

**PHONETIC VARIATION IN MODERN GREEK DIALECTS:  
NATURE, NURTURE AND LANGUAGE CONTACT<sup>1</sup>**

**1. Introduction**

A spoken word can be pronounced in many different ways. Within-speaker variation in phonetics can generally be attributed to two major reasons: the variability of the motor control system and speakers' adjustment depending on listeners' need for clarity of articulation (cf. for example [Perkell 1990: 266]). As a result of the latter, pronunciation of a word can be affected by a number of factors such as lexical frequency, probability of a word in a given context, position in the utterance or proximity to a prosodic boundary [Zipf 1949; Nelson 1983; Kohler 1990; Lindblom 1990; Pierrehumbert 2001; Bybee 2003; Kochanski et al. 2003; Bell et al. 2003; Aylett & Turk 2004].

What remains unclear, however, is the universality of the effects of these factors. Physiological constraints of the articulatory system as well as the need for compromise between the conflicting needs to maintain both speed and accuracy of communication in principle should apply to communication in all spoken human languages. Therefore one would expect that different languages would show similar patterns of variation. And indeed, W. Barry and B. Andreeva [Barry & Andreeva 2001] analyzed spontaneous speech processes in six European languages and found that all languages showed similar processes such as reduction of intervocalic clusters, lenition of stops, centralization of unstressed vowels and syllable loss. On the other hand, different languages show different patterns of variation and it is often claimed that some languages are more prone to reduction than others. The presence or absence of vowel reduction has even been used as one of the main criteria for rhythmic classification of different languages (cf. [Arvaniti 2012; Loukina et al. 2013 for overview]).

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Modern Greek dialects present an interesting test case for the study of such interplay between universal and language-specific factors. Standard descriptions of Modern Greek rarely talk about phonetic variation, and in comparative studies Modern Greek is often represented as one of the languages with little reduction in connected speech (cf. for example [Barry and Andreeva 2001]). At the same time, descriptions of regional varieties of Modern Greek often talk about various reduction phenomena such as strong vowel reduction in Northern dialects or lenition of stop consonants in Cypriot Greek. Why is it then that such processes are only attested in some but not all varieties of Greek?

## **2. Brief description of the data**

Some of the experimental results presented in this paper are based on a corpus of spontaneous speech in three dialects of Modern Greek recorded in Cyprus (Nicosia), Athens, and Thessaly (Karditsa). Cypriot and Thessalian Greek represent respectively South-Eastern and Northern Greek dialects and show different treatment of most regional features (cf. for example [Newton 1972b; Kontosopoulos 2001; Trudgill 2003]). Athenian Greek was chosen in order to provide some benchmark data which would be as close as possible to a natural colloquial form of Standard Modern Greek.

The corpus contains informal interviews about local history and traditions recorded from 21 speakers of the same age (70-80 years old) and social group (predominantly manual workers) who grew up in the respective areas. Each interview lasted on average 25 minutes.

A study of intra-word variability requires multiple occurrences of the same words. Therefore the interviews were transcribed and the transcriptions were used to compile word frequency index for this corpus and identify the most frequently occurring content words such as 'village', 'year', 'house'. A subset of ten words was selected for further analysis based on stress patterns and segmental properties. Acoustic analysis included all occurrences of selected words with acceptable recording quality, about 1000 samples in total (see [Loukina 2008, 2009] for further description of the corpus and sampling procedure).

## **3. Nature: universal aspects of phonetic variation**

This paper focuses on two connected speech processes: vowel reduction and consonant lenition. Changes in the quality of unstressed vowels are often attributed to physiological reasons, for example shorter duration of an

unstressed vowel may lead to formant undershoot or greater assimilation of vowel to the adjacent segments (cf. [Lindblom 1963; van Bergem 1993; Moon and Lindblom 1994; Barnes 2006]). For consonants, less effortful articulation is often preferred in casual, quicker speech, leading to lenition of consonants (cf. [Kirchner 2001: 29-46; Ohala 1983]).

