The position of clitics in Persian intonational structure

Vahideh Abolhasani Zadeh1,2, Carlos Gussenhoven2,3, Mahmood Bijankhan1

1Department of Linguistics, University of Tehran, Iran
2Department of Linguistics, Radboud University Nijmegen, Netherlands
3School of Languages, Linguistics and Film, Queen Mary University of London, UK
vahidehabolhasani@yahoo.com, c.gussenhoven@let.ru.nl, mbjkhan@ut.ac.ir

Abstract

Persian clitic groups differ from words. Most importantly, a pitch accent (L+H*) is associated with the word-final (i.e. base-final) syllable of clitic groups, but with the word-final syllable of words, meaning that clitics remain outside the domain of the word. The pitch accent marks the stress, but we found no independent durational or spectral differences between stressed and unstressed syllables. Interestingly, the intonational distinction between words and clitic groups remains intact in the stretch of speech after the focus. Unlike Germanic. Persian post-focal words are accentuated, though pronounced with reduced pitch range. Index terms: clitic group, phonological word, prosodic hierarchy, focus, pitch range

1. Introduction

The aim of this paper is to introduce the clitic group (CG) as a level in the prosodic hierarchy of Persian. The hybrid nature of clitics, intermediate between affixes and words, is reflected in the phonology by assuming a distinct constituent between the phonological word, which groups affixes with stems, and the phonological phrase, which groups word with other words.

The motivation for assuming the CG is the assignment of a pitch accent to final syllables of phonological words. This rule skips right-edge clitics, but not suffixes. We illustrate this in (1a,b,c,d), where (1a) are two isolated words, (1b) two suffixed words, (1c) two words with a clitic, and (1d) a compound. As these data show, words and clitic groups remain intact in the stretch of speech after the focus. Unlike Germanic, Persian post-focal words are accentuated, though pronounced with reduced pitch range.

Index terms: clitic group, phonological word, prosodic hierarchy, focus, pitch range

1. Introduction

The aim of this paper is to introduce the clitic group (CG) as a level in the prosodic hierarchy of Persian. The hybrid nature of clitics, intermediate between affixes and words, is reflected in the phonology by assuming a distinct constituent between the phonological word, which groups affixes with stems, and the phonological phrase, which groups word with other words.

The motivation for assuming the CG is the assignment of a pitch accent to final syllables of phonological words. This rule skips right-edge clitics, but not suffixes. We illustrate this in (1a,b,c,d), where (1a) are two isolated words, (1b) two suffixed words, (1c) two words with a clitic, and (1d) a compound. As these data show, words and clitic groups remain intact in the stretch of speech after the focus. Unlike Germanic, Persian post-focal words are accentuated, though pronounced with reduced pitch range.

Index terms: clitic group, phonological word, prosodic hierarchy, focus, pitch range

1. Introduction

The aim of this paper is to introduce the clitic group (CG) as a level in the prosodic hierarchy of Persian. The hybrid nature of clitics, intermediate between affixes and words, is reflected in the phonology by assuming a distinct constituent between the phonological word, which groups affixes with stems, and the phonological phrase, which groups word with other words.

The motivation for assuming the CG is the assignment of a pitch accent to final syllables of phonological words. This rule skips right-edge clitics, but not suffixes. We illustrate this in (1a,b,c,d), where (1a) are two isolated words, (1b) two suffixed words, (1c) two words with a clitic, and (1d) a compound. As these data show, words and clitic groups remain intact in the stretch of speech after the focus. Unlike Germanic, Persian post-focal words are accentuated, though pronounced with reduced pitch range.

Index terms: clitic group, phonological word, prosodic hierarchy, focus, pitch range
Sadat Tehrani [11] described the AP-contour as the pitch accent L+H*. There are two allophones for this pitch accent: L+H* and H*, whereby L+H* is used for polysyllabic and H* monosyllabic APs. Information structure is claimed to be expressed by deaccenting APs after the focus constituent. The AP is ended by a boundary tone, which [11] notates as ‘h’ in the case of non-final (‘non-nuclear’) APs and as ‘1’ in the case of the last accented (‘nuclear’) APs. In broad focus sentences, the nuclear pitch accent is on the last AP, followed by ‘1’, and pre-nuclear accents appear on non-final APs, followed by ‘h’. This predicts that if an AP boundary tone lands on an unaccented AP-final syllable, which must be a clitic, the clitic has equal pitch or higher pitch relative to the preceding accented syllable, which has H* [11, p. 47].

4. The experiment

We composed a corpus of sentences featuring two minimal pairs contrasting a noun and a noun plus clitic combination. This pair of minimal pairs itself contrasted only in the voicing of the obstruent in the onset of the last syllable, which in the CG was the last consonant of the stem. These data form part of a larger corpus, in which more segmental conditions are included. Since no obvious quadruplets were available in the segmental condition we report on here, one of the four words pre-nuclear accents appear on non-final APs, followed by ‘h’. This predicts that if an AP boundary tone lands on an unaccented AP-final syllable, which must be a clitic, the clitic has equal pitch or higher pitch relative to the preceding accented syllable, which has H* [11, p. 47].

