ASSIMILATION PHENOMENA IN THE DIALECT OF EPIRUS
THE CASE OF /S/-VOICING

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This study focuses on the assimilation phenomenon of /s/-voicing in the Greek dialect of Epirus. The phenomenon is present in Standard Modern Greek. A voiceless sibilant becomes voiced when it is followed by a voiced consonant as a result of a voice assimilation process. In this study /s/-voicing was examined not only across word boundaries, but also word internally in order to test the role of morphological boundaries in the application of assimilation. The results indicate that there is a relation between the boundary depth and /s/-voicing. Furthermore we will test the application of the assimilation in cases where $/s/+ C_{[+voi]}$ clusters are created as a result of vowel deletion, a well documented phenomenon in this dialect.

1. Introduction: Previous Research

A great number of assimilation phenomena in Greek has caught researchers' attention and has been described in terms of auto-segmental phonology (Malikouti-Drachman 2001; Baltazani 2006; Arvaniti 2007). Assimilation in Greek can occur across words (sandhi phenomena), or within word boundaries. This study aims to investigate /s/-voicing in the Greek Dialect of Epirus, which is spoken in the western part of mainland Greece, Epirus province is located in the North-West of Greece. Epirus dialect belongs to the group of the Nothern Dialects (Hatzidakis, 1892).

Arvaniti and Pelekanou (2002) were the first to examine phonetically the phenomenon of /s/-voicing across word boundaries in Greek. In their experiment they noticed partially voiced and unvoiced sibilants preceding voiced consonants. These results indicate that sandhi phenomena are not obligatory and in many cases, such as in /s/- voicing, they are rather gradient than categorical. Tserdanelis (2005) suggested that there is a blocking of the voicing assimilation when prosodic boundaries appear between the two words (Tserdanelis 2005: 76).

In the most recent study Baltazani (2006), has also shown that there is a lot of variability in the realization of /s/- voicing. Most of the tokens were fully voiced, however, partially voiced tokens as well as unvoiced tokens were found. The results indicate that /s/-voicing was not applied in all the cases although there were no prosodic boundaries between the sibilant and the following voiced consonant. Therefore there is no clear relation between the existence of

prosodic boundaries and the application of /s/-voicing. Baltazani also suggested that there is also some variability across speakers and that the type of the following consonant affects the application of voicing.
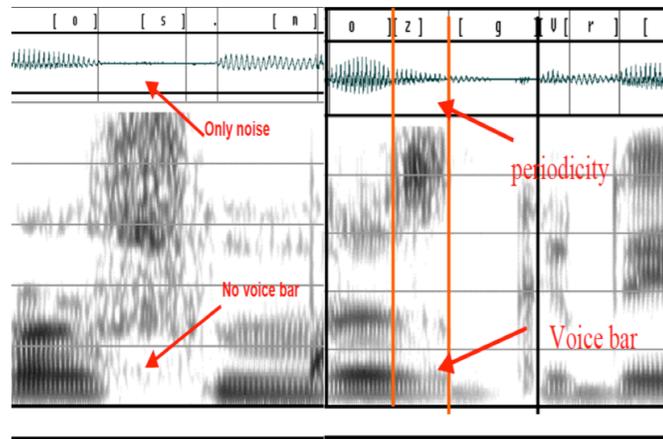

Figure 1. Phonetic realization of /s/ and /z/ (Baltazani 2006: 6)

2 Methodology

2.1 Speakers and Analysis

Approximately 250 tokens from 7 native speakers of the dialect were used for this study. The recordings include spontaneous speech and have been made during interviews of speakers of the dialect in the area of Epirus as a part of a research program of the University of Ioannina, Greece on 2008. The acoustic data were analyzed with the software Praat (Boersma & Weenink 2012).

2.1 Measurments

1) The boundaries of the segments and the voiced part were marked by the researcher following Baltazani's method based on the observation of the acoustic wave (see Figure 1). More specifically the criteria for marking voicing were:
    a) The indication of the glottal pulses in Praat.
    b) The periodicity on the waveform
    c) The detection of voice bar in the spectrogram

The segments were categorized as "voiced", "partially voiced" and "voiceless".

