterance phonological setting was made. Finally, an acoustic frequency-intensity-duration analysis was made, and the results of the auditory and acoustic analyses were compared.

The apparatus used was an IDFF (Intensity-Duration-Frequency of Fundamental) Analyser. This presents a simultaneous display of the acoustic characteristics of an utterance up to 2.5 seconds in length, measurable by scales, and precisely identifiable with respect to the successive phonetic segments to which they relate. The use of this apparatus helps the linguist to observe and measure all the acoustic features other than formant structure which are operative in a complex speech signal at a given time.

The following is a summary of the conclusions reached:

(a) The acoustic displays indicated that frequency variation was general (with few exceptions) in the monosyllabic morphemes studied, even in those with very short syllables. This variation was auditorily perceived in syllables of more than 0.09 sec. duration, provided that the frequency change was sufficient to effect an auditory contrast in pitch. In syllables of less than 0.09 sec., and in those in which the frequency variation was not sufficient to effect contrast, the auditory perception was of a single pitch level.

(b) In long syllables the range of frequency was great. The auditory perception of this corresponded generally to the frequency pattern. Certain characteristic pitch patterns were observed: rising, falling, rise-fall, fall-rise, and rise-fall-rise.

(c) These patterns were communicatively significant, because they affected the meanings of the words as constituents of the grammatically structured utterances. The pattern of *Oh yes*, for example, (rise-fall-rise, fall-rise, with peak level corresponding to 300 Hz), signalled dubious assent by the speaker to the utterance of the previous speaker. The pattern of the same words *Oh yes* (rise-fall, rise-fall, with peak level 275 Hz.) signalled polite agreement with the utterance of the previous speaker.

Certain predicative phrases consisting of an intensifier and an adjective were found to have a characteristic pitch pattern. In *pretty good* a fall on *pretty* was followed

by an intra-syllabic rise on *good*. The auditory pattern agreed here with the acoustic data.

(d) Pitch appeared to be the definitive factor in auditory prominence in these morphemes. Auditory prominence corresponded well enough with frequency variation (with the modifications noted above). It often did not correspond with intensity variation. In one occurrence of *yes* (decisive agreement) a sharp contrastive frequency fall co-occurred with a sharp contrastive intensity rise.

These observations suggest that intra-syllabic pitch movement is a characteristic of spoken Australian English in certain monosyllabic words, and that it is sometimes relevant to the communication of meaning. Charting of intonation contours by using pitch levels as contour points remains a useful auditory analytical procedure. However a system of auditory analysis which concentrates upon observing levels only may not present the full facts of the language. Auditory perception does not correspond always with acoustic evidence. Instrumental displays are however most useful in helping the linguist to realize the acoustic complexity of the speech signals, and in thus elucidating the phenomena of auditory perception.

<sup>3</sup> A recent relevant article is W. F. Klatt, "Sentence morphemes in English," *CJL*, 12, 2 (1967), 90-96.