4.1 Results

Textgrids were produced in Praat [10] in which all segment boundaries were determined. Instead of establishing only the start of the closure duration and the end of the stop burst of plosives, the boundary between closure and burst was included as a segmental boundary, for both voiced and voiceless plosives. In the case of voiced plosives, this meant that we had burst intervals of zero duration in a number of cases. Initial plosives were only measured for their bursts, as no reliable indication of the beginning of the closure is available. An example of a TextGrid with wave form is shown in Fig. 1. As can be seen, we also included separate tiers for segments, words and clitics.

Figure 1. Praat textgrid for the noncliticized Un tabeš-e.
suggests that the difference is not due to inherent stress which might exist independently of the pitch accent, since lengthening due to stress typically occurs in all positions.

4.1.2 Centre of gravity

When the energy distribution in an area defined over some time window and frequency bandwidth is considered an object with mass, it will have a center of gravity (COG). The COG of a given segment is in a sense its mean frequency. For sonorants, the COG is related to spectral slope, whereby the steeper the slope, the lower is the COG. The measure is particularly useful for segments without well-defined formant structure, like those with voiceless friction[14]. COGs were calculated for [f] and the burst of [p]. Analyses of variance with the interaction with STRUCTURE (clitic vs nonclitic), MODE (declarative vs interrogative) and FOCUS (neutral, post-focal, focal) separately for [f] and [p/b]-burst yielded no significant effects.

4.1.3 Fundamental frequency

We report mean f0 for the clitic and nonclitic forms for neutral, post-focal and focal conditions for declarative and interrogative intonation separately. Fig. 4, 5 and 6 show the declarative condition, while Fig. 7, 8 and 9 do the same for the interrogative condition.
whereby the first syllable of the stem [təp]/[təb] has high pitch and the following clitic low pitch, evident in Fig. 4, is repeated in Fig. 5, but within a reduced pitch range. This suggests that the tonal structure is preserved after the focused Un, and that rather the phonetic realization is adjusted through pitch range reduction. Second, inspection of Fig. 6 confirms this in that the pitch of utterance-final, post-focal un is higher than the end of the preceding focal cliticized form. Since the latter ends low, and declaratives end low, the raised pitch between these two low targets must be due to a H-tone. This can only be the H* which is assigned to un on the grounds that it is an AP. Its realization, however, is affected by its post-focal status, as its pitch is some 60 Hz below that of the H*-bearing syllable [tə] in the cliticized form in Fig. 4, which is not post-final.

![Figure 7. Mean interrogative F0 contours for ‘Un’ (left) and in neutral ‘ta[b/p]eš-e’ (right) on normalized time scales (clitic: —, nonclitic:----).](image)

![Figure 8. Mean declarative F0 contours for ‘Un’ (left) and post-focal ‘ta[b/p]eš-e’ (right) on normalized time scales (clitic: —, nonclitic:----).](image)

![Figure 9. Mean interrogative F0 contours for focal ‘ta[b/p]eš-e’ (left) and ‘Un’ (right) on normalized time scales (clitic: —, nonclitic:----).](image)

The interrogative contours confirm both conclusions, as shown in Fig. 7 and 8 for the comparison of the contrasts in neutral and post-focal positions, since the post-focal differences (Fig. 8) are again reduced versions of the contrast in neutral position (Fig. 7). Second, what this set of interrogative contours suggest beyond this conclusion is that there is no L%, as the pitch remains high, but does not contain a H% either, as the pitch does not rise, and if anything falls a little, though not as much as in the declaratives. A third conclusion is that there no evidence of a H- tone after the non-final AP. Rather than rising, the F0 falls, most clearly so in the situation in which unaccented syllables appear before the non-final AP-boundary, as in the clitic case shown in Fig. 9. Thus, non-final APs have L-, which is not clearly pronounced when H*-toned syllables define the AP-boundary.

5. Conclusions
Suffixed and unsuffixed Persian words have a pitch accent on their final syllable. CGs distinguish themselves from words by not shifting the pitch accent onto the right-attaching clitic or clitics, thus leaving the pitch accent on the syllable before the first clitic. Our investigation into the realization of segmentally identical structures that differ in the presence of a word-clitic boundary (‘clitic’ and ‘non-clitic’ conditions) revealed that post-focally tonal structures remain intact, but their realization is with reduced pitch range. The tonal structures of both the neutral and post-focal conditions thus is as in (6a) for the word condition and (6b) for the clitic condition. In the interrogative, the L% is not there, which we indicate by %, shown in (7a) for the non-clitic and (7b) for the clitic condition. Representations of the focal cases is entirely parallel, but have un in final position.

(6) a. un’[b/eʃ-[ɛn]-[ɛʃ- eʃ]’
   un’[b/eʃ-[ɛn]-[ɛʃ- eʃ]’
   H* L- L+H* L-% H* L- H* L-%

(7) a. un’[b/eʃ-[ɛn]-[ɛʃ- eʃ]’
   un’[b/eʃ-[ɛn]-[ɛʃ- eʃ]’
   H* L- L+H* % H* L- H* %

6. Acknowledgements
This research is carried out with financial support from the Iran Telecommunication Research Center. We thank Joop Kerkhoff for technical assistance.

7. References