

## Tutorial on optimization-based grammatical frameworks and their cognitive foundations

This tutorial will introduce the grammatical framework of Optimality Theory (OT; [3], [5], [6]) within the context of a general theory of cognitive computation, Gradient Symbolic Computation (GSC; [7], [8], [9]). The tutorial will explain :

- how GSC gave rise originally to the precursor of OT, Harmonic Grammar (HG; [2], [4], [10]), in which the strengths of universal constraints within a particular grammar are encoded as numbers, and
- how GSC has led recently to a variant of HG, Gradient-symbolic HG (GHG; [1], [9]), in which linguistic representations are structures in which symbols (i) are present to varying degrees and (ii) may blend together within a single structural position.

Representations in GSG correspond directly to the ‘partially active’ structures ubiquitous in psycholinguistics and to the activation patterns of neuroimaging; indeed, GSG provides a formal theory that unifies linguistic competence and performance.

The Association Lecture of the conference will present a new GHG analysis of the well-studied phenomenon of liaison in French phonology. The latent liaison consonants (which alternate with zero) are formally encoded as literally weak — only partially present underlyingly. GSC enables a uniform formalization of multiple previous approaches to the analysis of liaison, and the new analysis literally blends these together. The resulting analysis provides a unified explanation of a wide diversity of liaison evidence concerning both competence and performance.

### References

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