

Relative clauses

Patrick D. Elliott

March 4, 2020

Do we face von Stechow's problem for pied-piping in relatives?

1 Null operator theory

Let's start by defining a new type constructor:

$$(1) \quad R\ a := e \rightarrow a$$

The relative operators is an inhabitant of $R\ e$ (an identity function):

$$(2) \quad Op_{Rel} := \lambda x . x \qquad R\ e$$

We can shift a relative operator into a scope taker via a shifter we can call Q_{Rel} .¹

¹ This is a flipped version of the `fmap` of the Reader functor.

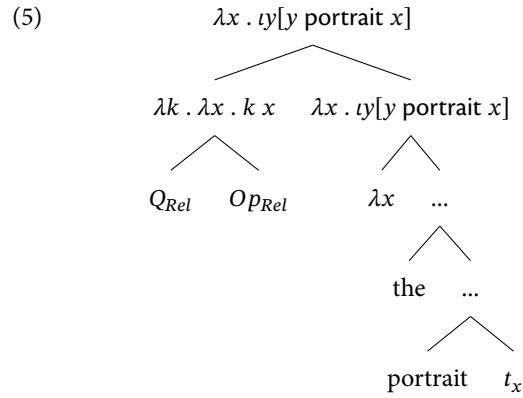
$$(3) \quad Q_{Rel}\ m := \lambda k . \lambda x . k\ (m\ x) \qquad R\ a \rightarrow (a \rightarrow b) \rightarrow R\ b$$

Now we have everything we need to get simple pied-piping:

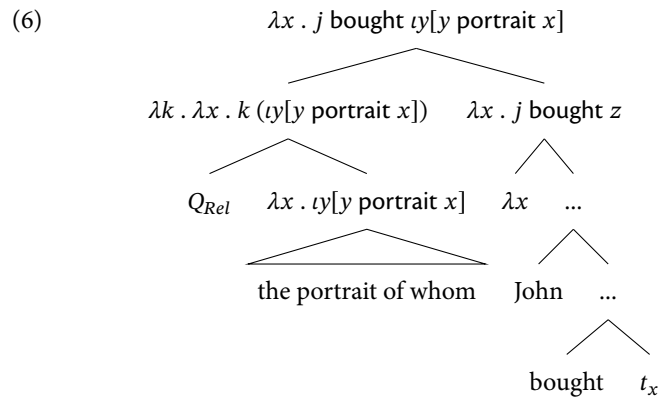
$$(4) \quad \text{Mary met the man } [[\text{the portrait of whom}] \text{ John bought}].$$

1.1 Composition via QR

Let's start with the composition of the pied-piped DP – we shift the relative operator to a scope-taker via Q_{Rel} , and scope it to the edge:



Now we shift the result into a scope-taker via Q_{Rel} , and scope it to the edge of the relative clause, returning a derived predicate:



1.2 Composition via (indexed) continuations

Since continuations do meaning composition *in-situ*, the semantic component should be accompanied by a (directly compositional) syntactic component.

I'll assume that the atoms of computations are pairs of phonological features and meanings.

