p-set 2

Patrick D. Elliott[1] *& Martin Hackl*[2]

[1] pdell@mit.edu

[2] hackl@mit.edu

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Deadline: 02.20 (i.e., before next class)

1 Warming up

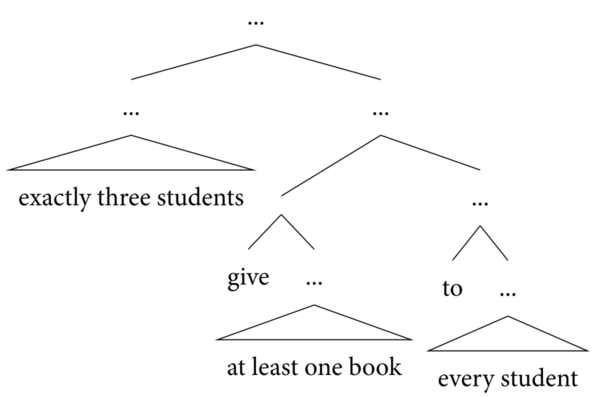
Compute the indicated reading of the following sentence:

(1) Exactly three students gave at least one book to every girl.

$\forall$ > atLeastOne > exactlyThree

Assume (roughly) the following syntax:

(2)



Note:

- You'll probably want to assume that *to* is semantically vacuous, and treat *give* as a type $\mathtt{e} \to \mathtt{e} \to \mathtt{e} \to \mathtt{t}$ function.
- Feel free to eschew lambda expressions in favour of tower notation, unless you feel like you need extra practice.
- In class, we mostly talked about *every* and *some*, which we can easily represent as first order quantifiers. Here's a general recipe for modeling any quantificational DP as a continuized individual, taking advantage of a simple equivalence:

(3) $Q \equiv \lambda k \,.\, Q\,(\lambda x \,.\, k\; x)$ $\quad\quad (\mathtt{e} \to \mathtt{t}) \to \mathtt{t}$

In tower terms:

(4) $$\frac{Q\,(\lambda x \,.\, [\,])}{x}$$

2 More on con/dis-junction

2.1 Conjunction practice

The following sentence has a "split scope" reading (in my view) that can be paraphrased as: *John refused to stay in any hotel, and John refused to rent any car*.

(5) John refused to stay in any hotel or rent any car. $\quad\quad \wedge >$ refuse $>$ any

Assume that a WYSIWYG syntactic structure. Show how we can derive the split scope reading using the machinery introduced in class.

2.2 Scope of disjunction

In class, we claimed that our account predicts that the scope of conjunction is sensitive to scope islands, on the basis of examples like the following:

(6) John hopes [that some company will hire a main and a cook].
✗*John hopes that some company will hire a maid, and John hopes that some company will hire a cook.*

Is the scope of *dis*junction sensitive to scope islands? We predict that it is; can you come up with counterexamples?

3 DP-internal composition

> N.b. this question is based heavily on section 6 of the handout from session 2. Consult the handout if you run into trouble.

3.1 *Part i*

As you'll probably have noticed, we've spent this whole time treating quantificational DPs such as *every boy* as primitives.

At this point a natural question to ask is: how do determiners compose with their restrictors?

Surprisingly, the answer isn't as straightforward as you might think.

Naively, we may assume that determiners receive they're standard meaning – essentially, a function from a predicate to a *continuized* individual.

(7) $[\![\text{every}]\!] \overset{?}{\coloneqq} \lambda P \,.\, \dfrac{\forall y[P\ y \to [\,]]}{y}$

But, what happens if the restrictor itself contains a quantificational expression? Consider the following example:

(8) Every boy with a book left. $\forall > \exists$

Try to compute the meaning of the subject, and explain what goes wrong and why.

3.2 *Part ii*

Barker & Shan (2014) generalize tower notation to the more general type-schema.[3]

(9) Tripartite tower types (def.)

$$\dfrac{\mathtt{r} \,\big|\, \mathtt{i}}{\mathtt{a}} \coloneqq (\mathtt{a} \to \mathtt{i}) \to \mathtt{r}$$

We can think of our existing tower notation as an abbreviation for a tripartite tower type, where the intermediate and final result types happen to be the same:

(10) Bipartite towers as abbreviations for tripartite towers

$$\dfrac{\mathrm{r}}{\mathrm{a}} \coloneqq \dfrac{\mathrm{r} \,\big|\, \mathrm{r}}{\mathrm{a}}$$

[3] See also Charlow (2014: chapter 3).

Now that we have tripartite tower types, we can think of the restrictor argument c of *every* as a *continuation argument*.

(11) Standard determiner semantics for *every*

$$[\![\text{every}]\!] \coloneqq \lambda c\,.\left[\lambda P\,.\,\frac{\forall y[P\,y \rightarrow [\,]]}{y}\right](\lambda x\,.\,c\,x) \qquad (\mathtt{e} \rightarrow \mathtt{t}) \rightarrow \frac{\mathtt{t}}{\mathtt{e}}$$

We can abbreviate the meaning of *every* as a tower, where c is the continuation argument:

$$(12)\qquad \frac{\left[\lambda P\,.\,\dfrac{\forall y[P\,y \rightarrow [\,]]}{y}\right](\lambda x\,.\,[\,])}{x} \qquad : \frac{\frac{\mathtt{t}}{\mathtt{e}}\,\Big|\,\mathtt{t}}{\mathtt{e}}$$

Our existing definition of S can be made more type-general, in order to accommodate tripartite tower types. *Adjacent types* match and cancel out:

$$(13)\qquad \mathsf{S} : \frac{\mathrm{r}\,|\,\mathrm{i}}{\mathrm{a} \rightarrow \mathrm{b}} \rightarrow \frac{\mathrm{i}\,|\,\mathrm{j}}{\mathrm{a}} \rightarrow \frac{\mathrm{r}\,|\,\mathrm{j}}{\mathrm{b}}$$

The actual definition of S doesn't change.

(14) *scopal function application* (def.)

$$m\;\mathsf{S}\;n \coloneqq \lambda k\,.\,m\,(\lambda x\,.\,n\,(\lambda y\,.\,k\,(x\;\mathsf{A}\;y)))$$

Likewise, the type of *lower* is further generalized; the definition doesn't change:

$$(15)\qquad (\downarrow) : \frac{\mathrm{a}\,|\,\mathrm{b}}{\mathrm{b}} \rightarrow \mathtt{a}$$

Show how generalizing our existing machinery allows us to derive the surface scope reading of our original sentence:

(16) Every boy with a book left.