2) Additional measurements were made in order to confirm the voicing:
    a) The duration of the segment
    b) The mean intensity with a pass Hann-band filter at 2.000 Hz
    c) The center of gravity (CoG)

3) Two parameters were examined in relation to /s/-voicing:
    a) The boundary depth (stem, morpheme boundary, word boundary)

(1) κόσμος   /ˈkozmos/[1]   (= world)
    προσβάλλω   /proˈzvalo/   (= I offend)
    τους βλέπω   /ˈtuz ˈvlepo/   (= I see them)

    b) The speaker

3 Results

The measurements show a relation between the intensity, duration and center of gravity of the sibilants on the one hand and the researcher's impressionistic indication of voicing (Figure 2). The values of intensity and CoG were higher in the voiceless tokens, while the duration was lower in the voiced tokens.
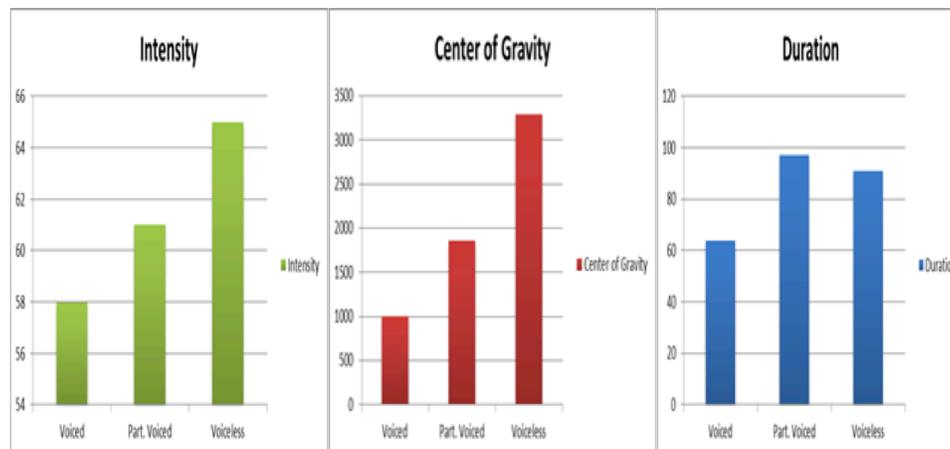

Figure 2. Acoustic measurements

In overall, the results indicate a relation between the morphological boundary and the application of assimilation. As can be seen in the Figure 3, more segments were assimilated when the cluster of /s/+ $C_{[+voi]}$ was in the stem than when a morpheme boundary was in between the sibilant and the following consonant and even fewer segments were voiced when found in word boundaries.

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[1] For consistency reasons I always use /z/ before voiced consonants in these examples.
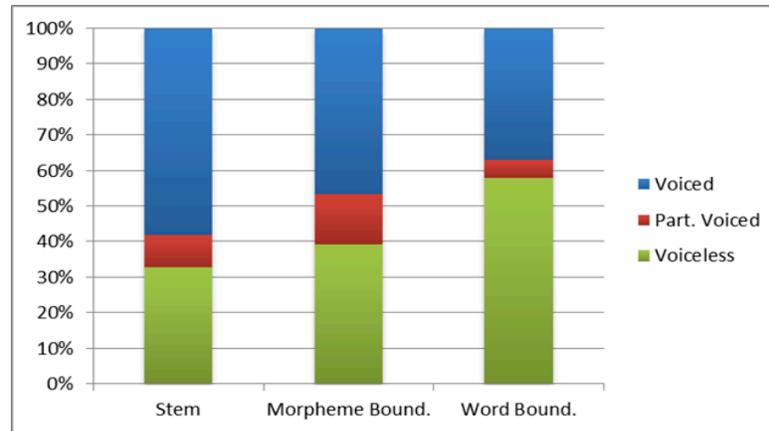
Figure 3. Voicing and boundary depth

A separate measurement was made for the cases where a /s/+ C$_{[+voi]}$ cluster was created as a result of vowel deletion, a phenomenon that is very common in the dialect of Epirus. The results indicate similar frequency of voiced segments as the "word boundary" category as can be seen in the next chart.

