

## When *Distributed Morphology* meets *Gradient Harmonic Grammar*: A new approach to Greek stem allomorphy

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*Stem allomorphy* has been a hotly debated issue that, due to its cross-modular nature, has received great attention from both morphological and phonological theory. The phenomenon is widely attested in fusional inflectional systems such as Greek, where the stem form of most nouns and verbs varies according to the morphosyntactic environment. Consider, for instance, the Greek nominal forms in (1–2):

- |     |    |   |   |
|-----|----|---|---|
| (1) | a. | <i>papá-s</i><br>priest-MASC.NOM.SG     | <i>papáð-es</i><br>priest-MASC.NOM/ACC.PL     |
|     | b. | <i>psará-s</i><br>fisherman-MASC.NOM.SG | <i>psaráð-es</i><br>fisherman-MASC.NOM/ACC.PL |
| (2) | a. | <i>xtípima</i><br>hit.NEUT.NOM/ACC.SG   | <i>xtímat-a</i><br>hit-NEUT.NOM/ACC.PL        |
|     | b. | <i>máθima</i><br>lesson.NEUT.NOM/ACC.SG | <i>maθímat-a</i><br>lesson-NEUT.NOM/ACC.PL    |

In order to account for stem alternations like the ones presented above, two types of analysis have been put forth in the literature. On the one hand, *stem-listing* approaches (e.g. Ralli 2005; Bermúdez-Otero 2013) postulate multiple stem entries associated with a particular set of inherent morphosyntactic features (e.g. *papa*-MASC.SG vs. *papað*-MASC.PL). On the other hand, readjustment accounts couched within the *Distributed Morphology* (DM) framework (e.g. Halle & Marantz 1993, Embick & Halle 2005) posit a default underlying representation that undergoes phonological reshaping in certain morphosyntactic environments (e.g.  $\sqrt{\text{PRIEST}} \leftrightarrow \text{papa} / \_ \sim \text{Num}[\text{SG}]; \sqrt{\text{PRIEST}} \leftrightarrow \text{papað}$  elsewhere).

However, both kinds of analysis fail to capture some important generalizations drawn from the Greek data. First, they disregard the fact that the nouns *papás* (1a) and *psarás* (1b), on the one hand, and *xtípima* (2a) and *máθima* (2b) on the other, exhibit certain common phonological and semantic properties; for instance, they have the same sequence of vocalic and consonantal segments at the right edge of their stem (*-á/-áð* and *-ma/-mat*) and they have a common semantic core (both (1a) and (1b) have a male human referent, while both (2a) and (2b) denote an abstract deverbal concept). Second, and most importantly, both theories overlook the phonological motivation that lies behind the attested alternations: the stem-final /ð/ or /t/ seems to emerge only when in onset position (e.g. *pa.pá.ðes* vs. *\*pa.páðs*; *xti.pi.ma.ta* vs. *\*xti.pi.mat*).

In this paper we propose an alternative account that provides a new insight to stem allomorphy both at a morphosyntactic and a phonological level. With respect to the former, we put forth a DM analysis (Halle & Marantz 1993; Embick & Noyer 2007), according to which both *papás* and *psarás* derive from a nominalizing syntactic head  $n_{[+\text{human}]}$  that forms masculine human nouns and is realized by the phonological exponent *-áð*. Similarly, we posit that both *xtípima* and *máθima* contain an  $n_{[-\text{human}]}$  nominalizer realized by the exponent *-mat*. We thus assume that the underlying representations of the above nouns (in nominative singular) are /pap-áð-s/, /psar-áð-s/, /xtípi-mat/ and /máθi-mat/ respectively.

Furthermore, adopting Smolensky & Goldrick's (2016) *Gradient Harmonic Grammar* (GHG) model, we posit that these representations include phonological elements that are not fully active and therefore need to be provided with additional activity in order to be realized. To be more specific, we maintain that the final consonants of the exponents /áð/ and /mat/ have a partial degree of presence in the underlying structure. Assuming that a fully active segment has an *activity level* equal to 1, this partial degree of presence is formalized by means of a numerical value that ranges between 0 and 1 (in our case 0.8). This assumption entails that, in order for /ð<sub>0.8</sub>/ or /t<sub>0.8</sub>/ to emerge in a surface form, they have to be enhanced with a 0.2 of extra activity. Whether or not this additional amount of activity is provided depends on whether or not this yields a more *harmonic* –i.e. phonologically optimal– output. For instance, /ð<sub>0.8</sub>/ is silenced in the singular form *papás* (</papáð<sub>0.8</sub>s/) because its realization would result in an illicit cluster at the end of the phonological word (*\*papáðs*) and thus in the violation of the heavily weighted constraint \*CC]<sub>ω</sub>. On the contrary, in the plural form *papádes* (</papáð<sub>0.8</sub>es/), /ð<sub>0.8</sub>/ reaches the required activity level (=1) and gets to be pronounced, since its realization not only has no bearing on the \*CC]<sub>ω</sub> constraint, but it also satisfies \*VV, which disallows hiatus environments (*\*papáes*).

In empirical terms, the proposed analysis provides a comprehensive account of the allomorphic patterns attested in Greek noun inflection, which not only can easily extend to other languages such as Hebrew and Russian but also finds further support in similar GHG approaches of allomorphic phenomena (see Spyropoulos et al. 2017 for Greek verb inflection; Faust & Smolensky 2017 for Hebrew; Zimmermann 2018 for Nuu-chah-nulth). Crucially, it is shown to fare better in capturing also non-categorical phenomena that would be difficult to treat under standard OT models or autosegmental theories. Moreover, at a theoretical level, the current proposal approaches the issue of allomorphy from both a morphosyntactic and a phonological point of view, thus contributing to our knowledge of the operations taking place at the morphosyntax/phonology interface.

## References

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