Multidominance and semantic interpretation:
a novel perspective on composition and the semantics of ECM and extraposition

In both Adjunct Extraposition (AE,1) and Exceptional Case Marking infinitival constructions (ECM,2), prima facie, the meaning of a complex expression seems to contain the semantic contribution of elements that are not syntactically contained within it. :

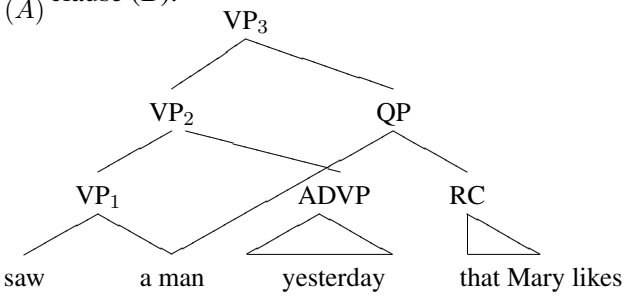
(1) AE: I gave him$_i$ a picture yesterday from John$_i$'s collection

(2) ECM: John figured **Mary** out yesterday to be the thief

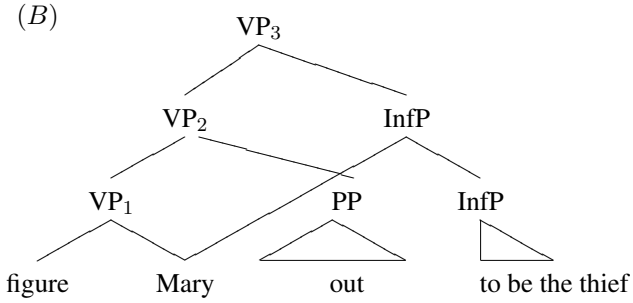
In (1) the meaning of the object NP includes the contribution of the VP external modifier that cannot have a VP internal origin given the absence of condition- C effect (from Fox and Nissenbaum 1999, F&N). In the case of (2) the verb syntactically combines with an NP but semantically composes with the meaning of the infinitival clause that must follow VP modifiers. Both are difficult cases to analyze within standard accounts. We propose to analyze these two structures as cases of multidominance. We provide a novel predicate abstraction rule that generalizes the semantic analysis of movement (Heim and Kratzer 1998, H&K) to multidominance. Finally, we argue that our proposal offers a straightforward derivation, and an extension, of the observation that the NP in AE cannot be interpreted (scope wise) inside the VP (F&N's Williams generalization, 7) .

We suggest to analyze both AE and ECM as cases of *parallel merge* (a.k.a multidominance, McCawley 1982; Citko 2005) of the NP, an extension of *internal merge* (Engdahl 1986; Chomsky 2001; Starke 2001). In AE, the NP is shared between the VP and a VP-adjunct quantifier (that contains the relative clause, A). In ECM, it is shared between the VP and a VP-adjunct Infinitival clause (B).

(A)



(B)



The structure in (A) solves the puzzle in (1) (formalizing F&N's *late merge*). The syntactic analysis of ECM in (B) captures the hybrid status of the NP, which exhibits properties both of infinitival subject (e.g. the availability of expletive subjects) and of matrix object (e.g. case, accessibility to passivization). Multidominance analysis fares better than the ECM as ECM analysis (Chomsky 1973) for cases such as (2) where the infinitival must be separated from the NP by matrix VP material (*John figured Mary to be the thief out yesterday). It fares better than a movement analysis (Lasnik, 1995) for prepositional ECM cases (3):

(3) Mary counted on John to do the dishes

The analysis of the infinitival clause as an adjunct to a transitive VP captures the otherwise surprising syntactic generalization that all ECM verbs in English have also a transitive frame. This generalization is not trivially accounted for in the standard analysis that assumes ECM to be a distinct verbal frame. The differences between ECM and AE (such as extractability) are due to the differences in the category of the adjunct (DP, a phase, vs. InfP).

