"Heaviness" as evidence for a *derive-and-compare* grammar

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Overview. "Heaviness" is a notion frequently invoked to explain grammatical output that deviates from canonical behavior on account of its relationship with a heavy syntactic constituent. Previous research has suffered from the lack of a precise theory of what heaviness is, as demonstrated by the quotation marks that tend to accompany the term. In this paper, we argue that **heaviness is a scalar phonological variable** measured by the number of prosodic units. Furthermore, we argue that **heaviness effects are manifestations of prosodically-motivated preferences**, and as such are fundamentally different from the grammar that builds syntactic structure.

In light of this, we propose a grammatical architecture which consists of two modules: one in which rule-based grammars derive possible options, and a separate system consisting of a hierarchy of constraints which compares the options and arbitrates the outcome. We present two case studies of heaviness effects to support this position: a study of extraposed relative clauses in Icelandic, and a study of auxiliary contraction in English.

Zeroing in on the "heaviness" effect. We first refine the nature of heaviness:

- **Heaviness is not an effect of information structure or syntax.** We argue that a theory that attributes heaviness effects to discourse status or to structural complexity makes unattested predictions.

- **Heaviness is not a binary feature.** We show that there is a very robust linear effect between the rate of extraposition and the length (in words) of a relative clause in our data set from the IcePaHC corpus (Wallenberg et al., 2011). This effect supports a treatment of heaviness as a scalar or continuous variable. We attribute this effect to phrase length in words (cf. Stallings, et al., 1998; Shih & Grafmiller, 2011).

Outlining a grammatical architecture. We model the grammar as consisting of two distinct systems: one which derives grammatical strings via ordered rules, followed by a filter component that evaluates grammatical outputs and picks the one that is optimal given some set of preferences.

- **Rule-based derivational component.** We follow two camps in our rejection of a constraint-based derivational component: Embick (2010), who argues that a globalist derivational component overgenerates patterns of allomorphy that are in fact unattested; and the large body of literature that rejects non-rule-based derivational components on the grounds of opacity. However, the combination of gradience and a sharp cutoff found in our data is difficult to account for in a rule-driven generative component; hence, the second component of our model.

- **Comparison-based evaluation component.** Our argument for comparison-based filtering comes from a corpus study of variable auxiliary contraction in English (e.g., Kaisse, 1983). We present data demonstrating a sharp cutoff in the use of contracted auxiliaries when the preceding subject reaches a heaviness of 8 words. We account for this heaviness effect using a hierarchy of constraints, specifically a model in which a cutoff point distinguishes between categorical decisions and decisions about relative acceptability (Coetzee 2004; 2006). We propose such a cutoff point between the markedness constraints that disfavor contracted auxiliaries after subjects of 8 and 9 words.

Our results support a theoretical model in which structure-building takes place in multiple computationally efficient, locally-oriented rule grammars, with comparison-based filtering, based on a hierarchy of constraints, arbitrating the final outcome.