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Understanding bit by bit

Information theory and the role of inflections in sentence processing

What makes a sentence hard to process? Apart from the meanings of the words it contains, their number, and the way these words combine into constituents, words also contribute to processing difficulty on the basis of their accessibility in lexical retrieval. Apart from their frequency of use or their complexity in form, accessibility is also influenced by the number and roles of the related forms in the paradigms in which they are stored. This is a factor that so far has not been sufficiently taken into account. As is experimentally shown in this dissertation, a measure for this is the inflectional entropy, an information-theoretic measure that quantifies the support that a word receives from its inflectional paradigm, during activation. This study investigates how the speed of sentence processing is modulated by the interaction of the linguistic-imposed constraints and the processing resources, as quantified by the inflectional entropy, within- and between-sentences and within- and between-languages. The experimental data indicate that the processing speed of a reflexive object, like the Dutch zichzelf, unlike a definite NP like Maria, depends on how the main verb is processed, providing evidence that the reflexive's interpretation requires an operation on the verb. Moreover, it is demonstrated that processing speed benefits from rich morphology. In fact, morphologically rich languages, like Greek, despite having longer words and more complicated paradigms, also have verbs with higher inflectional entropy than morphologically poor languages, like Dutch. As such, they require fewer processing resources during first activation, boosting computations that are costly.