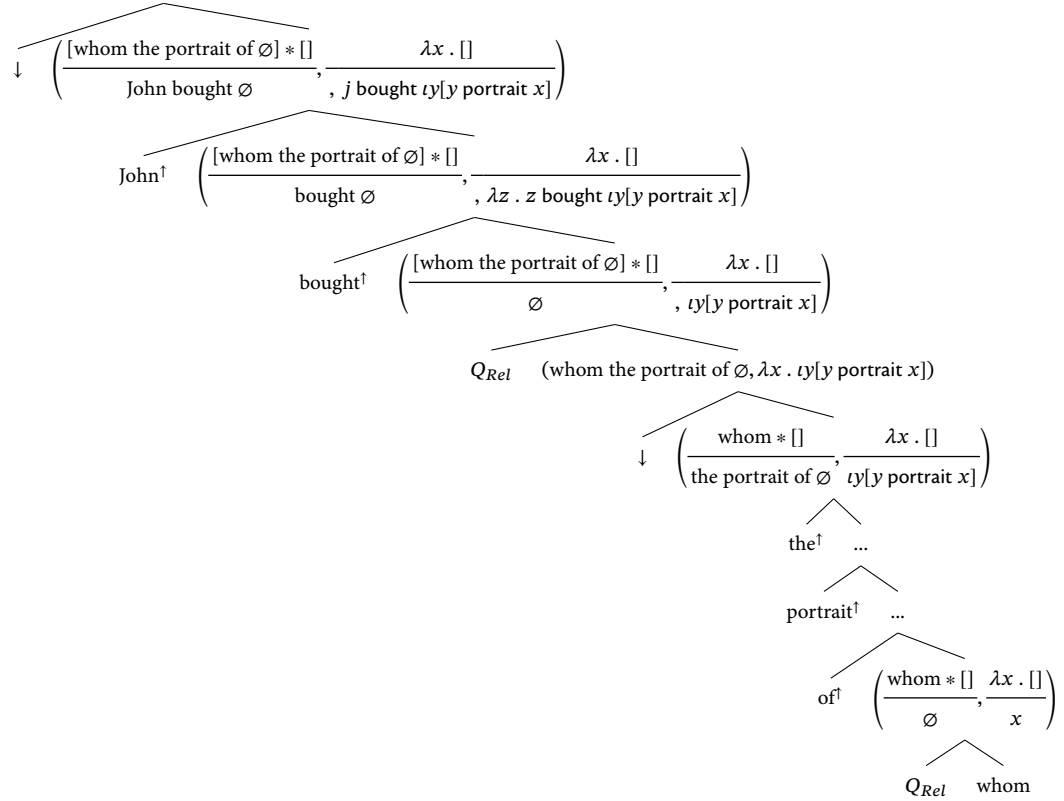
(7) Mary met the guy the portrait of whom John bought

$$(8) \quad Q_{Rel} (\mathbb{X}, m) := \left(\frac{\mathbb{X} * []}{\emptyset}, \frac{\lambda x . []}{m x} \right)$$

$$(9) \quad Op_{Rel} := (\text{whom}, id)$$

$$(10) \quad (m, n)^\dagger := (m \text{ id}, n \text{ id})$$

(whom the portrait of \emptyset John bought \emptyset , $\lambda x . j$ bought $\iota y[y \text{ portrait } x]$)

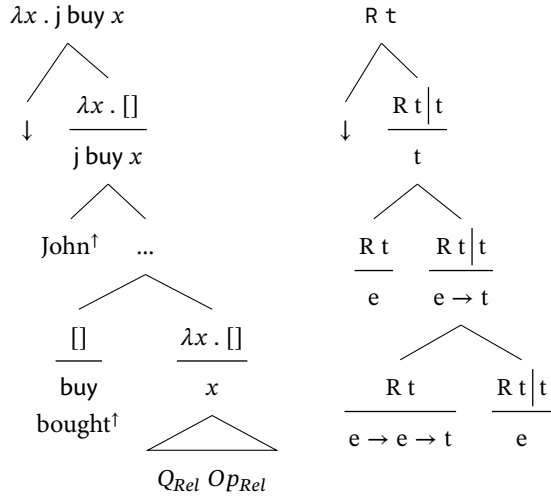


We can think of the result of applying Q_{Rel} as a tower, in [Barker & Shan's \(2014\)](#) terms.

