

Glottalization as prosodic boundary marking in Central Italian

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Cross-linguistically, nonmodal phonation (in particular creaky voice) is commonly used to mark prosodic boundaries, either initially and/or finally (Gordon & Ladefoged 2001). This sort of allophonic glottalization has been documented, for example, in English (Pierrehumbert 1995, Dilley *et al.* 1996), German (Kohler 1994) and French (Fougeron 2001). Despite the exclusion of glottal consonants from traditional phonological accounts of Italian, a number of studies have noted that glottalization (here intended as creak, glottal stop or breathiness) often occurs in word-final stressed open syllables, generally before a phrase boundary or a pause (see Vayra 1994, van Santen & D'Imperio 1999, Stevens *et al.* 2002). Glottalization in this context is posited to result from: a) an enforcement of stressed syllable well-formedness, where a glottal consonant fills an empty “C-segment” coda position in final stressed syllables (Vayra 1994), and b) utterance-internal prosodic boundary marking (van Santen & D'Imperio 1999). In the present study the two possible sources of glottalization posited to date (syllable-level and phrase-level) are investigated separately.

In part I of this study, acoustic and laryngographic recordings were made of five native speakers of central Italian who produced three sets of near-minimal pairs for stress (e.g. *meta-meta* ‘destination’-‘half’). The target words appeared both in carrier phrases (1), which were designed to elicit the placement of a strong prosodic boundary immediately following the target, and in meaningful sentences (2), where the target words were elicited phrase-internally. For both conditions, two segmental contexts (following word vowel vs. consonant initial) were tested.

- (1) *Dico la parola meta/meta di nuovo.* ‘I say the word half/destination again.’
Dico la parola meta/meta a Gianni. ‘I say the word half/destination to Gianni.’
- (2) *Ho dato meta del mio panino a Gianni.* ‘I gave half of my sandwich to Gianni.’
Austin è la meta di chi ama sentire musica dal vivo. ‘Austin is the destination for those who love listening to live music.’

Glottalized segments were subsequently identified by examining the waveform produced by the laryngograph for irregular glottal cycles, as compared to the regular cycles of vibration in modal voice (see Marasek 1997). Support for labeling was sought in the acoustic signal as well, following work by Dilley *et al.* (1996) and Gordon & Ladefoged (2001).

Creaky voice was the most frequent form of glottalization found. Results show a main effect of a following phrase boundary on the glottalization of vowels in word-final open syllables, independent of both lexical stress and segmental context. Glottalization is also largely conditioned by the segmental context – a following vowel triggers glottalization of both stressed and unstressed vowels at a phrase boundary significantly more frequently than a following consonant. Glottalization as hiatus-breaking has previously been reported by Stevens *et al.* (2002). No main effect of stress was found, though there is a tendency for stressed vowels to glottalize more frequently than unstressed vowels, particularly before a consonant. This is perhaps due to a desire to block the cross-boundary application of *Raddoppiamento sintattico*, which otherwise triggers doubling of a word-initial consonant following a final stressed vowel. These results are in line with what has been suggested by Stevens *et al.* (2002), that is, that glottalization is not exclusively associated with final stress. It is the presence of a phrase boundary which correlates with glottalization, not word stress.

In part II of this study, the findings from analysis of laboratory speech are confirmed with evidence from semi-spontaneous speech in Map Task dialogues recorded in Rome and Florence from the CLIPS corpus (<http://www.clips.unina.it/it/index.jsp>). Data from four speakers of each variety were analyzed. Glottalization, again predominantly in the form of creaky voice, is found in both phrase-initial and phrase-final vowels, as well as utterance-finally, strongly suggesting that glottalization may be used to delimit phrases in central Italian.

To sum up, the results put forward in both parts of the present study suggest that glottalization is present in central Italian, and furthermore that it is conditioned by the presence of phrase boundaries, particularly in cases of hiatus.

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