Variation in vowel quality is a very prominent feature of Northern Greek dialects where [o] and [e] are rare in unstressed position and usually alternate with [i] and [u]; etymological high vowels /i/ and /u/ are often dropped in unstressed position (cf. [Tzartanos 1909; Papadopoulos 1926]). Thus *χωράφι* 'field' pronounced [xor'afi] in Athenian Greek appears as [xur'afj] in Thessalian Greek, *παιδί* 'child' Athenian [peð'i] corresponds to [pið'i]. Although raising of mid-vowels is the most well-known feature of Northern dialects which may have acquired lexical status, descriptions mention that /a/ in unstressed syllables also differs in quality from its stressed counterpart (cf. for example [Chatzidakis 1892: 349-52]).

Lenition of stop consonants is mentioned in some descriptions of Cypriot Greek (e.g. [Newton 1972a]). Notably, in this variety lenition only affects voiceless unaspirated stops, but there also exists a series of aspirated voiceless stops [p<sup>h</sup>], [t<sup>h</sup>], [k<sup>h</sup>], traditionally referred to as "geminate" (for further discussion of the phonological status of Cypriot geminates see [Newton 1968; Arvaniti 2001b; Eftychiou 2004]).

According to traditional descriptions, in Standard Greek all vowels can occur both in stressed and unstressed position without much variation in quality (cf. for example [Arvaniti 1999b]). There is also no mention of consonant lenition.

Thus it may appear that the seemingly universal physiological principles underlying phonetic variation only apply in some of the regional varieties of Modern Greek. Yet one of the important features of within-word phonetic variation is that it often goes unnoticed by the speakers or listeners. And indeed experimental phonetic studies of casual speech in Standard Modern Greek showed variation both in consonant and vowel quality. Thus M. Fourakis [Fourakis et al. 1999] and K. Nicolaidis [Nicolaidis 2003] found that Standard Modern Greek shows a tendency for centralization and upward shift of unstressed vowels as well as devoicing or loss of high vowels. In one of the first experimental phonetic studies of Greek, R. Dauer [Dauer 1980] noted that intervocalic consonants (especially /s/ and /t/) in casual speech and at rapid tempo may be voiced or partially voiced. In a detailed articulatory study of spontaneous speech in Standard Modern Greek, K. Nicolaidis [Nicolaidis 2001] found variation in the degree of constriction and the overall

degree of contact in the pronunciation of plosive [t], depending on its duration.

The analysis of my corpus showed that stressed and unstressed vowels in fact differed in quality in all three varieties [Loukina 2009, 2011]. The variation was greatest for /a/ which is rarely mentioned in studies on vowel reduction. Furthermore, in agreement with the ‘physiological’ explanation of phonetic variation, in all three varieties the quality of several unstressed vowels depended on vowel duration: shorter vowels tended to be higher or more centralized. Similarly, in all three varieties voiceless stop phonemes were sometimes pronounced as voiced fricatives. Such pronunciation was more frequent in unstressed syllable and in shorter consonants.

Thus similar processes are attested in three very different dialects of Modern Greek. Shorter segments show changes in pronunciation consistent with the phonetic explanation and in agreements with the idea that reduction in spontaneous speech is a universal phenomenon. Why then are such processes consistently mentioned in impressionistic descriptions of some of the dialects but not of the others?

#### **4. Nurture: difference between the dialects**

A corpus study not only allows one to establish whether a particular phenomenon occurs in a given variety, but also provides information about the frequency of the phenomenon. A probabilistic approach to linguistic phenomena has led to many recent advances in empirical linguistics (cf. [Coleman 2011] for review). Probabilities rather than rules also form the basis of most current speech technologies and natural language processing algorithms. Therefore it is hardly surprising that frequency of occurrence is also the key to differences between three Modern Greek dialects discussed in the previous section.

