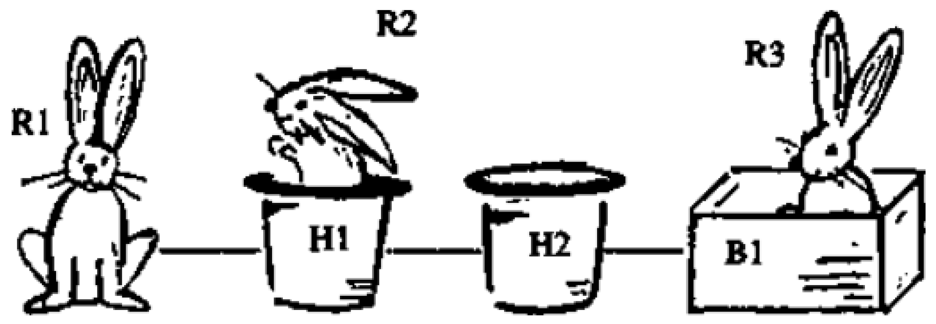
Decomposing definiteness: Effects of delayed quantification in descriptions

Dylan Bumford New York University Semantics and Linguistic Theory 26

Haddock: Polyadic uniqueness



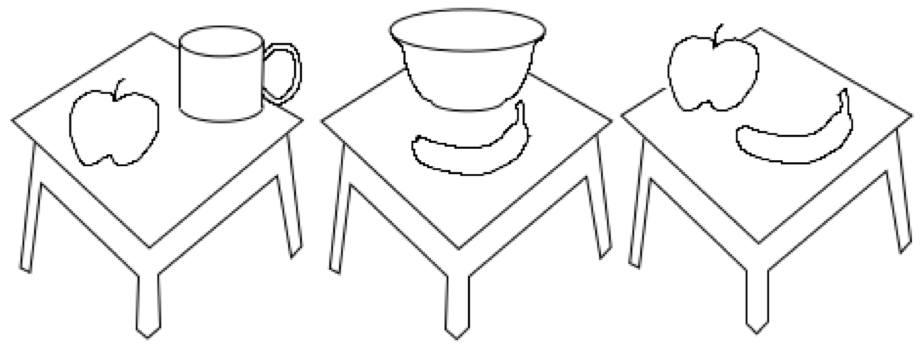
(1) the rabbit in the hat

a. [the rabbit in u]$_v$

b. [the hat v is in]$_u$

Haddock's (1987) observation: the description in (1) refers to R2, despite undefinedness of 'the hat'

Stone & Webber (1996): indeed, polyadicity totally general; e.g., (2) refers to the rightmost table



(2) the table with the apple and the banana

a. [the table with u and v]$_w$

b. [the apple s.t. w is with it and v]$_u$

c. [the banana s.t. w is with u and it]$_v$

Haddock's intuition: description as *Constraint Satisfaction Problem*

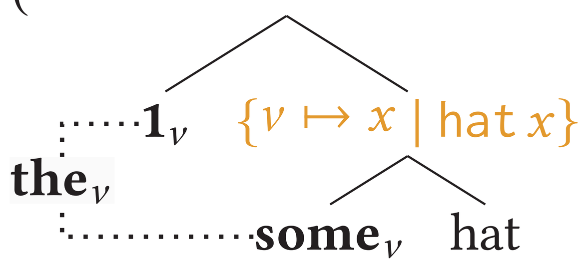
x y
rabbit x
in y x
hat y

How to derive compositionally?

Decomposed definite

Hypothesis: Definite determiner lexically factored into distinct referent-introducing and quantificational components

$$\begin{cases} G & \text{if } \left|\{g\,v \mid g \in G\}\right| = 1 \\ \# & \text{otherwise} \end{cases}$$



