Pottsian LFG

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Potts (2005) provides a very appealing account of the semantics of (*inter alia*) 'supplementals' such as appositive relative clauses (ARCs). This paper considers how the approach can be implemented in the architecture of LFG, with ARCs as the focus for exemplification (a side effect is thus to provide a novel account of ARCs in LFG).[1]

Potts' central idea is that the interpretation of every expression involves two dimension: an *at-issue* dimension of normal truth-conditional content, and a 'conventional implicature' *ci-dimension*. In addition to the normal logical types e, t, $\langle e, t\rangle$, etc, his type theory includes *ci-types*, such as $\langle e, t^c\rangle$, which takes a normal 'at-issue' entity to a ci-proposition. In the case of an ARC such as (1) the at-issue content of the subject NP will just correspond to *Kim* (type e), and the ci-content will be the proposition that Sam dislikes Kim (type t^c).

(1) *Kim, who Sam dislikes*, will not come.

Since Potts stipulates that there are no functions of type $\langle a^c, b\rangle$ for any types a, b (that is, no functions from the ci-dimension), this provides an appealing account of the way supplementals are interpreted, e.g. the familiar 'wide scope' behaviour of ARCs.

Potts, (p85ff) notes that the approach seems problematic from a resource sensitivity perspective, since it seems that part of the content is consumed twice (e.g. the content of the host NP contributes to both at-issue and ci-dimensions, so it is consumed twice, once in each dimension). He sketches a solution whereby an emotive adjective like *damn* is associated lexically with a resource like (2).

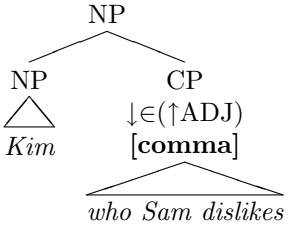
(2) $f \multimap [f \otimes p^c]$

Thus an emotive like *damn* will combine with a noun like *Republican* to produce two resources: an at issue resource (f) corresponding to the normal meaning of *Republican*, and a ci-resource (p^c) corresponding to something like $bad'(Republican')$, which expresses disapproval of Republicanism.

The suggestion is not developed beyond this description of a resource, and he does not consider whether the approach can be generalized to deal with ci-content that is not lexically based. We attempt to remedy this here.

We assume a rather conventional structure for ARCs, as in (3), where [**comma**] is a meaning constructor taking the normal RRC semantics of *who Sam dislikes* into ARC semantics.

(3)



In relation to (3) we propose that the meaning of *Kim, who Sam dislikes,* can be produced by consuming the resources corresponding to *Kim* and *who Sam dislikes*, contributing a 'tensor' resource $K_{\langle e\rangle} \otimes WhatSamDislikes_{\langle t^c\rangle}$, involving resources of types e and t^c.

We follow the analysis of restrictive relatives (RRCs) in Dalrymple (2001, 416ff): semantically, RRCs are functions from noun semantics to noun semantics (i.e. an RRC consumes, and produces, a resource of type $\langle e, t\rangle$ — from a Pottsian perspective, both resources are entirely within the at-issue dimension).

If we abbreviate to $\mathcal{P}$ the actual content of the relative clause, we have (4).

(4) $\lambda Q.\lambda X.\mathcal{P} \wedge Q(X) : [v_{\langle e\rangle} \multimap r_{\langle et\rangle}] \multimap [v_{\langle e\rangle} \multimap r_{\langle et\rangle}]$

Here $v_{\langle e\rangle}$and $r_{\langle et\rangle}$are abbreviations for $(ADJ \in \uparrow)_\sigma VAR)$ and $(ADJ \in \uparrow)_\sigma RESTR)$, which are the resources associated with VAR and RESTR of $(ADJ \in \uparrow)_\sigma$ — the resource corresponding to the modified noun (the noun of which the relative clause is an adjunct).

To make this more concrete, the semantics of the RRC *who Sam dislikes* will be as in (5).

(5) [**who Sam dislikes**] $= \lambda Q.\lambda X.person(X) \wedge\ dislikes(Sam, X) \wedge\ Q(X) : [v_{\langle e\rangle} \multimap r_{\langle et\rangle}] \multimap [v_{\langle e\rangle} \multimap r_{\langle et\rangle}]$

[1] Existing LFG work on related constructions includes Fortmann (2006), where the treatment involves f-structure 'orphans'. This does not deal with the semantics, which is our main focus here. In the full paper we will present evidence that such an orphan approach not appropriate for at least some supplementals, including ARCs.

We define [**comma**] as in (6), where h is an abbreviation for $(ADJ \in \uparrow)_\sigma$ (the resource associated with the host NP).

