Lingua 121 (2011) 1923–1933

Contents lists available at ScienceDirect

Lingua

journal homepage: www.elsevier.com/locate/lingua

Prosodic effects on phrasing: Clash avoidance in Catalan

Pilar Prieto *

Institució Catalana de Recerca i Estudis Avançats, Universitat Pompeu Fabra, Spain

ARTICLE INFO

Article history:
Received 20 May 2009
Received in revised form 9 December 2010
Accepted 13 December 2010
Available online 17 February 2011

Keywords:
Clash avoidance
Prosodic phrasing
Accent placement
Catalan

ABSTRACT

This paper empirically investigates the effects of the presence of stress clash on phrasing decisions in Catalan. An interesting fact about Catalan phrasing, initially noted by Oliva (1992) and also reported by Prieto (2005a), is that the presence of a clash in this language can optionally trigger prosodic restructuring. Five native speakers of Central Catalan read 32 stress-clash and non-stress-clash sentence pairs at normal and fast speech rates, for a total of 320 utterances. The results clearly show that speakers adjust prosodic phrasing so that clash situations are avoided. Catalan speakers tend to get around stress clash by deleting the first stress in the clash and grouping the two words into one phonological phrase, thus avoiding potential prosodic breaks between the two words. This shows that the phonological construction of phonological phrases cannot rely exclusively on syntactic information, but rather that metrical structure needs to be accessible. All in all, this article offers empirical support for one of the predictions of metrical phonology, namely that languages tend to alternate between metrically strong and weak syllables and that stress clash situations are avoided crosslinguistically.

1. Introduction

One of the contributions of prosodic and metrical phonology has been to uncover a principle that seems to hold crosslinguistically, which is that the overall rhythmic pattern of utterances tends to be organized such that there is an alternation of strong and weak syllables (see, among others, Liberman and Prince, 1977; Hayes, 1980; Selkirk, 1984, 1986; Nespor and Vogel, 1986, 1989). In other words, languages tend to avoid strings of adjacent strong syllables, as well as strings of adjacent weak syllables. These generalisations are expressed by Selkirk's Principle of Rhythmic Alternation (Selkirk, 1984). This principle states that every strong position on a metrical level n should be followed by at least one weak position on that level, and, conversely, that any weak position on a metrical level n may be preceded by at most one weak position on that level.

It is also well known that when languages show rhythmic patterns that are not in conformity with the alternation principle (i.e., clash or lapse contexts) they tend to be resolved. Stress clash situations, for example, tend to be resolved crosslinguistically through the use of a variety of repair strategies. One of the strategies frequently used in English is the so-called **stress** or **accent shift**, also referred to as **rhythm rule**. This process applies when two stresses appear in adjacent or near-adjacent syllables, by moving the fist stress to an earlier full vowel within the word (e.g., *achromatic lens* > *achromatic lens*; *thirteen men* > *thirteen men*; Liberman and Prince, 1977; Prince, 1983; Selkirk, 1984; Gussenhoven, 1991; Shattuck-Hufnagel et al., 1994, among others; throughout this article, stressed syllables will be underlined). In Catalan, on the other hand, **destressing** and **deaccenting** of the first accent involved in the clash is the general strategy for clash repair (*deu nens* > *deu nens* 'ten children'; Oliva, 1992; Prieto et al., 2001; but see also Prieto,

* *E-mail address:* pilar.prieto@upf.edu.

0024-3841/$ – see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.lingua.2010.12.007

2005b for another strategy used in Catalan). This strategy has also been documented in Italian (Farnetani and Kori, 1983; Nespor and Vogel, 1989), and Spanish (Pamies Bertrán, 1994; Atria Lemaitre, 2009), as well as in Greek (Arvaniti, 1994). **Tonal repulsion** or **overlap** are two other options used by languages, a process that can be understood as an Obligatory Contour Principle effect: for example, the presence of competing rising pitch movements can be resolved by anticipation of the first gesture or delay of the second (Bruce, 1977 for Swedish, Silverman and Pierrehumbert, 1990 for English, Prieto, 2005b for Catalan; see also Nespor and Vogel, 1989; Helsloot, 1995 for Italian) or by a change in pitch accent type, such as two immediately adjacent pitch accents realized as a rising followed by a falling jump (see Helsloot, 1995 for Italian).

