Diversity and Change of Case Marking Patterns

Evolutionary Game Theory and Case Marking Systems

Game-theoretic models provide a powerful framework for studying the emergence and stabilities of optimal communicative systems in a population, allowing for an asymmetry between the hearer and speaker activities of communicative agents. Here, in particular, the model of the signaling game (Lewis 1969) has been applied to study diverse ‘language universals’ (cf. Jäger 2014), ranging from evolutionary trends across languages such as the progressive-imperfective cycle (cf. Deo 2015, Enke, Mühlenbernd and Yanovich 2016) and the Jespersen cycle (Ahern and Clark 2014), to iii) typologically supported universal properties of language sub-systems, such as color categorization (Jäger and van Rooij 2007), or case systems (Jäger 2007).

Jäger (2007) develops a signaling game model to explain why particular case systems are predominant among the languages of the world. The model component of Jäger’s study involves the formalization of case marking strategies in terms of encoding-decoding processes, represented by the application of ‘speaker strategies’ and ‘hearer strategies’, respectively. The analytic component of Jäger’s study is the detection of evolutionarily stable case marking systems (in terms of speaker/hearer strategies) under evolutionary dynamics. His analysis shows that the following four case marking systems are evolutionarily stable (Maynard Smith 1972) – thus particularly resistant against forces of language change:

· split ergative systems (e.g. many Australian languages)
· accusative systems with differential object marking (cf. English, Dutch)
· ergative systems with differential subject marking (cf. several Caucasian languages)
· no case marking (cf. Chinese, Thai)

Note that exactly these systems are predominant among the languages of the world. Their frequent presence can therefore be explained on the basis of insights from evolutionary game theory, such as the notions of evolutionary stability. However, the model struggles to motivate the strategies and parameters in the cognitive constraints of the individual agents, as determined by so-called ‘processing cues’, cf. as defined in the Competition Model, which will be introduced in what follows.

The Competition Model for Actor Identification

Given that the supposed goal of sentence processing is comprehension, i.e. the extraction of meaning, traditional perspectives on grammatical relations such as the subject quickly break down, with trivial examples like the passive voice and expletive subjects demonstrating that subjecthood is at best a single cue for the semantic relations actually conveyed by a given sentence. From a cross-linguistic perspective, traditional notions of syntax are untenable, as even simple concepts such as “subject” are difficult if not impossible to define in a way that is valid across the world’s more than 6000 languages.

In a series of studies in the 1980s Bates and MacWhinney showed that syntax was not sufficient for predicting sentence interpretation cross-linguistically, leading them to put forth their Competition Model, called thus because it was based on competition between different processing
cues (Bates, McNew, et al. 1982; MacWhinney, Bates, and Kliegl 1984; Bates and MacWhinney 1989). E.g. processing cues for actor identification include traditional morphosyntactic features such as case, agreement and word order as well as semantic and even pragmatic-phonological features such as animacy and stress. The interaction of these cues varies across languages and the language-specific weighting (cue strength) depends on cue validity (measuring how helpful a given cue actually is in determining an interpretation) (MacWhinney, Bates, and Kliegl 1984).

Cue validity in turn depends on the cue availability (called “cue applicability” in MacWhinney, Bates, and Kliegl 1984) and cue reliability (measuring how informative a cue is). For example, morphological case in German, when present, provides for a single possible interpretation, independent of other syntactic properties such as word order. But case marking in German is often ambiguous and thus not always available (1), so that further cues such as word order (1a), animacy (1b) or world knowledge (1c) are accessed (cf. Silverstein 1976). Case marking thus has strong cue reliability yet weaker cue availability, which still yields a large cue validity and thus cue strength, seen in the highly deterministic nature of unambiguous case marking in German.

Together, the Competition model and a game-theoretic model for communication will allow for providing new insights into the evolutionary emergence and development of ideal actor identification strategies, from both a neurocognitive and a communicative perspective. In our talk, we will present a game-theoretic model that extends Jäger’s (2007) work by implementing processing cues in order to determine i) whether the model can detect the same case systems as evolutionarily stable as are also detected by the original model, ii) whether the model can additionally reproduce non-canonical systems of actor identification (e.g. languages such as Fore using an animacy-driven strategy), and iii) how probable transitions from one system to another are. In total, the talk will give new insights into ranges and boundaries of the diversity and change of case marking systems.