Fragment

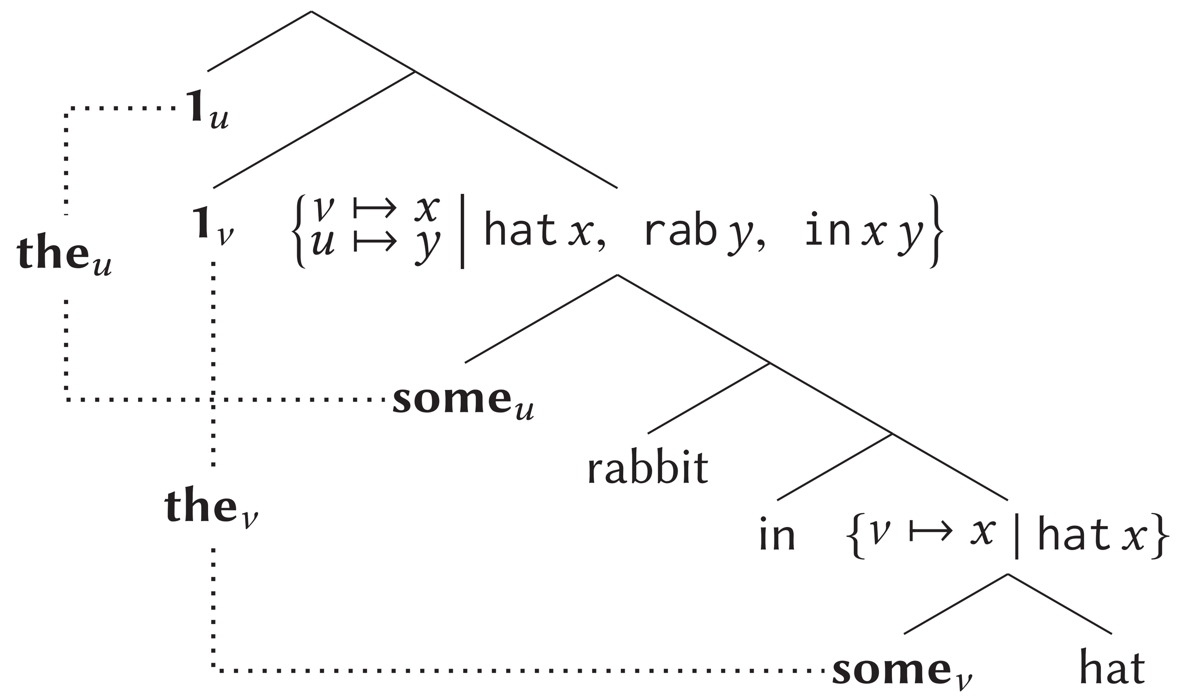
Item	*Type*	*Denotation*
some$_u$	$(e \to \mathbb{D}_t) \to \mathbb{K}_e$	$\lambda c \lambda k \lambda g. \bigcup\{k\,x\,g' \mid x \in \mathcal{D}_e,\ \langle \mathsf{T}, g'\rangle \in c\,x\,g^{u \mapsto x}\}$
1$_u$	$\mathbb{F}_\alpha$	$\lambda m \lambda g{:}\ \lvert\{g'\,u \mid \langle a, g'\rangle \in m\,g\}\rvert = 1.\ m\,g$
the$_u$	$\mathbb{K}_{(e \to \mathbb{D}_t) \to \mathbb{K}_e}$	$\lambda k \lambda g.\ \mathbf{1}_u\,(k\,\mathbf{some}_u)\,g$
est$_u$	$(e \to e \to t) \to \mathbb{F}_\alpha$	$\lambda o \lambda m \lambda g.\ \{\langle a, g'\rangle \in m\,g \mid \neg\exists\langle b, h'\rangle \in m\,g.\ o\,(h'\,u)\,(g'\,u)\}$
M$_v$	$\mathbb{F}_\alpha$	$\mathbf{est}_u\,(\sqsubset) \equiv \lambda m \lambda g.\ \{\langle a, g'\rangle \in m\,g \mid \neg\exists\langle b, h'\rangle \in m\,g.\ h'\,u \sqsubset g'\,u\}$

$\mathbb{K}^\rho_\alpha \equiv (\alpha \to \rho) \to \rho$

$\mathbb{D}_\alpha \equiv g \to \{\alpha * g\}$

$\mathbb{F}_\alpha \equiv \mathbb{D}_\alpha \to \mathbb{D}_\alpha$

Derivations



(3) the rabbit in the hat

Step 1: The indefinite component of 'the' builds a set of potential witnesses for the nominal, here, 'hat'

Step 2: The outer indefinite constrains this set to just those hats with rabbits in them, and adds a discourse marker to the model associated with the new rabbits