One of the goals of this paper is to expand our knowledge about how clash resolution may vary across languages, both in terms of the conditions that govern its applications, and its realization. On the other hand, we are specially interested in how the clash resolution strategies interact with sentence-level phenomena like pitch accent placement and phrasing decisions. One of the shortcomings of most descriptions of clash resolution strategies, also pointed out by Grabe and Warren (1995:96), is that most of the examples consist of two-word sequences which are concatenations of words in citation form prominence patterns, thus devoid of surrounding context. Except for very few studies, we do not find analyses of clash data at the sentential level. When stress clash *is* analyzed at the sentential level, it has been found that intonational prominence and phrasing are clearly intertwined with this stress clash. For example, Liberman and Prince (1977) pointed out that stress shift does not apply if the stress shift word is the terminal nuclear element of an intonational phrase. Similarly, Nespor and Vogel (1989) suggested that the domain of stress shift is the phonological phrase and that it does not apply across phonological phrase boundaries. For French, Post (1999, 2000) found that clash resolution is bounded by the phonological phrase, and moreover, that the optional application of clash resolution provides evidence for the restructuring of phonological phrases. She accounts for the French results in terms of interacting constraints that regulate accent placement (NoClash and Lapse), metrical prominence, and alignment constraints (regulating mappings between the syntactic and prosodic phrasing structures, as well as those between prosodic phrasing and metrical structures), and proposes that phrasing and accentuation are intimately related in French (see also Gussenhoven, 2004).

This article investigates experimentally one of the most common clash resolution strategies found in Catalan, namely destressing and deaccenting.[1] In a recent study, Prieto et al. (2001) demonstrated through a set of perception experiments that Catalan listeners show a high degree of perceptual confusion between sequences of two stressed syllables in a clash environment (e.g., *camí net* 'clean path') and other homophonous sequences with one final stress (e.g., *caminet* 'little path'). This demonstrates that Catalan uses a general clash resolution strategy that consists of a systematic destressing of the first syllable in the clash sequence. The upper panel in Fig. 1 illustrates the accent deletion phenomenon with the target utterance *El camí net és allà* 'The cleared path is there'. The example shows that the first stressed syllable in the clash environment is totally deaccented and lacks the presence of a rising pitch accent (L+H*). By contrast, the lower panel in Fig. 1 shows the phonetic realization of a near-minimal pair utterance with no clash, *La camisa neta és allà* 'The clean shirt is there'. In this case the first stressed syllable is produced with a rising pitch accent L+H*.

A very interesting fact about Catalan phrasing, initially noted by Oliva (1992) and also reported in Prieto (2005a), is that stress clash resolution plays an important role in phrasing decisions in this language. Recent work on Catalan phonology shows that although tonal repulsion is available as a stress clash resolution strategy in the language, the preferred option for resolving stress clashes is destressing or deaccenting of the first stress involved in the clash (Bonet and Lloret, 1998; Oliva, 1992; Prieto et al., 2001; Wheeler, 2005). In his study of Catalan phrasing, Oliva (1992:131) suggests that the presence of a clash can optionally trigger p-restructuring. The example in (2a) shows how the stress clash situation present in the first sentence (that is, between *comprarà* and *llibres*) is resolved by placing both words within the same phonological phrase (or p-phrase), thus allowing for the deletion of the first stress. By avoiding the stress clash situation, speakers show a clear preference for sentences with no clash, even if its resolution is not obligatory. By contrast, the example in (2b) shows that when the stress clash situation is not present (between *comprava* and *llibres*) there can be a phrase break separating the two target words.

(2) a. (*Comprarà llibres*) (*de sintaxi*)
'(S)he will buy syntax books'

b. (*Comprava*)ϕ (*llibres de sintaxi*)ϕ
'(S)he used to buy syntax books'

As we will see below, evidence for phonological phrasing in Catalan comes from stress/accent and intonation data (see Prieto, 2005a for further details). Catalan speakers place a prominent stress (what we will call p-phrase prominence) and an accent on the last tonic syllable of a p-phrase, and speakers produce an F0 continuation rise at the right boundary of a p-phrase, i.e., an H- boundary tone (Frota et al., 2007; Feldhausen, 2010). The two graphs in Fig. 2 illustrate the waveform, spectrogram, and F0

[1] Catalan can optionally resolve clash situations through tonal repulsion of two immediately adjacent prominent syllables (cf. Prieto, 2005b). In this case, the two pitch accents are phonetically realized and the first one is generally aligned earlier in time to the first syllable. It seems that speakers can make use of this option when they want to emphasize or highlight the two words. In Italian, it is also possible to have two directly adjacent accented syllables within the same phrase (Helsloot, 1995).