



Research Article

The role of prominence in determining the scope of boundary-related lengthening in Greek

Argyro Katsika*

Haskins Laboratories, 300 George Street, Suite 900, New Haven, CT 06511, United States



ARTICLE INFO

Article history:

Received 7 November 2014

Received in revised form

15 December 2015

Accepted 22 December 2015

Available online 16 February 2016

Keywords:

Prosodic boundaries

Boundary-related lengthening

Boundary-related shortening

Gestural coordination

Pauses

Articulatory Phonology

Greek

ABSTRACT

This study aims at examining and accounting for the scope of the temporal effect of phrase boundaries. Previous research has indicated that there is an interaction between boundary-related lengthening and prominence such that the former extends towards the nearby prominent syllable. However, it is unclear whether this interaction is due to lexical stress and/or phrasal prominence (marked by pitch accent) and how far towards the prominent syllable the effect extends. Here, we use an electromagnetic articulography (EMA) study of Greek to examine the scope of boundary-related lengthening as a function of lexical stress and pitch accent separately. Boundaries are elicited by the means of a variety of syntactic constructions. The results show an effect of lexical stress. Phrase-final lengthening affects the articulatory gestures of the phrase-final syllable that are immediately adjacent to the boundary in words with final stress, but is initiated earlier within phrase-final words with non-final stress. Similarly, the articulatory configurations during inter-phrasal pauses reach their point of achievement later in words with final stress than in words with non-final stress. These effects of stress hold regardless of whether the phrase-final word is accented or de-accented. Phrase-initial lengthening, on the other hand, is consistently detected on the phrase-initial constriction, independently of where the stress is within the preceding, phrase-final, word. These results indicate that the lexical aspect of prominence plays a role in determining the scope of boundary-related lengthening in Greek. Based on these results, a gestural account of prosodic boundaries in Greek is proposed in which lexical and phrasal prosody interact in a systematic and coordinated fashion. The cross-linguistic dimensions of this account and its implications for prosodic structure are discussed.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

1.1. Prosodic boundaries, boundary-related lengthening and its scope

The aim of this paper is to examine the scope of the temporal effect of prosodic boundaries, called boundary-related lengthening, to determine the role of lexical and phrasal prominence in it, and to develop a theoretical account that captures it. Prosodic boundaries are essential for organizing speech, chunking it into units adequate for speech processing (production and perception) and language acquisition. They emerge from *grouping*, one of the two main functions of *prosody*, which is the component of grammar that organizes speech by encoding *grouping* and *prominence* (cf. Fletcher (2010) for an overview). *Grouping* groups speech units together forming larger cognitive constituents. For instance, syllables are grouped together into words, words into phrases, and phrases into larger phrases. Prosodic boundaries usually separate constituents of the same type, like phrases from each other (see Selkirk (1996) for a proposal in which some boundaries separate constituents of different types). *Prominence* marks syllables within words (i.e., stressed syllables) and words within phrases (i.e., accented words) as rhythmically or conceptually important relatively to their non-prominent counterparts.

Standard phonological theories view prosody as a hierarchical structure, with grouping and prominence arising from this organization (e.g., Beckman & Pierrehumbert, 1986; Hayes, 1989; Nespor & Vogel, 1986; Selkirk, 1984). Lower-level constituents (e.g., words) are grouped together forming higher-level constituents (e.g., phrases). Although the number of levels that the prosodic hierarchy of a language has is debated, there is general agreement on the need for at least a minor and a major phrase above the word level (see Shattuck-Huganagel and Turk (1996) for an overview). Minor and major phrases are often referred to as *Intonational*

* Tel.: +1 203 865 6163x269; fax: +1 203 865 8963.

Phrases (IP) and *intermediate phrases* (ip) respectively, adopting the terms proposed by the Autosegmental-Metrical model of intonational phonology (Beckman & Pierrehumbert, 1986; Pierrehumbert, 1980). As for prominence, lexical stress (lexical prominence) is marked for most languages at the prosodic word level, and accentuation (phrasal prominence) is marked at the intermediate phrase level mainly via specific pitch movements called *pitch accents*. Viewed that way, the role of prosody can be rephrased as encoding hierarchies of groupings and prominences.

Prosodic boundaries are associated with spatio-temporal, tonal and pausal events that characterize their strength, specifying therefore their prosodic level and grammatical and communicative function. On the spatio-temporal domain, boundary-adjacent articulations are temporally longer both pre- and post-boundary (often referred to as *boundary-related lengthening*), spatially larger, especially the first articulation post-boundary (referred to as *strengthening*), and with the temporal intervals corresponding to their duration overlapping less with each other across the boundary as opposed to their non-boundary-adjacent counterparts (e.g., lengthening: Beckman & Edwards, 1992; Byrd & Saltzman, 1998; strengthening: Cho, 2008; Cho & Keating, 2001, 2009; Fougeron, 2001; Fougeron & Keating, 1997; Keating, Cho, Fougeron & Hsu, 2004; overlap: Byrd, 2000; Byrd, Kaun, Narayanan & Saltzman, 2000; Byrd & Saltzman, 1998). Acoustically, both phrase-final and phrase-initial segments are longer than phrase-medial ones (e.g., phrase-finally: Cooper & Paccia-Cooper, 1980; Klatt, 1975; Lehiste, 1973; Oller, 1973; Shattuck-Hufnagel & Turk, 1998; Turk, 1999; Turk & Shattuck-Hufnagel, 2007; Umeda, 1975; Wightman, Shattuck-Hufnagel, Ostendorf & Price, 1992; phrase-initially: e.g., Cho, McQueen & Cox, 2007; Klatt, 1975; Oller, 1973; Shattuck-Hufnagel & Turk, 1998; Tabain, 2003a). It is the magnitude of these spatio-temporal effects that marks boundary strength, since the effects increase cumulatively across the prosodic hierarchy, becoming larger the stronger the boundary (e.g., pre-boundary lengthening: e.g., Byrd, 2000; Byrd & Saltzman, 1998; Cambier-Langeveld, 1997; Cho, 2006; Tabain, 2003b; Tabain & Perrier, 2005; post-boundary lengthening: Byrd & Saltzman, 1998; Cho, 2006; Cho & Keating, 2001; Fougeron, 2001; Keating et al., 2004; Tabain, 2003b; pre-boundary strengthening: Fougeron & Keating, 1997; Keating, Wright & Zhang, 1999; Tabain, 2003b; post-boundary strengthening: e.g., Cho & Keating, 2001; Fougeron, 2001; Fougeron & Keating, 1997; Keating et al., 1999; Keating et al., 2004; Tabain, 2003b; overlap: Byrd, 2000; Byrd & Choi, 2006; Cho, 2004). The cumulative nature of boundary lengthening has also been detected acoustically (cf. Fougeron & Keating (1997), Keating et al. (1999)).

