# Dynamic complexity in heritage morphosyntax: A case study of grammatical gender

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Morphosyntax is one of the areas in heritage grammars that is often subject to change compared with a given baseline (e.g., Montrul 2016, Polinsky 2018). The dynamic nature of this area makes is a fertile domain for investigating how mental grammars change across the lifespan of an individual speaker and across generations of speakers. In this talk, we will specifically focus on grammatical gender and use this as a case study of how to model complexity in heritage speakers and beyond. Establishing a working definition of the dynamic complexity of linguistic structure and the accompanying operations responsible for generating these structures is one of the hallmark challenges of formal approaches to language. This challenge is even more daunting when modeling the grammars of multilingual speakers, due to the dynamic and integrated nature of these grammars (Putnam et al., 2018).

In general, heritage speakers face difficulties with grammatical gender. Polinsky (2008) shows that more proficient speakers of heritage Russian in the US have retained a three-gender system whereas less proficient speakers only have a two-gender system. Less proficient speakers also do not master the complex system of declension classes. Scontras et al. (2018) provide experimental evidence that heritage speakers of Spanish have restructured their grammar compared to the baseline. Importantly, they argue that both the gender features and the functional sequence of the nominal phrase are restructured in heritage Spanish. The burning question remains however what the possible outcomes of such restructuring is. This talk will advance a predictive model that addresses this question.

Adopting Miestamo's (2006, 2008) systemic definition of complexity, we provide an overview of how the connection between atomic linguistic elements can be neatly captured in an exoskeletal model of grammar. An exoskeletal model calls for a separation of the mechanisms responsible for generating syntactic structure and the insertion of lexical items (i.e., morphotactic units) into said structures. Notably, this formalism allows us to propose a new typology of possible outcomes in heritage grammars, a typology which distinguishes between features and the functional sequence itself, and whether or not these are retained or lost (a 4-way typology). To make this argument, we will present a different case study, one involving grammatical gender assignment in language mixing environments.

It is well-known in the literature on language mixing that speakers are able to assign grammatical gender to a noun which does not originally have a gender feature (e.g., Alexiadou & Lohndal 2018, Riksem et al. 2019, Valdéz Kroff et al. 2019). This often occurs when nouns from English are mixed into a grammatical gender language. The robustness of such gender assignment leads to an important research question: Is gender assignment stable in cases of language mixing or does it change across time?

Our empirical evidence will be drawn from heritage Norwegian, specifically the variety spoken in the US (American Norwegian; AmNo). Ever since Flom (1903), scholars have studied how AmNo-speakers mix English and Norwegian, and in particular, how they assign one of the three genders MASCULINE, FEMININE and NEUTER to English nouns mixed into an otherwise Norwegian noun phrase. The examples in (1) show three different indefinite articles whereas the examples in (2) illustrate three correspondingly different definite articles (often labeled declension classes) (all examples from Riksem 2018 based on the Corpus of American Nordic Speech (CANS; Johannessen 2015)).

(1)    a.    ei **nurse**      *a.*$_{INDF.SG.F}$ *nurse*

      b.    et **shed**      *a.*$_{INDF.SG.N}$ *shed*

      c.    en **chainsaw**      *a.*$_{INDF.SG.M}$ *chainsaw*

(2)    a.    **field**-a      *field-*$_{DF.SG.F}$

      b.    **shed**-et      *shed-*$_{DF.SG.N}$

      c.    **chopper**-en      *chopper-*$_{DF.SG.M}$

The central question here concerns what determines gender assignment on English nouns. Haugen (1953: 44) argues that 'All nouns become masculine unless they were associated with a homophonous fem[inine] or neut[er] morpheme or a female creature', whereas Hjelde (1996) argues that it is possible to identify morphological, semantic, and phonological assignment rules. In a more recent study, Riksem (2018) argues that translational equivalence is not a guiding principle in gender assignment to English nouns, unlike what has been found e.g., when Spanish is the L1 (Liceras et al. 2008, though see Bellamy et al. 2018 on other language pairs). However, Riksem does not discuss what, if any, the assignment principles in AmNo actually are.

This talk will demonstrate that there is a substantial amount of inter-speaker and sometimes intra-speaker variability when it comes to gender assignment, and that assignment of FEMININE and NEUTER seems to be fairly random, depending on perceived phonetic similarity and associations with existing Norwegian nouns. A comparison with previous generations reveals that speakers are less consistent in their assignment of grammatical gender on English nouns in CANS, and importantly, that overwhelmingly masculine is the main gender. Gender assignment will be modelled using Kramer's (2014, 2015) approach, whereby grammatical gender is syntactically assigned via a categorizing head that categorizes a category-neutral root.

Whereas Scontras et al. (2018) show that both features and the functional sequence may be restructured in heritage speakers, our data show that features can be restructured without a corresponding change to the functional sequence itself. In terms of complexity, heritage grammars can both decrease and increase: It decreases in terms of fewer features having to be acquired and used, and by simpler mapping rules between gender features and gender exponents. However, it also increased when the relationship between gender and declension class becomes less transparent.

Our talk suggests that a first critical step in establishing a working heuristic of complexity in heritage grammars is to distinguish between underlying features and their exponents. Based on the AmNo-data analysed for this talk, we have the following criteria for defining complexity: i) Number of syntactic-semantic features, ii) Number of functional projections, iii) Mapping from syntactic-semantic features to exponents (One-Form-One-Mapping mappings are simpler). Crucially, work on heritage languages provides us with important generalizations in terms of which domains of grammar that can restructure and how they may do so; however, what has alluded us to date is a straightforward and conceptually appealing way to capture 'complexity'.