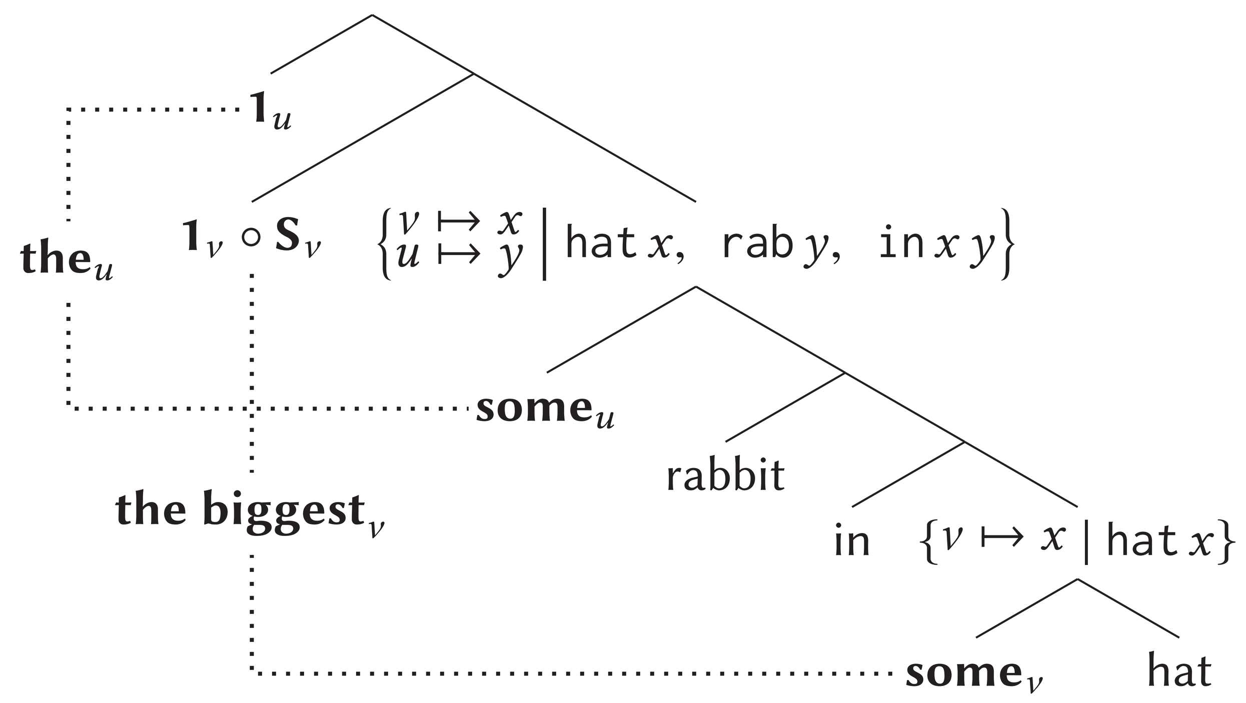
Step 3: Only then do the uniqueness checks take action, ensuring a unique hat-with-rabbit and rabbit-in-hat, respectively

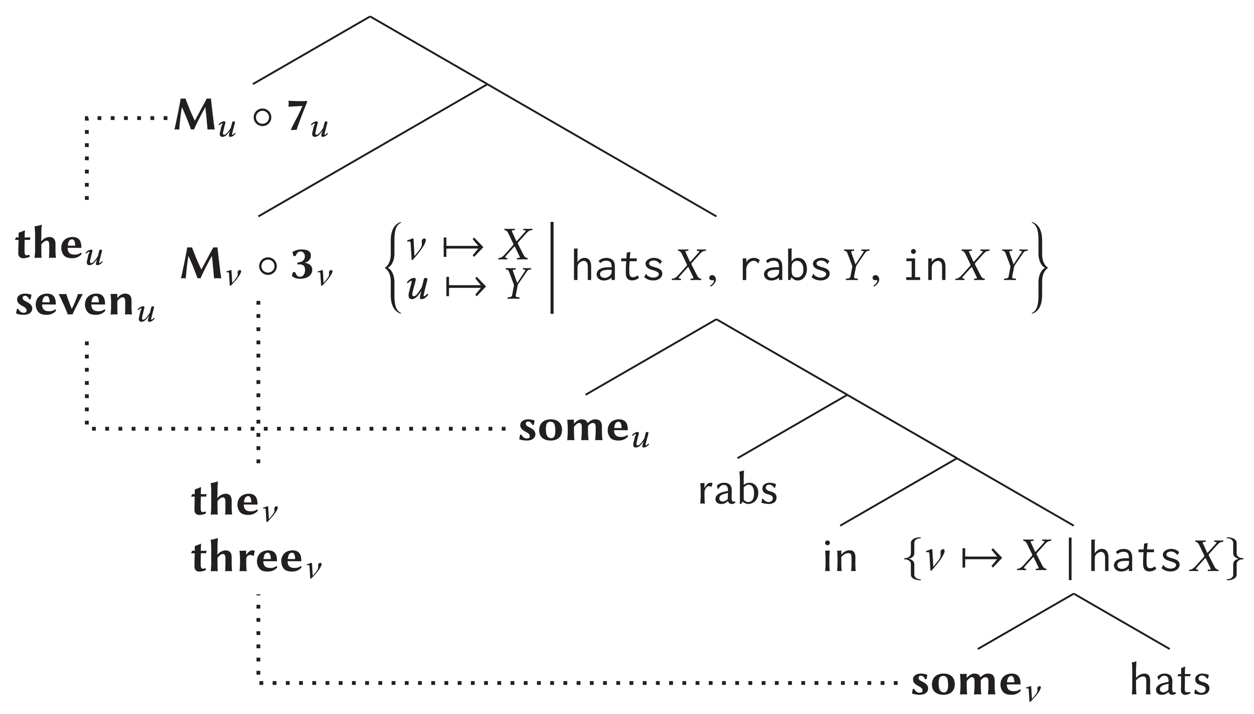
(4) the rabbit in the biggest hat

Steps 1–2: As before

Step 3: The superlative operator filters out alternatives that are dominated in the choice of v, i.e. those that assign v to a smaller individual than some other alternative does

