1 Overview

- Any side effects regime can be grafted onto a continuized CCG. Give a general technique for accomplishing this, relate it to the ContT monad transformer (Liang et al. 1995).
- Yields two combinators. Type-theoretic way to track effects (Shan 2005).
- Dynamic semantics is (Shan 2001):[1]
  - State: ability to manipulate the discourse context, i.e. create discourse referents.
  - Nondeterminism: indefinites are
- No need to settle on "the" grammar. Functional application can live in its bones, and side effects can be grafted on, modularly. Lexical entries that would from a more flat-footed perspective seem completely incongruous can play together nicely.
- The perspective Barker 2002, Shan & Barker 2006, Barker & Shan 2014 is in a sense an instantiation of this general perspective, where the underlying monad is the Identity monad.
- Monads as a natural way to extend a continuations-based grammar with tools for dynamic binding and exceptional scope. In the end: you have functional application, plus the functors from whichever monads are implicated in a given language.
- Other techniques (DPL, DMG) not reducible to monads.

2 Adding side effects to κ

- Normal continuized grammar:
  - Lift
  - Lower
  - Continuized functional application
- Adding side effects (Wadler 1994, 1995, Shan 2002):
  - Replace Lift with $\star$
  - Replace Lower with η
  - Keep continuized functional application
- Two type constructors:
  - Bipartite Cont:
  - Unary Monadic:

1 NB: does not characterize all varieties of dynamic semantics. Dynamic treatments following Groenendijk & Stokhof 1990 (e.g. Zimmermann 1991, Szabolcsi 2003, de Groote 2006) provide a way for indefinites to extend their binding domain but do not treat indefinites as nondeterministic analogs of proper names.

3 Finding the dynamic monad

- A PLA-style system.
- Monad for state
- Monad for nondeterminism
- Use StateT to stitch the two together
- Static lexicon, dynamic lexicon
- Examples
- Interesting properties: no dynamic conjunction, completely standard model theory (cf. de Groote 2006).
- Binding, totally modularized
  - BarkerShan:
  - ▷

4

de Groote 2001 Charlow 2014

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