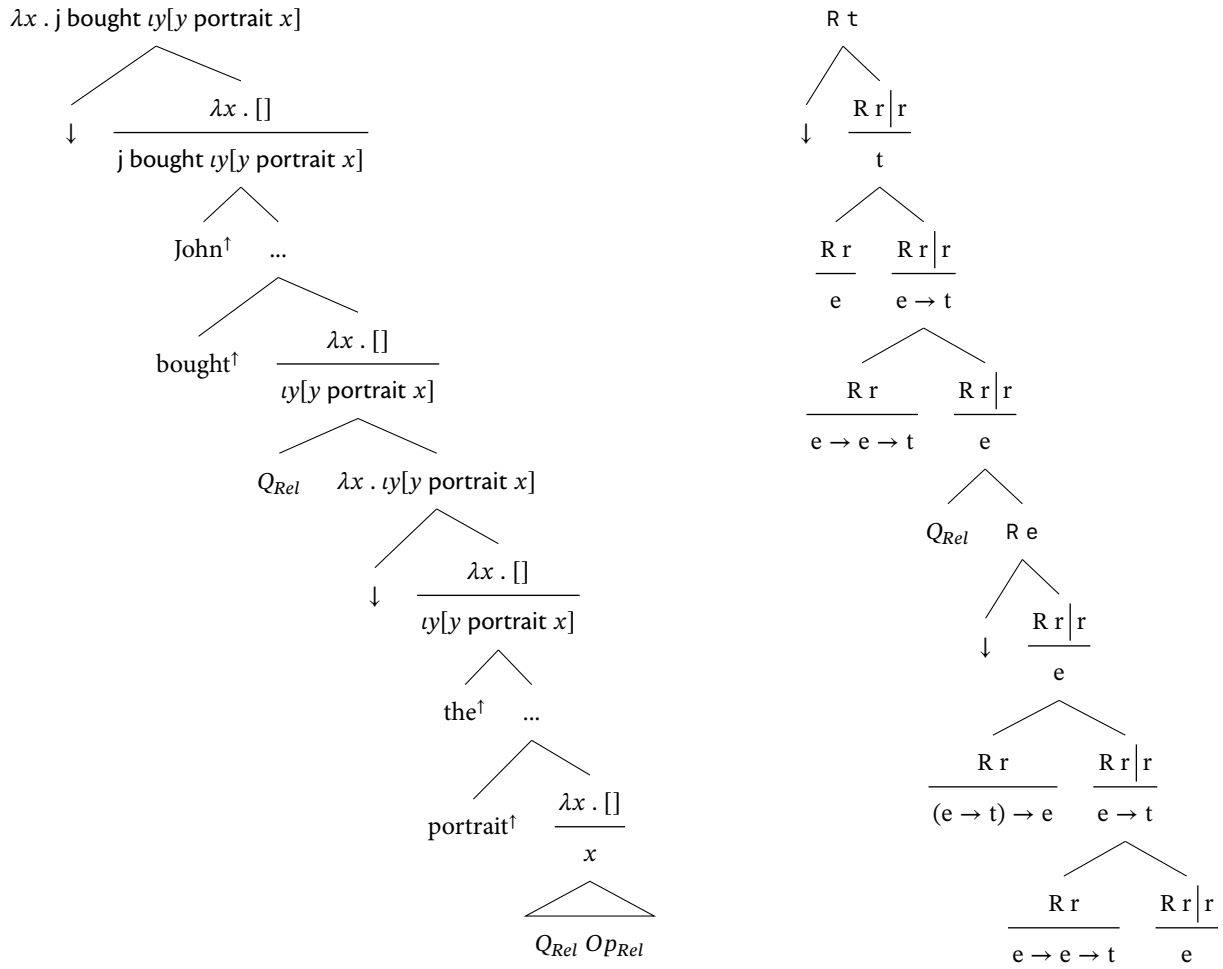
$$(11) \quad Q_{Rel} Q_{Op} = \frac{\lambda x . []}{x} \qquad \frac{R \ b \mid b}{e}$$

Composition may now proceed *in-situ* via *lift* and *scopal function application*.

(12) That John bought.



(13) The portrait of whom John bought.



2 Islands

We can cash out the islandhood of relative clause with the following condition:

- (14) Islandhood of relative clauses
Relative clauses must denote an evaluated type (R e).

In a framework in which continuations are used for meaning composition, a consequence will be that relative clauses with multiple relative operators won't compose.

References

Barker, Chris & Chung-chieh Shan. 2014. *Continuations and natural language* (Oxford studies in theoretical linguistics 53). Oxford University Press.
228 pp.