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Phonetic realization of focus in English declarative intonation

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Abstract

The present study investigates how focus is phonetically realized in declarative sentences in American English. The goal is to test the hypotheses that, (a) focus is manifested *in parallel* rather than *in alternation* with other intonational functions, and (b) every syllable in a sentence is associated with a local pitch target. Eight native speakers of American English recorded short declarative sentences with narrow focus at different locations or without any narrow focus. Detailed f_0 analyses reveal that a narrow focus is realized by expanding the pitch range of the on-focus stressed syllables, suppressing the pitch range of postfocus syllables, and leaving the pitch range of prefocus syllables largely intact. Focus is not found, however, to determine the presence or absence of f_0 peaks. Data analyses also reveal evidence for the presence of a local pitch target in every syllable. These findings are incompatible with conventional theories of English intonation. As an alternative, the Parallel Encoding and Target Approximation (PENTA) model is considered. The model defines and organizes the intonational components in terms of function rather than form. It also assumes target approximation rather than interpolation as the basic articulatory mechanism of f_0 contour generation. It is argued that the approach used in the PENTA model, which takes account of both communicative functions and articulatory implementation, may provide a coherent account of detailed f_0 contours in English.

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1. Introduction

> Ordinarily, when we speak of stressing something, we refer to giving it special emphasis. But it is misleading to think of the stressed syllable of a word as something that is regularly more emphatic than the other syllables. Rather, that syllable is the one that will get the special emphasis whenever the word is emphasized. (Bolinger, 1986, p. 14)

Focus, which is equivalent to emphasis in the above quote, is a communicative function known to be mainly manifested through f_0 variations (cf. Ladd, 1996 and references therein). The quote by Bolinger expresses a widely received view about how focus is realized in English intonation: *It gives prominence to the syllables that are lexically stressed, primarily by assigning them a pitch accent*. The present study is designed, as its primary goal, to reevaluate this view. The secondary goal, which is necessitated by the first, is to understand the detailed f_0 contours and their alignment with segmental materials as related to focus. We will start with a brief overview of how focus is treated in the two most influential theoretical frameworks of English intonation: the British nuclear tone tradition and the American autosegmental-metrical (AM) framework, both of which share Bolinger's view about emphasis as quoted above.

1.1. The nuclear tone tradition

In the nuclear tone tradition (Crystal, 1969; O'Connor & Arnold, 1961; Cruttenden, 1997; Palmer, 1922), to analyze the intonation of an utterance, for each intonation group a nucleus is first identified as "the stressed syllable of the last prominent word in a sense group" (O'Connor & Arnold, 1961, p. 271). While a variety of nuclear tones have been described, the one most closely related to focus in short declarative sentences is the high-fall (Cruttenden, 1997, p. 51), also known as the High Fall (O'Connor & Arnold, 1961, p. 13). The f_0 contour in the syllable following the nucleus is referred to as the tail (O'Connor & Arnold, 1961), or nuclear tail (Crystal, 1969), or simply as part of the nuclear tone (Cruttenden, 1997). Beside the nucleus and tail, pitch accents before the nucleus are also identified "by an obtrusion of the pitch on one syllable from the pitch on surrounding syllables…" (Cruttenden, 1997, pp. 47–48). These accents are referred to as either the prenuclear accents (Cruttenden, 1997) or the head (Crystal, 1969; O'Connor & Arnold, 1961). A declarative sentence with a narrow focus is therefore described as having a high-fall nucleus, a low flat tail and an unspecified head and/or prehead.

1.2. The AM theory

In the AM theory, unlike in the British tradition where nuclear tones are often described as contours, intonation is described in terms of two level tones—H and L (Beckman & Pierrehumbert, 1986; Ladd, 1996; Pierrehumbert, 1980). It is also assumed that pitch accents, which consist of either a single tone or two successive tones, are "phonologically located on metrically prominent syllables" (Pierrehumbert, 2000, p. 20). Unlike the British tradition which generally recognizes only sense groups (O'Connor & Arnold, 1961), intonation-group (Cruttenden, 1997) or tone-unit (Crystal, 1969), the AM theory assumes that there are two levels of phrasing in English intonation: the intermediate phrase and the full intonational phrase.