Displacement Logic for Grammar

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Lecture 5

Comparisons

The Alternatives 1: Structural postulates

This is the methodology of MMTLG (Moortgat 1997[5]; Oehrle 2011[9]): multiple residuated base logics + structural postulates of inclusion between their modes. Instances are the underlyingly non-associative logics of scope $\mathrm{NL}_{\lambda/\mathrm{CL}}$ (Barker and Shan 2014[1]) and Lambek-Grishin calculus (Moortgat 2009[6]).

- This is as well for as far as it goes, for many years it has been mainstream, and **D** can, as we have seen, be considered a MMTLG, but the structural postulates increase derivation lengths and widen the proof/derivation search space. However as we have also seen, in **hD** the structural postulates are fully *absorbed* in the sequent syntax so that there are only logical rules, making derivations shorter and narrowing the proof/derivation search space.
- They deal with only scope whereas **D** addresses also e.g. discontinuous functors, parentheticals, cross-serial dependencies, comparative subdeletion, gapping, ...

- It could be argued that the structural postulates of $\mathrm{NL}_{\lambda/\mathrm{CL}}$ and Lambek-Grishin calculus might also be absorbed, but that would be for their proponents to show.
- The calculus of **D** is conceived from an algebraic semantics akin to language models whereas $\mathrm{NL}_{\lambda/\mathrm{CL}}$ and Lambek-Grishin calculus have only post-hoc frame semantics. It could be argued that the structural postulates of $\mathrm{NL}_{\lambda/\mathrm{CL}}$ and Lambek-Grishin calculus might also have algrebraic semantics, but that would be for their proponents to show.

The Alternatives 2: Lambda syntax

This is the methodology of including linear lambda abstraction for word order (Oehrle 1994[10]; ACG: de Groote 2001[2]; λ-Grammar: Muskens 2001[8]; HTLG: Kubota and Levine 2012[4]).

- In ACG and λ-Grammar, there is the KLM (Kubota, Levine, Moot) problem with non-directional linear types $B \circ\!\!- A$ that as a higher-order argument, there is no discrimination between continuous and discontinuous dependents $\circ\!\!- A$; consequently there is overgeneration of readings of right-node raising, and even of transitive verb coordination.

HTLG *fibres* (Gabbay 1999[3]) non-directional linear implication over the Lambek connectives and largely circumvents the KLM problem. However there is a remnant problem that in a higher order argument $(C \circ\!\!- B) \circ\!\!- A$ the left-to-right orders of the two discontinuous dependents B and A are not distinguished; consequently there is overgeneration of e.g. determiner gapping (Y. Kubota, p.c.):

(1) *Most$_i$ dogs like$_j$ Whiskas and I e_j e_i cats.

D has no such problems (Morrill and Valentín to appear[7]).


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Thank you!