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BOUNDED PROJECTION: THE EFFECT OF PROSODIC PHRASING ON FOCUS INTERPRETATION

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0. Introduction¹

It is well-known from studies of languages other than English that focus can affect the grammatical possibilities of prosodic phrasing for an utterance. I argue here, based on the results of a comprehension experiment for English, that the reverse can also hold true: the prosodic phrasing of an utterance can affect the interpretation of focus. Specifically, I claim that prosodic phrasing blocks the projection of focus, limiting focus to material in the prosodic phrase which contains the focusing pitch accent. I shall refer to this as the *bounded projection* effect.

The bounded projection effect may appear to be a counterexample to a phonological analysis such as in Truckenbrodt (1995) that claims there is no direct connection between focus and prosodic phrasing. However, I show that the comprehension facts can be accounted for through a parsing explanation and thus do not necessarily challenge his grammatical analysis.

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I further show that the bounded projection effect falls out from independently motivated parsing principles if we employ a model of sentence comprehension which makes use of the prosodic hierarchy, but that the bounded projection effect is not easily accounted for under different assumptions about the role of prosody in sentence comprehension.

1. Phonological Background

I will employ a prosodic hierarchy for English in which each utterance is composed of one or more intonational phrases, each intonational phrase is composed of one or more intermediate phrases and ends with a high or low boundary tone (H% or L%), each intermediate phrase contains one or more pitch accents and ends with a high or low phrase accent (H- or L-), and pitch accents can be high (H*), low (L*), or a combination of high and low (e.g., L+H*) (Pierrehumbert 1980, Beckman & Pierrehumbert 1986, Pierrehumbert & Beckman 1988).

I will assume that arguments which present new information must be accented (Selkirk 1984) with an appropriate pitch accent (Pierrehumbert & Hirschberg 1990), such as an H*. I will also follow Selkirk's theory of focus projection (1984, 1995). In this theory, accented words are *F-marked*. F-marking can project from internal arguments to heads, from heads to phrasal nodes, and from NP- and *wh*-moved elements to their traces. The focus of a sentence is the F-marked constituent which is not dominated by any other F-marked constituent (1995 pp. 555, 561). Thus, production (1a), in which capitalization marks an H* pitch accent, can have focus as marked in (1b) - (1e), in which the accented word *potatoes* is F-marked, and the F-marking optionally projects to the NP, VP, or sentence.

- (1) Focus Projection:
- The farmer delivered some POTATOES.
 - The farmer delivered some [potatoes]FOC
 - The farmer delivered [some potatoes]FOC
 - The farmer [delivered some potatoes]FOC
 - [The farmer delivered some potatoes]FOC

2. Prosodic Phrasing and Focus

There are languages which require that a prosodic phrase be associated with focus. For example, in Chicheŵa (Kamrava 1990) the neutral phrasing of a VP, given in (2a), has just one prosodic phrase (marked with parentheses), but utterances of the VP with contrastive focus require a prosodic phrase break at the right edge of the focus, as shown in (2b - 2d). Other languages which require a prosodic phrase break at the edge of a

focused constituent include Bengali (Hayes & Lahiri 1991), Korean (e.g., Jun 1993), and Japanese (e.g., Nagahara 1994).

(2) The Effect of Focus on Phrasing in Chicheŵa:

- (Anaménya nyumbá ndí mwálá)FOC
hit house with rock
'He hit the house with a rock.'
- (Anaménya nyumbá ndí [mwálá]FOC)
'He hit the house with [a rock]FOC
- (Anaménya [nyumbá]FOC) (ndí mwálá)
'He hit [the house]FOC with a rock.'
- ([Anaménya]FOC) (nyumbá) (ndí mwálá)
'He [hit]FOC the house with a rock.'

English does not seem to require a prosodic phrase break at either the left or right edge of a focused constituent. Thus the sentence in (3), with narrow focus on *delivered*, is well-formed when produced as a single prosodic phrase, as in (3a), or when produced with a prosodic break at the left edge of the focus, as in (3b); at the right edge, as in (3c); or with breaks at both edges, as in (3d).

- (3) Phrasing Options for Focus in English:
- (The farmer [DELIVERED]FOC some potatoes)
 - (The farmer) ([DELIVERED]FOC some potatoes)
 - (The farmer [DELIVERED]FOC) (some potatoes)
 - (The farmer) ([DELIVERED]FOC) (some potatoes)

However, example (4) shows that prosodic phrasing and focus do interact in English. The response in (4), with accents on the subject and object, no accent on the verb, and a prosodic phrase break before the object, is intuitively unnatural as an answer to a VP-focus question. Example (5) shows that there is nothing inherently unnatural about the phrasing, as it is fine with an object-focus question.²

² Steedman (1991), working within Categorical Grammar (see his paper for details), notes the intuitive difference in acceptability between sentences like (4) and (5). He provides an account which can correctly rule out (4) and allow (5) but incorrectly allows question (i) to be answered with the contour in (ii) when the verb presents new information. Further, his system uses a reduced accent and tone inventory which, for example, incorrectly excludes the use of L+H* accents to mark new focal information. Thus, the article does not seem to provide a general account of focus and phrasing patterns in English.

(i) What happened to the potatoes?

H* L- L+H*L-L%

(ii) (The farmer delivered) (the potatoes)