In Athenian and Thessalian Greek, vowel quality consistently depended on duration, stress and phonetic context. In Thessalian Greek the difference between vowels was greatest. In Cypriot Greek the difference between vowels in different positions was smaller than in the other two varieties, and the correlation between vowel quality and duration much weaker (see [Loukina 2009, 2011] for details). In other words, while shorter vowels may show changes in quality in all three varieties, the probability of such change is very high in Thessalian Greek and relatively low in Cypriot Greek. For consonant lenition the situation was the reverse: almost half of voiceless stops in Cypriot Greek were pronounced without closure and with sustained voicing, while in Athenian Greek lenition affected about 20% of all

consonants and in Thessalian Greek, with the exception of /k/, 90% of etymological stop consonants were pronounced as voiceless with well-defined closure and release.

The difference between the dialects therefore lies not in the presence or absence of a certain feature, but rather in the extent or frequency of use of this feature, especially in quick casual speech. While variation in time and effort is generally language-independent, it may be realized differently even in several varieties of the same language.

The observed differences in spontaneous speech variation between the three varieties of Greek may be juxtaposed with other traits of the sound systems of these varieties. In Cypriot Greek, consonants in general seem to be more prone to various reduction and strengthening processes than vowels or than the consonants of Athenian or Thessalian Greek. Thus, according to some descriptions, Cypriot shows (or used to show) loss of intervocalic fricatives, which can be seen as another case of lenition. On the other hand, consonant+/j/ clusters in this variety show occlusivization (that is strengthening) of /j/ to a palatal stop [c] (cf. [Drachman & Malikouti-Drachman 1996; Malikouti-Drachman 1999]).

On the contrary, in Cypriot Greek there is less difference in quality between stressed and unstressed vowels than in the other two varieties, but stressed vowels also lack acoustic prominence [Loukina 2008]. In this respect Cypriot Greek differs from Thessalian and Athenian Greek where stressed vowels are consistently associated with higher amplitude and F<sub>0</sub> peak even in casual speech [Loukina 2008].

The observed co-occurrence of consistent acoustic prominence of stressed vowels and vowel reduction on the one hand and strengthening, lenition and relatively weak prominence of stressed vowels on the other agrees with previous typological observations about lenition and vowel reduction as historical processes. Thus A. Martinet [Martinet 1952], in his classic article on lenition, links Celtic lenition to phonetically weak accent and presence of gemination. On the contrary, vowel reduction is often associated with strong accent (cf. [Van Coetsem 1996] for discussion and multiple references). It is possible that the frequent co-occurrence of these features may be a result of causal relations between them, but an exact model of such interaction has yet to be developed.

### **5. Language contact: the culprit?**

As is usually the case in historical linguistics, it is hardly possible to give a definite explanation of what caused the emergence or loss of a particular

phenomenon in a given variety; however, some speculations can be made as to what might have triggered or reinforced such change. One possible trigger could have been contact with neighbouring languages. Thessaly and Cyprus are not only distant geographically, but also have different history and demographics.

Thessaly, located in Central Greece, has long been populated not only by Greeks, but also by Slavs and Aromanians. Cyprus, in the south-eastern part of the Mediterranean, was home to Turkish, Arab and Armenian communities and also for a long time remained under Frankish and Italian rule. The similarities between Greek dialects and the neighbouring languages suggest that language contact along with other factors may have contributed to the expansion of one of the variants which was also common to other languages involved in the contact.

The phonetic systems of the contact languages for the three varieties of Greek show a clear division between what can be called ‘Balkan’ languages (Bulgarian, Macedonian, Albanian, Arvanitika, Aromanian and Judeo-Spanish) and ‘South-Eastern’ languages (Turkish, Arabic and Armenian).