On the tonal domain, specific falling or rising pitch movements occur at the end of phrases belonging in high prosodic levels (cf. Silverman et al. (1992)). The ones associated with intermediate phrases are called *phrase accents*, and the ones associated with intonational phrases are called *boundary tones*, using the terms introduced by Autosegmental Metrical Phonology. Since the end of an intonational phrase (higher in the hierarchy) always coincides with the end of an intermediate phrase (lower in the hierarchy), a boundary tone is always preceded by a phrase accent. A subset of strong, phrase-level, boundaries might also include pauses. These are heard as silences. In terms of articulation, the small number of studies on the issue indicates that grammatical pauses (contrasted to ungrammatical ones, such as hesitations) involve articulatory configurations (Gick, Wilson, Koch & Cook, 2004; Katsika, Krivokapić, Mooshammer, Tiede & Goldstein, 2014, the latter being complementary study to the current one) with stable spatial and velocity characteristics (Ramanarayanan, Byrd, Goldstein & Narayanan, 2010; Ramanarayanan, Bresch, Byrd, Goldstein & Narayanan, 2009; Ramanarayanan, Goldstein, Byrd, & Narayanan, 2013) and which are regularly timed with respect to boundary tones (Katsika et al., 2014) (see Krivokapić (2014) for an overview).

Our focus here is on the scope of boundary-related lengthening, i.e., the temporal interval over which the effect extends pre- and post-boundary including pauses. Although the effect itself is broadly attested and its scope is considered not to vary with prosodic level (cf. Cambier-Langeveld, 1997; Katsika, 2009), the exact domain of the affected speech and whether and how this is affected by prominence (lexical or phrasal or both) is not well understood.

Pre-boundary, a large number of studies targeted phrase-final words of different number and structure of syllables in different languages and language varieties using different types of measures, such as acoustic or articulatory (e.g., acoustic studies: British English: Campbell & Isard, 1991; American English: Nakatani, O'Connor & Aston, 1981; Oller, 1973; Turk & Shattuck-Hufnagel, 2007; British English: White, 2002; Dutch: Cambier-Langeveld, 1997; Hebrew: Berkovits, 1993a, 1993b, 1994; Estonian: Krull, 1997; Greek: Katsika, 2009; articulatory studies (all on American English): Beckman & Edwards, 1992; Byrd, 2000; Byrd et al., 2006; Byrd, Lee, Riggs & Adams, 2005; Byrd & Saltzman, 1998; Edwards, Beckman, & Fletcher, 1991; Krivokapić, 2007a). The largest and most reliable part of boundary-related lengthening was detected on the rhyme of the phrase-final syllable. Moreover, the duration of that rhyme was found to be more important for perceiving prosodic boundaries in comparison to other candidates, such as the phrase-final foot (Wightman et al., 1992). Turning back to speech production, additional, but smaller, systematic effects were observed earlier than the final rhyme. In particular, lengthening extended to the onset of the final syllable when the final vowel was short (not a diphthong or reduced) (Cambier-Langeveld, 1997; Oller, 1973) or when lexical stress was not final (Oller, 1973). With respect to stress, there are additional indications that boundary-related lengthening could extend further away from the boundary, reaching the stressed syllable (e.g., Berkovits, 1994; Krull, 1997; Nakatani et al., 1981), even when the stress was more than two syllables away from the boundary (e.g., acoustics: Turk & Shattuck-Hufnagel, 2007; White, 2002; articulation: Byrd & Riggs, 2008). The limited research on the effect of remotely positioned stress on the scope of phrase-final lengthening so far is inconclusive. The effect yielded one domain of boundary-related lengthening extending from the coda of the stressed syllable to the boundary in British English (White, 2002), but two separate domains, naming the rhyme of the final syllable and the rhyme of the stressed syllable (with any intervening syllables remaining unaffected), in American English (Turk & Shattuck-Hufnagel, 2007 and replication by Rusaw, 2011, 2013; see also Shattuck-Hufnagel & Turk, 1998; Turk, 1999). It needs to be noted however that the amount of lengthening detected on the syllable intervening between the stressed and final syllables in British English was small (approximately 10 ms). Further research in American English via articulatory data found speaker-specific effects of stress on the scope of boundary-related

Download English Version:

<https://daneshyari.com/en/article/1100665>

Download Persian Version:

<https://daneshyari.com/article/1100665>

[Daneshyari.com](https://daneshyari.com)