MaxElide

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1 Strict vs. sloppy

- We've already seen that elliptical constructions involving bound variables can give rise to an ambiguity.

(1) Ivan sold his telecaster. Jorge also did Δ.

(2) a. $\Delta =$ sell Ivan's telecaster. strict

b. $\Delta =$ sell Jorge's telecaster. sloppy

- On an approach to ellipsis assuming *silent structure*, the classical analysis of the sloppy reading is to posit a bound variable inside of the EC.

(3) Ivan^x [$_{\text{VP}}$ sold his$_x$ telecaster].

Jorge^y also did sell his$_y$ telecaster.

- Question: how is the *identity condition* on ellipsis met under the sloppy reading?

(4) *The parallelism condition*

Ellipsis of EC requires semantic identity with with an antecedent constituent AC.

- The pronoun in the AC picks out *Ivan*, but the pronoun in the EC picks out *Jorge*.[1]

(5) a. $[\![\text{AC}]\!]^g = x \textsf{ sold telecaster}(x)$

b. $[\![\text{EC}]\!]^g = y \textsf{ sold telecaster}(y)$

- Sag (1976) and Williams (1977) argue that, under the sloppy reading, the AC and the EC *are* in fact identical - the pronoun is interpreted as a variable bound by a VP-internal λ-operator.[2]

(6) Ivan [$\lambda\ x\ .\ x$ sold x's telecaster].

Jorge also did $\lambda\ y\ .\ y$ sold y's telecaster.

[1] The functions in (5) aren't α-equivalent, since there are contexts which map x and y to distinct individuals.

[2] Note that, since each occurrence of the variable y is bound by a matching λ-operator, the choice of variable name in the EC doesn't matter here for the purposes of semantic identity. In other words, VP-A and VP-E denote α-equivalent functions.

2 *Re-binding*

2.1 *Re-binding vs. internal binding*

- The Sag-Williams account of the strict-sloppy ambiguity makes a straightforward prediction *internal binding* as in (8), is allowed, but *re-binding* as in (7), is not.

(7) *Re-binding* ✗

a. $[\ \ldots \lambda x \ldots [_{AC} \ldots x \ldots]]$

b. $[\ \ldots \lambda y \ldots [_{EC} \ldots y \ldots]]$

(8) *Internal binding* ✓

a. $[\ \ldots [_{AC} \ldots \lambda x \ldots x \ldots]]$

b. $[\ \ldots [_{EC} \ldots \lambda y \ldots x \ldots]]$

- In other words, *sloppy identity* requires an EC-internal binder, and a corresponding AC-internal binder.

2.2 *Evidence for the Sag-Williams position*

- Internal binding should only be possible if the understood antecedent of the variable is the sister of the EC. *Parallelism* therefore rules out (9b).

(9) a. Jorge said that Tanya likes him_J,
and IVAN also did $\lambda x\ .\ x$ say that Tanya likes x.

b. *Jorge said that Tanya likes him_J,
and IVAN also $\lambda x\ .\ x$ said that she does $\lambda y\ .\ y$ like x.

- Consider also the following example from Fox & Takahashi (2005: p. 225), where wh-movement creates the re-binding configuration:[3]

(11) a. John knows which professor we invited,
but he is not allowed to reveal which one $\lambda x\ .\ x$ we invited x.

b. *John knows which professor we invited,
but he is not allowed to reveal
which one λx . we did $\lambda y\ .\ y$ invite x.

[3] Note that, because of the possibility of *successive-cycle wh-movement*, it is not immediately obvious that the parallelism condition rules out the configuration in (11).
Concretely, why can't wh-movement leave behind an intermediate trace adjacent to the EC?

(10) which one λx . we did t_x
$\lambda x\ .\ \lambda y\ .\ y$ invite x

2.3 *Evidence against the Sag-Williams position*

- Sometimes, it looks like sloppy identity is possible even where internal binding is not:

(12) Jorge insists that Tanja likes him,

but IVAN $\lambda x . x$ DENIES that she does $\lambda y . y$ like x

- The same point goes for rebinding configurations created by movement (Fox & Takahashi 2005: p 226):

(13) Mary doesn't know who we can invite,

but she can tell you who $\lambda x .$ we can NOT $\lambda y . y$ invite x

- The empirical generalization that Fox & Takahashi (2005) suggest is the following:

(14) *Intervening focus:*

when a focused-expression intervenes between the re-binder and and the re-bound variable, ellipsis is licensed.