Most Balkan languages show vowel reduction similar to the one described for Thessalian Greek: cf. [Tilkov & Boiadzhiev 1981: 50–69; Pettersson & Wood 1985; Zhobov 2004] for eastern Bulgarian, [Sussex & Cumberley 2006: 509] for eastern Macedonian, [Caragiu-Marioțeanu 1968; Kramer 1989; Katsanes & Dinas 1990: 2930; Beis 2001] for Aromanian and [Gabinsky 1992] for some evidence of reduction in Judeo-Spanish. All these languages also distinguish between a series of voiceless unaspirated plosives [p], [t], [k] and voiced plosives [b], [d], [g], at least in word-medial position. The only exception is Arvanitika, which has lost the opposition of voiced stops and nasal+voiced stop clusters, most probably under the Greek influence (cf. [Hamp 1961: 103; Sasse 1991: 57]).

Contact languages of Cypriot Greek included Cypriot Arabic, Cypriot Turkish and Armenian. Descriptions of these languages do not mention vowel reduction of the type found in Balkan languages [Borg 1985: 44–45; Saracoğlu 1989: 176; Georgiou-Scharlipp & Scharlipp 1997: 143; Gürkan 1997: 73–74; Vaux 1998]. At the same time all these languages show a contrast between voiced unaspirated stops and voiceless aspirated stops which is often described as geminates vs. singletons, and probably a lack of a distinct voicing opposition for stop consonants (cf. [Borg 1985:12] for Cypriot Arabic, [Kornfilt 1997] for Standard Turkish, [Georgiou-Scharlipp and Scharlipp 1997] for Cypriot Turkish and [Vaux 1998:16] for Western Armenian). Consequently singleton consonants in these languages are generally voiced and prone to lenition.

These similarities between Greek dialects and the neighbouring languages suggest that language contact along with other factors may have contributed to the expansion of one of the variants which was also common to other languages involved in the contact. A similar mechanism was suggested by V. Friedman [Friedman 1994] to explain some syntactic similarities between Balkan languages. That is the role of language contact in the development of Modern Greek dialects was catalytic rather than causal: it enhanced the preference for one of the variants which already existed in the language.

Noteworthy in this case phonetic similarities between the languages are highly localized and represent what B. Joseph calls “small pockets of convergence” [Joseph 2003: 228]. Furthermore, the boundaries of such ‘pockets’ differ at various linguistic levels. Thus, all three varieties of Greek show several well-known Balkan morphosyntactic features such as a lack of infinitive or specific formation of future tense. In terms of sound structure Cypriot Greek shows little similarity with Balkan languages, while Thessalian Greek appears to be far more “Balkan” than Athenian Greek. The different degree of “balkanization” across Greek dialects has been noticed before (cf. [Sawicka 1997]), but the data from this corpus provide firm evidence for those claims.

## **6. Conclusion**

Casual speech in three varieties of Modern Greek exhibits similar degrees of connected speech processes, but the frequency of those processes differs between the varieties. This once again shows the complexity of interaction between universal physiological principles of speech production and language-specific constraints. While speakers of all three varieties take shortcuts in their pronunciation, the exact path that this shortcut takes differs between the varieties: in Thessalian Greek vowels are subject to substantial variation, but consonants remain relatively stable, while in Cypriot Greek casual speech processes primarily affect consonants. Athenian Greek occupies the middle ground. Different processes in these varieties have probably been reinforced by contact with Balkan languages in the case of Thessalian Greek and other Mediterranean languages in the case of Cypriot Greek.

Difference in extent or frequency of processes is difficult to capture in a traditional “laundry” list of dialectal features common in impressionistic descriptions. Such regional differences are best understood through large corpus studies and probabilistic approach and there has never been a better

time for such studies: rapid technological advances allow us to store and analyse the amounts of data that would have been unthinkable a decade ago.

Finally, it is worth noting how fine grained is the nature of motor control in human speech which on one hand allows substantial variation in pronunciation and yet at the same time keeps it strictly within the boundaries determined by the linguistic competence of the speaker.

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