

**Towards a computational(ist) neurobiology of language:
Correlational, Integrated, and Explanatory neurolinguistics (**Précis**)**

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Abstract: We outline what an integrated approach to language research that connects experimental, theoretical, and neurobiological domains of inquiry would look like, and ask to what extent unification is possible across domains. At the center of the program is the idea that computational/representational (CR) theories of language must be used to investigate its neurobiological (NB) foundations. We consider different ways in which CR and NB might be connected. These are (1) A *Correlational* way, in which NB computation is correlated with the CR theory; (2) An *Integrated* way, in which NB data provide crucial evidence for choosing among CR theories; and (3) an *Explanatory* way, in which properties of NB explain why a CR theory is the way it is. We examine various questions concerning the prospects for Explanatory connections in particular, including to what extent it makes sense to say that NB could be *specialized* for particular computations.

Questions

(Q1) Basic Question: How does the brain execute the different computations that make up language?

(Q2) Advanced Question: Is the fact that human language is made up of certain computations (and not others) explained by the fact that these computations are executed in neurobiological structures that have certain properties (and not others)?

Possible Connections

Correlational Neurolinguistics: CR theories of language are used to investigate the NB foundations of language. Knowledge of how the brain computes is gained by capitalizing on CR knowledge of language.

Integrated Neurolinguistics: CR neurolinguistics *plus* the NB perspective provides crucial evidence that adjudicates among different CR theories. I.e., brain data enrich our understanding of language at the CR level.

Explanatory Neurolinguistics: (Correlational+Integrated Neurolinguistics) *plus* something about NB structure/function explains *why* the CR theory of language involves particular computations and representations (and not others).

Questions about specialization (crucial for Explanatory Neurolinguistics)

Specialization Question 1: Are there particular levels of NB organization that are to be privileged as candidates for CR specialization?

Specialization Question 2: Are there particular parts of the CR theory that are more likely to be candidates for Explanatory Neurolinguistic explanation than others?