The interactive building of names

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1 Introduction

With the parsing and production of natural languages increasingly established as fully incremental processes, the observed interactivity of participants in developing the content of conversational dialogues becomes much less of a puzzling phenomenon (Purver et al., 2006; Gregoromichelaki et al., 2011; Howes et al., 2011; Ginzburg, 2012) In conversational dialogue, speakers and hearers can switch roles at any point so that linguistic dependencies can be split between participants at any level of the discourse including sub-sentential ones. One person provides the linguistic environment for establishing some upcoming dependency –a phrasal head, an antecedent, the source for some ellipsis– for which the other interlocutor provides the follow-up dependent element –a complement, a pronominal, the ellipsis site, etc. Here, we consider the co-construction and construal of indefinite existential terms, in which we see the same potential for distribution of the contributing expressions across more than one participant:

(1) A: She needs a a
B: mattock. For breaking up clods of earth.

(2) A: We visited
B: a friend of Granny's
A who is recovering from a post-op infection.

The goal is to argue that indefinites can be analysed, like all other natural language expressions, in terms of mechanisms which are grounded in the potential they allow for coordinative interaction, despite their quantificational nature and hence scopal properties.

2 Dynamic Syntax

We adopt the Dynamic Syntax framework as background, in which the process of constructing meanings from strings of words incrementally is central to explanations of syntactic and semantic phenomena of natural language. Underspecification of meaning-structure representations and update of these are core notions of the framework (Kempson et al., 2001; Cann et al., 2005). Both emergent content and the attendant shifting context are defined over the transition between partial representations (shown as binary branching trees), as driven by partly top down, partly bottom up processes, evolving on a word by word basis. Production and parse activities operate in tandem with reference to some current structural state in anticipation of some upcoming update. In either activity, essentially similar partial semantic trees are developed, and switch of roles is predicted to be seamless. The only difference between the activities is that whereas the parser has only a relatively weak goal to fulfill, the construction of some meaning from the linguistic input, the speaker has a more particular goal, that of the content of what she wishes to say, relative to which all construction steps have to be checked for commensurability.

Macros of action sequences triggered by words, constituting their contribution to interpretation, are a major source of the tree-growth progression. The emergent trees reflect the structure of some predicate-argument representation of content to be paired with some emergent NL string, the building of which is driven by a combination of general strategies and such lexically induced sequences of macros of actions. Quantifying expressions are taken to induce terms of the epsilon calculus, invariably of type e, denoting witness sets, as are temporal specifications, which are mapped onto sortally restricted eventuality terms, both being built up as part of the process of meaning construction. These "syntactic" mechanisms, being meta- to the representations themselves, are actions defining HOW parts of representations of content can be introduced and updated, all such growth being relative to context, itself an evolving sequence of (partial) tree structures. Reflect-

ing compositionality of content as defined on such output trees, the individual nodes of that tree carry decorations of the (sub)-formulae of the predicate-argument formula finally derived. The update process taken to yield such a tree operates subject to a strict word-by-word incrementality. At all non-final stages of tree construction, there are open requirements that need to be satisfied. These take the form of $?X$ for any annotation X and the system defines actions that give rise to (possibly modal) expectations inducing further actions at subsequent stages of tree development. The progressive satisfaction of requirements as these get incrementally introduced yields incremental updates of some emergent structure towards some overall goal, the output tree with no requirements outstanding.

Recent work (Kempson, Fcmg) has argued that anaphora and predicate ellipsis are canonical instances of interaction in virtue of the antecedent-expression chains built up both within and across utterance boundaries, anaphorically and cataphorically. Furthermore, the mechanisms underpinning local and long-distance discontinuities are equally interactive, in displaying the same dynamic patterning allowing some underspecified parameter to be resolved: from established context; from local context emergent from the construction process; or even, given the domain-general vocabulary within which partial concepts are constructed, from the visual or other non-linguistic environment. The proposed presentation extends this argument to indefinite NP construal, which are defined as dependent terms. We will show how the construal of indefinite NPs is procedurally established over the course of a dialogue exchange, with the same range of forms of resolution and possibly with switch of speaker/hearer: dependency on a term already in context as in (1)-(3), dependency on a term to be subsequently locally constructed as in (4), and indexically (5):

(3) A: Will everyone in the competition need a...
B: a mattock? The ground is certainly very hard.

(4) A: A nurse interviews every patient
B: on which ward?
A: all of them. It is standard practice.

(5) A: A nice day at last.
B: Yes, isn't it.

Dynamic Syntax is uniquely well placed to model this phenomenon, as scope dependencies associated with quantifying expressions are induced on a step by step basis, these dependencies being defined as constraints on interpretation. There is thus a two-part construction process for quantifying terms: first, a process that induces the progressive construction of names, with scope dependency statements incrementally gathered together; second, an evaluation step in which the relationships of the constructed term to others within the overall construction are spelled out. At any point other than the final evaluation step, shift of roles is licensed, as in all cases this is made relative to a context having been constructed by either party, so no information is lost. Semantic construal of determiners is lexically defined and so allows variation across types, indefinites thus projecting an underspecified representation so that choice of scope dependency is determined by a free choice mechanism, analogous to pronouns. The apparent delay of projection of content in cases such as (5) is consistent with the incrementality requirement, being merely the anticipated combined effect of word-by-word processing and the update of partial specifications of content (analogous to expletive pronouns). The result is a characterisation of the flexibility of indefinites on a principled basis, enabling quantification construal, like all other aspects of natural-language structure and content, to be seen as grounded in mechanisms for coordinative interaction.

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