The computational simulation of sound change and its potential for the diachronic typology of changes

Although there were numerous approaches in the past to the problem of the computational simulation of sound change (cf. Smith 1969, Burton-Hunter 1976, Eastlack 1977, Hartman 2003, Mittmann 2009), it seems that the usefulness of the computer in the simulating, testing and modeling of sound changes on a larger scale has not been fully appreciated. The purpose of this paper is to present the results of the research on the computational simulation of sound changes from Classical Latin to Modern Spanish using the program 'Phono' developed by Steven Lee Hartman (Hartman 2003) on a lexicon of more than 2000 words.

The computational simulation of sound change consists of the application of rules that are modeled on the sound changes that actually occurred in the development of a language on a dataset that is representing the earlier stage of its development (e.g. simulating the sound changes from Latin to Spanish). The results of the application is afterwards compared with the actual attested data in order to uncover the rate of the regularity of the changes and the correct order in which they are applied. Discrepancies in the generated forms and the attested ones can be explained as either borrowings, analogical creations or errors in either the chronology of changes or in their modeling.

Most of the approaches to the simulation of phonological changes operated on small, selected lexicons and usually with only a selection of rules. In this talk I will discuss the use of the most advanced of the programs simulating phonological change created so far - 'Phono' by Steven Lee Hartman (Hartman 2003) - which makes use of the IPA alphabet and the matrix of distinctive features rather than simple letter substitution rules in deriving the Spanish forms from their Latin sources.

It is hoped that these type of tools might advance our knowledge of the typology of sound changes (Kümmel 2007) in general by the use of extensive datasets and a wide variety of data driven from various languages. Same tools can also be useful in discovering the directions of paradigm leveling. The mechanical application of the sound changes mentioned above to the lexical datasets of the pre-stages of the respective languages creates allomorphy in their paradigms which is then leveled out according to seemingly different principles and in different directions. However, with the use of extensive datasets it is possible to point out important factors concerning the directions of the levelings, their frequency and the dominating patterns. As observed by Warren Cowgill more than 50 years ago “A sufficiently large collection of such individual changes, appropriately classified, should give linguists a measure of the relative plausibility of different solutions for problems in historical grammar” (Cowgill 1966: 115).

Abstract word count excluding title and references: 450

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