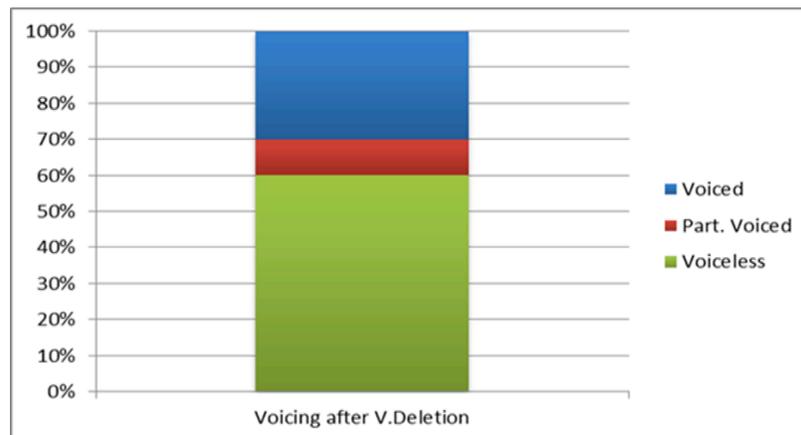(2) σου δώσω > σ'δώσω su δóso > sδósu 'to give you'),

Figure 3. Voicing and vowel deletion

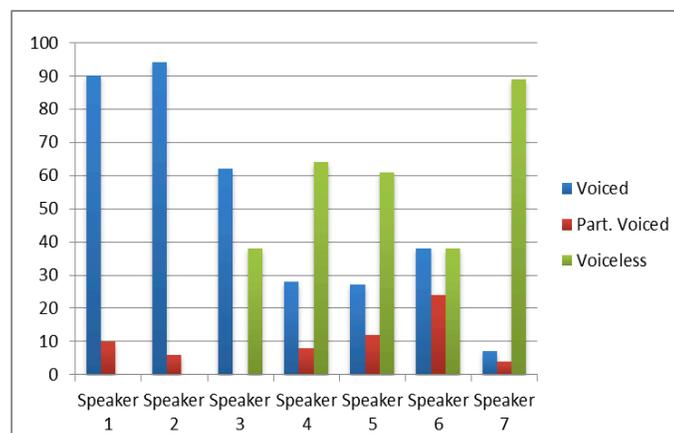Finally, a high degree of variability across speakers was found as can be seen in the last chart.

Figure 4. Speaker variability

4. Discussion and Conclusions

The results confirm some of the main conclusions of previous studies. The voice assimilation is not a categorical rule but it should rather be considered as gradient, since it does not apply in all the cases and it also applies in varying degrees.

Different speakers tend to apply the assimilation in different degrees. However, this study indicates that the partially voiced segments are not very common. Additionally, the study of the phonetic characteristics such as the center of gravity, or intensity indicates that apart from the vibration of the vocal chords, other aspects might be important for the interpretation of a phoneme from the speakers. That is, a voiceless sibilant with lower CoG than a typical [s] might tend to be perceived more like a /z/ than a voiceless sibilant with high frequencies. These intermediate situations might also illustrate interesting aspects of the phonetics-phonology interface.

An important relation between voicing and morphological boundaries was shown in this study. The results indicate that the deeper the boundary the less likely it is that /s/-voicing will be applied. The same relation also appears in the /s/-voicing in Standard Modern Greek (Dimos, in prep.) However, it is also clear that /s/-voicing was applied in all the different boundaries, thus there seem to be no blocking in the assimilation. The phenomenon remains gradient in all the morphological levels but the possibility of assimilation seems to increase as we move from word boundaries to the stem. Of course further study is necessary in order to be able to make any strong assumptions, since the size of the sample and the nature of the data does not allow us to derive definite conclusions.

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