3 *Enter MAXELIDE*

- Add maxelide references here

(15) MAXELIDE (alpha version)

Elide the largest deletable constituent.

- In all of our unacceptable cases, there was a bigger constituent that *could've* been deleted.[4]

[4] VP-ellipsis conditions the spell-out of T, which distracts from the parallel between (16a) and (16b). I've used *do*-insertion here to draw attention to the parallel, even though it sounds a little unnatural.

(16) Jorge said that Tanya likes him$_J$

a. ...and IVAN also did $\lambda x . x$ say that she does $\lambda y . y$ like x.

b. *...and IVAN also did $\lambda x . x$ say that she does $\lambda y . y$ like x.

- In the acceptable cases, however, the presence of an intervening focus blocks deletion of the larger constituent.
- (17a) isn't a candidate deletion, since it violates the parallelism condition.

(17) Jorge insists that Tanja likes him,

a. ✗...but IVAN $\lambda x . x$ DENIES that she does $\lambda y . y$ like x

b. ✓...but IVAN $\lambda x . x$ DENIES that she does $\lambda y . y$ like x

3.1 *Circumvention of MaxElide*

- It's not hard to come up with counter-examples to MaxElide:

(18) Jorge said that Tanya likes Ivan,

  a. ...Robert also said she does like Ivan.

  b. ...Robert also did say that she likes Ivan.

- Add Merchant reference

(19) MaxElide (beta version)

Elide the biggest deletable constituent if EC contains a variable that is free within EC.

- The constraint in (19) is still not quite general enough. Fox & Takahashi (2005) observe that it fails to rule out *co-binding* configurations:

(20) I know which puppy λx . ...

  a. ...you said Mary would adopt
  and Fred did say she would adopt x too.

  b. ...you said Mary would adopt
  and Fred said she would adopt x too.

- In *co-binding*, unlike *re-binding* configurations the variables free within AC and EC are re-bound by the same re-binder.

- Fox & Takahashi (2005) suggest the following refinement of MaxElide:

(21) MaxElide 1.0

Elide the biggest deletable constituent in a re-binding configuration.

A re-binding configuration is a structure in which EC dominates a variable that is free within EC and is bound by a binder YP outside of EC, and there is no variable in AC also bound by YP.

- This seems to get the right empirical coverage, but is it plausible that such a complicated principle is codified in the grammar? Can it be reduced to more basic principles?

4 *Fox & Takahashi's (2005) proposal*

- Fox & Takahashi (2005) propose that, in order to understand where MAXELIDE applies, we must expand the domain in which the parallelism condition applies beyond just what is deleted.
- Instead, Fox & Takahashi adopt a revised parallelism condition based on Rooth (1993).

(22) For ellipsis of EC to be licensed, there must exist a *Parallelism Domain* (PD).

(23) *Parallelism Domain:*
An XP is a PD of EC iff:

a. XP reflexively dominates EC.

b. There exists a constituent $\phi \in \mathsf{alt}(\text{XP})$, s.t. for all assignments g, $[\![\phi]\!]^g = [\![\text{AC}]\!]^g$.

- Fox & Takahashi propose that MAXELIDE is relativized to the PD:

(24) MAXELIDE 1.1
Elide the biggest deletable constituent reflexively dominated by a PD.

- Let's see how this accounts for MAXELIDE circumvention.

(25) Jorge said that Tanya likes Ivan,

a. ...ROBERT also said she does like Ivan.

b. ...ROBERT also did say that she likes Ivan.

- In the above example, both possible ellipses are PDs, and therefore MAXELIDE is trivially satisfied.
- In re-binding configurations however, the PD must at least contain the binder, and MAXELIDE 1.1 demands deletion of the biggest constituent within the PD.

(26) Jorge said that Tanya likes him$_J$

a. ...and IVAN also did [$_{\text{PD}}$ $\lambda\, x\, .\, x$ say that she does $\lambda\, y\, .\, y$ like x].

b. *...and IVAN also did [$_{\text{PD}}$ $\lambda\, x\, .\, x$ say that she does $\lambda\, y\, .\, y$ like x].