(6) $[\textbf{comma}] = \lambda P.\lambda Y.[Y, (P(\lambda Z.true))(Y)] : [[v_{\langle e\rangle} \multimap r_{\langle et\rangle}] \multimap [v_{\langle e\rangle} \multimap r_{\langle et\rangle}]] \multimap [h_{\langle e\rangle} \multimap [h_{\langle e\rangle} \otimes h_{\langle t^c\rangle}]]$

On the glue side, this consumes an RRC-like resource, and produces a resource of the kind Potts suggested in (2); on the meaning expression side, it is a function that applies to an RRC meaning expression, does some type lowering (cf. $\lambda Z.true$), and yields an expression $\lambda Y.[Y, T]$, a function from individuals to a pair of meaning expressions. If we abbreviate to $\mathcal{M}$ the restrictive meaning of *who Sam dislikes*, we have (7), expanding this abbreviation, we have (8).

(7) $\lambda P.\lambda Y.[Y, (P(\lambda Z.true))(Y)](\mathcal{M}) : h_{\langle e\rangle} \multimap [h_{\langle e\rangle} \otimes h_{\langle t^c\rangle}] =$
$\lambda Y.[Y, (\mathcal{M}(\lambda Z.true))(Y)] : h_{\langle e\rangle} \multimap [h_{\langle e\rangle} \otimes h_{\langle t^c\rangle}]$

(8) $\lambda Y.[Y, (\lambda Q.\lambda X.person(X) \wedge dislikes(Sam, X) \wedge Q(X)(\lambda Z.true))(Y)] : h_{\langle e\rangle} \multimap [h_{\langle e\rangle} \otimes h_{\langle t^c\rangle}] =$
$\lambda Y.[Y, (\lambda X.person(X) \wedge dislikes(Sam, X) \wedge \lambda Z.true(X))(Y)] : h_{\langle e\rangle} \multimap [h_{\langle e\rangle} \otimes h_{\langle t^c\rangle}] =$
$\lambda Y.[Y, (\lambda X.person(X) \wedge dislikes(Sam, X) \wedge true)(Y)] : h_{\langle e\rangle} \multimap [h_{\langle e\rangle} \otimes h_{\langle t^c\rangle}]$

If the meaning constructor associated with *Kim* is $Kim{:}h_{\langle e\rangle}$, we can now produce (9).

(9) $\lambda Y.[Y, (\lambda X.person(X) \wedge dislikes(Sam, X) \wedge true)(Y)](Kim) : h_{\langle e\rangle} \otimes h_{\langle t^c\rangle} =$
$[Kim, (\lambda X.person(X) \wedge dislikes(Sam, X) \wedge true)(Kim)] : h_{\langle e\rangle} \otimes h_{\langle t^c\rangle} =$
$[Kim, (person(Kim) \wedge dislikes(Sam, Kim) \wedge true)] : h_{\langle e\rangle} \otimes h_{\langle t^c\rangle}$

Thus, corresponding to *Kim, who Sam dislikes,* we have, on the meaning side, a pair of meanings (corresponding to *Kim*, and the proposition that Sam dislikes Kim). On the glue side, we have two corresponding resources, one in the at-issue dimension, and one in the ci-dimension.

In order to deal with these resources separately, we will need a new inference rule, as in (10) (inspired by the Context Split rule of Dalrymple (2001, p297)):

(10) $\dfrac{[M, M'] : R_e \otimes R_{t^c}}{M : R_e \quad M' : R_{t^c}}$

The resource corresponding to *Kim* can now be consumed by the main verb, in the normal way. If – in Pottsian fashion – we assume that there are no meaning constructors that consume ci-resources, the end result will be two resources: an at-issue resource corresponding to *Kim will not come*, and a ci-resource expressing the proposition that Sam dislikes Kim. The ci-resource will remain entirely separate from the at-issue content, accounting for the wide-scope interpretation of the ARC.

This is a promising result – it suggests that we can directly incorporate Potts's approach, and his analyses of particular phenomena, into the LFG framework. It raises two kinds of question, which are addressed in the full paper.

First, there are questions of empirical adequacy: does the account capture/explain the well-known idiosyncrasies of the construction in English, and does it generalize to other kinds of supplemental, e.g. appositive NPs (*Kim, a cyclist*)?

Second, it is interesting to ask whether there are alternative implementations of Potts ideas, and whether they involve substantive differences and/or empirical advantages. For example, can the projection architecture of LFG be exploited to dispense with Potts' non-standard ci-types? Suppose we introduce an additional semantic projection, *ci*, separate from, but similar to the normal σ-projection. In place of the glue expression in (8), we might have something like $h_{\langle e\rangle} \multimap [h_{\langle e\rangle}, \uparrow_{ci}]$, where the resource associated with the antecedent NP belongs to the σ projection (as usual), but the resource associated with the ARC belongs to this *ci*-projection. A further, even simpler, possibility would be to directly associate the content of the ARC with the root clause, i.e. to replace the glue in (8) with something like $h_{\langle e\rangle} \multimap [h_{\langle e\rangle}, \uparrow^*_\sigma]$, where $\uparrow^*$ abbreviates an inside-out functional uncertainty expression that denotes the root f-structure.

References

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