OPTIMALITY THEORETICAL MORPHOLOGY FOR HYBRID GRAMMARS: IMPLEMENTING BURZIO'S *OUTPUT-OUTPUT FAITHFULNESS*

Tamás Biró
ELTE Eötvös Loránd University, Budapest

Luigi Burzio (2002:175) equates morphology to 'output-output faithfulness', which in turn is partially the consequence of an effect that he calls 'gradient attraction'. He introduces an Optimality Theoretical formalism that is "essentially a theory of analogical association" *(ibid).* The aim of this paper is to implement his model, and to show that his formal approach to analogy is capable of modeling the emergence of hybrid grammars (Aboh 2015). The example employed will be taken not from Aboh's own research focus, which is the syntax of creole languages, but from Yiddish morphology.

Yiddish is the most known, albeit the least typical among the so-called *Jewish languages*, which can be viewed as another prototypical group of 'hybrid grammars', besides creoles.[1] Indeed, independently of the recent developments in creole studies, Sarah Bunin Benor (2008) has introduced a similar idea to the study of the judeo-languages: "Rather than seeing a given Jewish community's language as a 'Jewish language', I propose to see it as the selective use of a distinctively Jewish linguistic repertoire. […] Jews in any given time and place make selective use of their distinctive repertoire, in combination with the repertoires used by non-Jews […]". In fact, what she describes here applies rather to typical Jewish languages (Judeo-Arabic, Judeo-Persian, medieval Judeo-French, modern Jewish-American English, etc.), which cases involve a spectrum between the non-Jewish variety and the Jewish sociolect. In the case of the "post-co-territorial" Jewish languages (most notably, Eastern Yiddish and Ladino), however, after their speakers had lost contact with the speaker community of the non-Jewish variety, the combination of the repertoires (that is, the recombination of the linguistic features) has yielded a novel, hybridized grammar.

A famous example of feature combination and recombination is the plural morphology of (Eastern) Yiddish. On the one hand, Yiddish inherited the rich Germanic array of plural markers: *-Ø* (*fish*, plur. *fish* 'fish'; with umlaut: *hant*, pl *hent* 'hand'), *-ər* (*kind*, pl. *kinder* 'child'; with umlaut: *land*, pl. *lender* 'land'), *-(ə)n* (*delegat*, pl. *delegatn* 'delegate') and *-s* (*lebn*, pl. *lebns* 'life'). Furthermore, the suffix *-əs* is used to form the plural of words of Slavic origin (*slup*, pl. *slupəs* 'pole, post'). On the other hand, the Semitic (Hebrew and Aramaic) component of Yiddish, making up some 12-20% of the vocabulary of the language (Kahn 2015:691) comes with different plural formation rules. The Hebraic feminine plural suffix *-əs* (*soyd*, pl. *soydəs* 'secret', *mokəm*, pl. *məkojməs* 'place') might look similar to the suffix attached to some Germanic and Slavic words, but its influence on the vocalization on the word proves its being a distinct morphological category. The same applies to the originally masculine plural marker *-im* (or *-əm*; *nign*, pl. *nigunəm* 'melody, *lamdn*, pl. *lamdonəm* 'learned man').

While the Germanic and Hebraic co-morphologies appear to coexist peacefully in Yiddish, and to correlate strongly with the etymology of the vocabulary, certain data point to a more dynamic process. Some words of Hebrew origin are pluralized in a way different from the corresponding plural forms in Hebrew. Thus, *shabes* ('Sabbat') becomes *shabosəm*, and not **shabosəs*, the form expected based on Hebrew *šabbātōṯ*. Similarly, the plural of *balebos* ('landlord, etc.') is *balebatəm*, and not *baleybos.* Even more intriguing are the cases when the *-im* plural is attached to words from a different component of the language: e.g., *pojər*, pl. *pojərem* 'farmer' (cf. Modern German *Bauer*) and *doktər*, pl. *doktoyrəm* 'physician'. In sum, linguistic features originating in etymologically different components of the hybrid grammar may recombine. Noteworthy is however the limited scope of this kind of recombination.

[1] Note that no pejorative connotation is associated to the expression "hybrid grammar". In fact, Aboh asserts that *all* grammars are hybrid to some extent, even if creoles – and judeo-languages, we would add – are the most ostensible cases. Thus, we accept Max Weinreich's position that Yiddish is a full-fledged language on its own.

The observed recombination in the plural morphology is usually ascribed to analogy. Both *pojər* and *doktər* match the following pattern: *CoC(C)əC*, close to the Yiddishized version of an active participle pattern in Hebrew. Moreover, several Hebrew-origin words for professions also fall in this category: *rabonem* 'rabbis', *soyfrəm* 'scribe' etc. Hence, the phonological and semantic bases for the analogy.

Burzio's *gradient attraction*, a formalism to handle *output-output faithfulness* (or *output-output correspondence*) follows from his notion of *representational entailments*. On the micro-level, a word introduces an entailment: "if a word has the singular form *soyfər*, then its plural ends in *-em*", "if a word means 'rabbi', then its plural ends in *-em*". Subsequently, Burzio derives macro-level entailments, with contradicting details canceling out each other, and matching details reinforcing each other. Hence the entailment: "if a word has the singular form *CoC(C)əC*, then its plural ends in *-em*", "if a word refers to a profession, then its plural ends in *-em*". These entailments act as violable OT constraints.

The talk will also illustrate how *multi-agent computer simulations* with *iterative learning* (cf. several publications by Simon Kirby and his colleagues) can implement Burzio's formalism applied to Yiddish plural formation. An agent will be equipped with a lexicon and a grammar (Optimality Theory enhanced with Burzio's output-output faithfulness), as well as with a learning algorithm (such as GLA; Boersma and Hayes 2001) and a production model. Agents are not only organized into a society with various kinds of network structures (random small-world networks), but also into generations, each generation learning from the data produced by the preceding generation and feeding with data the learning algorithm of the ensuing generation.

A further factor required to establish a realistic model is the varying levels of education, correlating to some degree with various levels of linguistic consciousness by the different agents of the virtual population. Namely, those who were more educated in the traditional Jewish sources, and so would have acquired a higher proficiency in Hebrew, can be supposed to have been less likely to "confuse" the Germanic and the Hebraic co-morphologies. And yet, if a less educated group of the society had "hybridized" the grammar, even the most educated members of the next generation would acquire it.

The conclusion will be that reproducing the observations of historical sociolinguistics *in silico* is by far not self-evident. Most parameter combinations yield different results. Fine-tuning the numerous parameters can, however, help. While technicalities of the simulations are less interesting outside the model itself, the take-home message is clear: formalizing and computationally modelling analogical phenomena in historical morphology is certainly feasible.

References:

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