H&K's predicate abstraction rule (even when adapted to the *internal Merge* framework, 4) cannot be applied in the case of AE and ECM or multidominance more generally. In these configurations

there is no c-command relation (or scope) between the distinct occurrences of the shared element. However, a straightforward weakening of (4) would (5).

Preliminaries: A syntactic structure is a set of nodes, where each node (Y_1), identified by a unique address (1), is associated with a list of addresses of its daughters (Dr(Y)=$\{P_2,X_3\}$) and DOM(Y), the set of nodes reflexively dominated by it. A node cannot dominate itself (preventing cyclic graphs) but the same node can be the daughter of more then one mother. Semantically, each node can contribute either its lexical/composed meaning or a variable (its address). $[\![Y]\!]_{X_2/2}$ is a shorthand standing for the interpretation of Y where X is interpreted as the corresponding variable 2. $[\![P]\!]@[\![X]\!]$ is direction insensitive functional application. The type of the variable 2 in $[\![Y]\!]_{X/2}$ is the lowest type which permits functional application $[\![P]\!]@2$.

(4) H&K abstraction rule revised:

1. if $Dr(C) = \{A_z, B\}$ & $A_z \in DOM(B)$, Then :
2. $[\![C]\!] = [\![A]\!]@\lambda z.[\![B]\!]_{A/z}$

(5) A generalized abstraction rule:

1. if $Dr(C) = \{A, B\}$ & $\exists X_z.X_z \in DOM(A) \cap DOM(B)$, Then :
2. $[\![C]\!] = [\![A]\!]@\lambda z.[\![B]\!]_{X/z}$

In the revised rule (5), the c-command requirement is replaced by a sister containment requirement that is formally weaker. Informally, when we apply (5) to multidominance structures (as in A or B) the shared element will be interpreted lexically in one of the sisters and as a variable inside the other sister. The variable will be bound (via abstraction) *at the height of the merger point* of the constituents containing the shared node, turning one of the sisters into a function that can then compose with its sister. (5) has the same effect of (4) in cases of *internal Merge*.

In AE and ECM, by (5), the shared NP is interpreted lexically within the adjunct and as a variable inside the VP, which is abstracted on at the height of VP_2. In the case of ECM, the variable is of a propositional type (since ECM verbs, in their transitive frames, all S-select for propositional objects). VP_2 is then turned into an $< s, et >$ function that then combines with the propositional meaning of the infinitival adjunct. In the case of AE, the variable receives a type e interpretation and so VP_2 (originally a function of type $< e, t >$) is turned into a function of type $< e, et >$, identical to a transitive verb, that then standardly combines with the quantifier meaning of the adjunct. Though any semantics for object quantifiers would do, for concreteness we adopt here an 'in-situ' semantics for object quantifiers (informally sketched in 6):

(6) $[\![\text{A man that Mary likes}]\!] = \lambda P_{<e,<e,t>>}.\lambda k_e.\exists y.man'(y) \wedge MaryLikes'(y) \wedge P(y)(k)$

Our proposal provides an explanation for William's Generalization that the scope of the NP in AE must be at least as high as the attachment site of the adjunct modifier:

(7) a. I looked (very intensely) for anything that would help me with my thesis (very intensely)

b. * I looked for anything very intensely that will/would help me with my thesis

In (7b, from F&N) AE interferes with the licensing of the free-choice *any* by the verb. Since *any* would be multidominated in (7b), it will be interpreted as a variable of type e inside the VP and lexically as part of the VP adjunct quantifier. By (5) the VP will be turned into a transitive-verb-like function that will then be combined with the quantifier, itself outside the scope of the lexical verb. Parallel scope effects in ECM (Postal, 1974) can also be accounted for:

(8) The FBI proved that few students were spies (both wide and narrow scope *few*)

(9) The FBI proved few students to be spies (only wide scope *few*)