Step 4: The cardinality tests then ensure a unique rabbit in that unique largest rabbit-containing hat





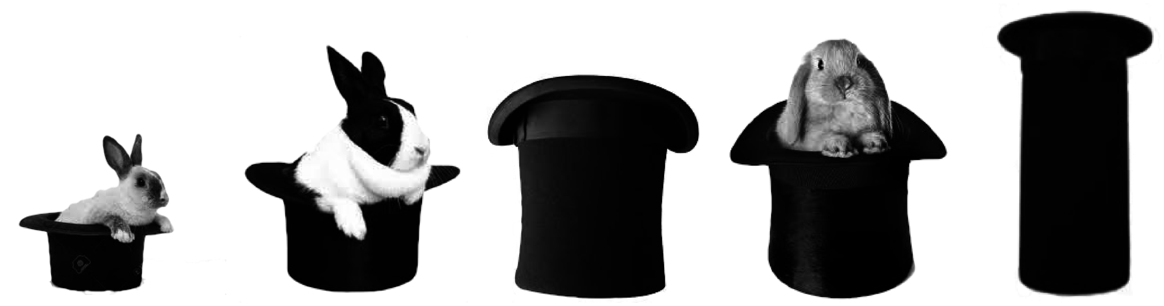
(5) the seven rabbits in the three hats

Steps 1–2: As before

Step 3: $\mathbf{3}_v$ guarantees that the alternative outputs contain, across them, three distinct atomic hats stored at v; $\mathbf{M}_v$ discards any outputs that don't map u to the entire triplet

Step 4: $\mathbf{7}_u$ tests that cumulatively contained in these three entities are seven rabbits; $\mathbf{M}_u$ leaves only the outputs mapping u to the total heptatomic hare

Superlatives



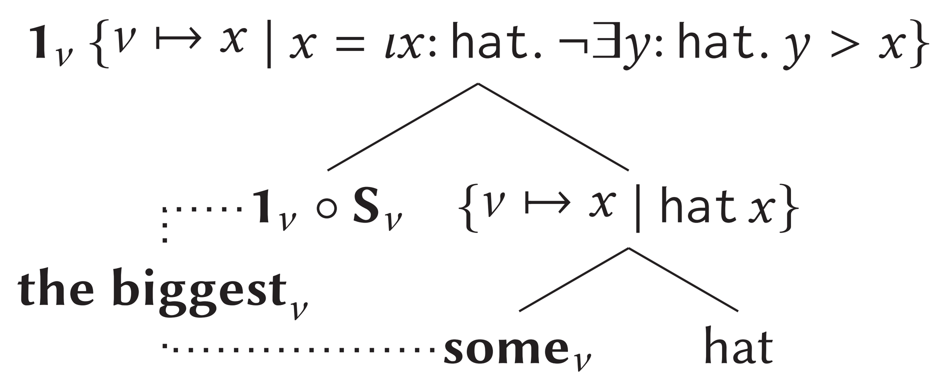
(6) the rabbit in the biggest hat

a. [the rabbit in x]$_y$

b. [the hat bigger than any hat with a non-y rabbit]$_x$

c. ≈ 'the rabbit in the biggest hat with a rabbit in it'

$\mathbf{S}_u = \lambda G.\ \{g \in G \mid \neg\exists g' \in G.\ \mathtt{size}\,(g'\,u) > \mathtt{size}\,(g\,u)\}$



Numerals

(7) the seven rabbits in the three hats

a. [the rabbits in X]$_Y$; $|Y| = 7$

b. [the hats Y are in]$_X$; $|X| = 3$

c. ≈ 'the 7 rabbits in the 3 hats with rabbits in them'

Numerals at an index count the number of distinct atoms across alternatives

$$\mathbf{3}_u = \lambda G. \begin{cases} G & \text{if } \left|\bigcup\{\text{atoms}\,(g\,u) \mid g \in G\}\right| = 3 \\ \emptyset & \text{otherwise} \end{cases}$$

Maximality as superlative: eliminates any alternatives that are dominated by others in their choice of u

$\mathbf{M}_v = \lambda G.\ \{g \in G \mid \neg\exists g' \in G.\ g\,u \sqsubset g'\,u\}$

References

Haddock, N. 1987. Incremental interpretation and Combinatory Categorial Grammar. *10th International Joint Conference on Artificial Intelligence.*

Stone, M. & B. Webber. 1998. Textual economy through close coupling of syntax and semantics. *INLG*, 178—187.

Bumford, D. 2016 ms. Split-scope definites: Haddock descriptions and relative superlatives.