- Just as before, intervening focus shrinks the candidates for deletion:

(27) Jorge insists that Tanja likes him,

a. ✗...but IVAN [$_{PD}$ $\lambda x . x$ DENIES that she does $\lambda y . y$ like x]

b. ✓...but IVAN [$_{PD}$ $\lambda x . x$ DENIES that she does $\lambda y . y$ like x

- Things get a little more interesting with *co-binding* configurations.

(28) I know which puppy λx . ...

a. ...you said Mary would adopt x
and Fred did [$_{PD}$ say she would adopt x] too.

b. ...you said Mary would adopt x
and Fred said she would [$_{PD}$ adopt x] too.

- Fox & Takahashi's idea is that, since in (28b), the variables in AC and EC are bound by the same binder, they share the same variable name, and therefore the embedded VP is also a PD.
- This is trivially the case – $[\![\text{adopt } x]\!]^g = [\![\text{adopt } x]\!]^g$ for all assignments.
- In co-binding configurations, circumvention of MAXELIDE crucially depends on identity of variable names.
- This begs the question: what prevents us from *always* circumventing MaxElide by simply always picking identical variable names, even when the re-binders are distinct?, i.e.

(29) a. [... λx ...[$_{AC}$ ... x ...]]

b. [... λx ...[$_{EC}$ ... x ...]]

- To block this possibility, Fox & Takahashi make recourse to Heim's *no meaningless co-indexation* constraint (Heim 1997).

(30) *No meaningless co-indexation*

If an LF contains an occurrence of a variable v that is bound by a node α, then all occurrences of v in this LF must be bound by the same node as α.

5 *Re-binding and covert movement*

- It is well known that QR can create a re-binding configuration.
- First off, observe that a quantificational object can take wide scope out of the EC.

(31) A doctor treated every patient.
A NURSE did ~~treat every patient~~ too. $\exists > \forall; \forall > \exists$

(32) a. AC: every patient $\lambda\, x$ a doctor treated x

b. EC: every patient [$_{\text{PD}}$ $\lambda\, y$ A NURSE ~~treated y~~]

- Since *a nurse* is focused, the VP is indeed the biggest deletable constituent in the PD.
- If covert movement can create a re-binding configuration, we expect that there should be circumstances under which sloppy identity is ruled out.

(33) At least one doctor tried to get me to arrest every patient,

a. ...and at least one NURSE tried to get me to ~~arrest every patient~~ as well. $\exists > \forall; {}^{*}\forall > \exists$

b. ...and at least one NURSE did ~~try to get me to arrest every patient~~ as well. $\exists > \forall; {}^{?}\forall > \exists$

6 *Re-binding and scope*

- question here: is re-binding about *covert movement*, or *scope*?

(34) Each brother hopes that old age will kill a certain relative of theirs soon, and each sister hopes that it will too.

(35) Each brother hopes that old age will kill a certain relative of theirs soon, and each sister does too.

6.1 Donkey re-binding

(36) Every farmer who owns a donkey^x asked Mary to beat it$_x$,
and every LANDLORD who owns a donkey did too.

(37) Every farmer who owns a donkey^x asked Mary to beat it$_x$,
and every LANDLORD who owns a donkey asked her to as well.

6.2 Re-binding and exceptional scope

(38) I want to know who left my party early and what was bothering him,
and BILL wants to know Δ too.

(39) Context: *both I and Mary had at least one unsatisfied guest at our respective parties.*
I want to know [who^x left my party early] ,
and [what was bothering him$_x$]
and MARY wants to know [who^x left her party early]
and [what was bothering him$_x$]

7 Griffiths (2018)

8 A monadic reconstruction of Rooth

- First let's define a type constructor F from a ordinary type a, to a *pair type* consisting of as, and (characteristic functions of) sets of as.

