

Cognitively constrained parsers and supporting psycholinguistic evidence

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In psycholinguistics there has been increased interest in developing computational models of parsing to predict reaction times during reading. Two strategies are popular in this line of research: either a parser developed independently in computational linguistics is transported to psycholinguistics and some linking hypothesis is formulated that will connect the output of the parser to reaction times (e.g., Boston et al., 2011, Hale, 2014). Alternatively, a parser is developed directly by psycholinguists using a cognitively informed framework. The development is often done by hand-coding parsing rules (Lewis and Vasishth, 2005, among others).

In the talk I will discuss a combination of the two strategies: developing a data-driven parser that is embedded in a cognitively constrained framework from the start. I will use the cognitive architecture Adaptive Control of Thought-Rational (ACT-R, Anderson, 2007) as the framework in which the parser is embedded and show some ways of how a parser could be fit into ACT-R. Since the parser is not hand-coded, it generalizes to various experimental stimuli more easily, and since it is embedded in a framework that is used to model reaction times, it gives us predictions for reading experiments relatively straightforwardly.

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