

SPIRALS IN LANGUAGE EVOLUTION

KATRIEN BEULS

*Artificial Intelligence Lab, Vrije Universiteit Brussel,
Pleinlaan 2, 1050 Brussels, Belgium
katrien@ai.vub.ac.be*

All kinds of innovations, whether biological, technological or scientific, typically follow a natural cycle in which a new concept gets introduced, increases in complexity, runs into limitations and consequently elaborates its own structure. Eventually, the old concept cannot overcome its limitations any longer and is replaced by a new one, which is simpler at the start, but in due course becomes elaborated itself (Arthur, 2010; Wagner, 2011). Linguistic innovations, however, have often been described as a spiral in which changes do not exactly replicate themselves but parallel earlier changes in an approximate manner (Hopper & Traugott, 2003). Already in the 19th century, the German neogrammarian Georg von der Gabelentz (1901) coined the term *Spiralllauf*, which captures two competing tendencies in the development of languages: one tendency toward economy to ease articulation and another toward expressivity to be optimally distinctive (and therefore perhaps redundant to some extent). A typical example of such a spiral is the evolution of the future tense in Roman languages: a synthetic future in Latin (*cantabit* 'he shall sing') is replaced by an analytic form (*cantare habet* 'he has to sing' > 'he shall sing'), which in turn is fused into a new synthetic form in its daughter languages (Fr. *chantera*, Sp. *cantará* 'he shall sing'), leading again to new analytic expressions (Fr. *il va chanter* 'he is going to sing').

Similar spiral evolutions came out of a recent *PLOS ONE* article on agent-based models for the evolution of grammatical agreement markers in a population of speakers that share an artificial lexicon (Beuls & Steels, 2013). The article could show how grammatical markers were systematically shortened over time to reduce the speaker's articulatory effort (economy). Yet, over time, as new speakers were introduced into the linguistic community the semantic origins of the eroded agreement markers had been detached from their new forms, leading to the following two scenarios: (i) a marker lost its expressiveness in a certain situation and the speaker would therefore reinvent a new meaningful marker with a form that is directly recruited from the lexicon (e.g. *-object* to mark inanimate things if the language of communication would be English); (ii) the marker is reduced to a one-letter formal marker that can be used with all types of words irrespective

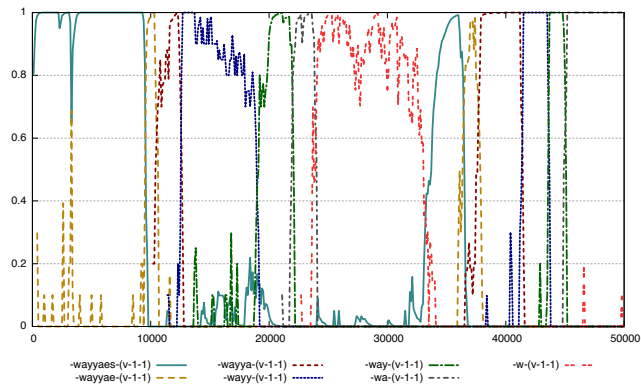


Figure 1. The evolution of the *-wayyaaes* marker shows a spiral tendency in which it is first reduced to a one letter marker *-w*, reinvented as *-wayyaaes* and finally settles on *-wa* to remain a distinctive marker.

of their semantic or syntactic categories. The first scenario is depicted in Figure 1. The *-wayyaaes* marker (linked with the semantic category *v-I-I*) is shortened to the one-letter marker *-w* under the articulatory effort pressure and is used by the majority of the speakers until the original marker overtakes again (around interaction 32 000). The second round of evolution is faster and the population settles on a two-letter marker to avoid ambiguity with other truncated markers that result in *-w*. Re-inventions such as the one in Figure 1 only occur when there is a population turnover in the linguistic community. When all speakers know the origin of a marker and can still relate the shortened form to its original semantic category, evolution stops at the endpoint of the marker's erosion. Yet, when new agents enter the community, the meaning of a marker might not be transparent so that he might have to invent a new marker with a direct link to an existing word.

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