(40) The focus type-constructor (def.)

$$\mathsf{F}\,\mathsf{a} \coloneqq \begin{pmatrix} \mathsf{ord} :: \mathsf{a}, \\ \mathsf{foc} :: \mathsf{a} \to \mathsf{t} \end{pmatrix}$$

- Now let's define a unary type-lifter η, that shifts ordinary values to inhabitants of F, and a binary operation ⊛ for composing inhabitants of F.[5]

(41) a. $x^\eta \coloneqq (x, \{\, x \,\})$

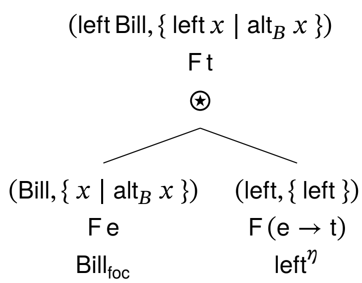
b. $(f, \mathbb{g}) \circledast (x, \mathbb{y}) \coloneqq \begin{pmatrix} f\,x, \\ \{\, g\,y \mid g \in \mathbb{g} \wedge y \in \mathbb{y} \,\} \end{pmatrix}$

[5] $\langle \mathsf{F}, \eta, \circledast \rangle$ constitutes an *applicative functor*. This guarantees that is is *composable* with other applicative functors, providing us with assurance that our theory of focus will play nicely with other applicative machinery.
See, e.g., Charlow (2018) for an account of assignment-sensitivity using *applicative functors*.

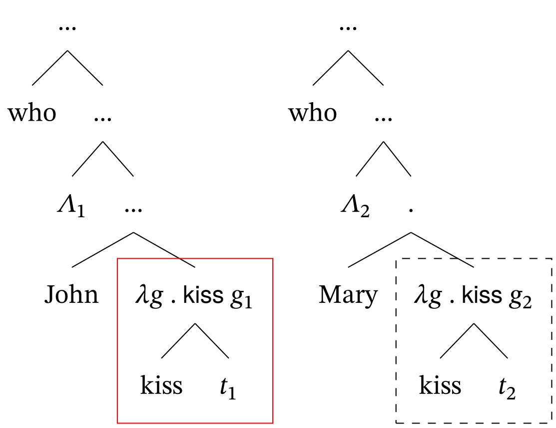
- The η-shifter returns a *pair* of values – the input value a, and the characteristic function of the singleton set $\{ a \}$.
- $\circledast$ does ordinary composition (function application) on the ord values of its arguments, and *pointwise* function application on the foc values of its arguments.

(42) $\mathsf{foc}\ x \coloneqq (x, \{ y \mid \mathsf{alt}_x\ y \})$

(43)



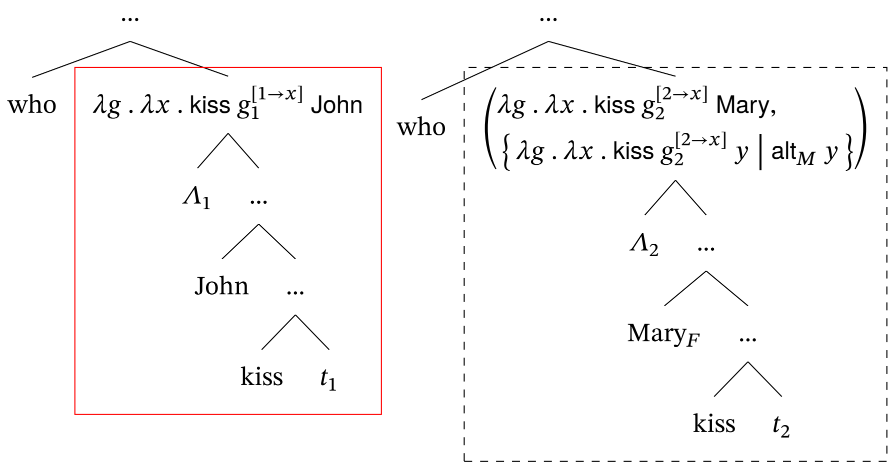
(44) I know who JOHN will kiss,
and also who MARY will kiss



$\lambda g\ .\ \mathsf{kiss}\ g_1 \notin \{ \lambda g\ .\ \mathsf{kiss}\ g_2 \}$

Since $\lambda g\ .\ \mathsf{kiss}\ g_1 \not\equiv \lambda g\ .\ \mathsf{kiss}\ g_2$

(45) I know who JOHN will kiss,
and also who MARY will kiss



9 *Ellipsis as binding*

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