Parasitic Scope **(Barker 2007)**
Semantics Seminar
11/10/08

1. Overview

- Attempts to provide a compositional, fully semantic account of *same*.
- Elements other than NPs – in particular, adjectives – can be scope-taking items.
- Presents evidence that *same* can scope over non-NP triggers, and formalizes such interactions.
- Provides support for the use of continuations in modeling scope-taking.

2. The data

- *Same* has two basic readings:
    - Deictic *same*

      (1) Bill read *the same book*.
      = Bill read {the book under discussion, the book in the speaker's hand, etc.}

      → Only the context-dependent reading is available.

    - Sentence-internal *same*

      (2) Anna and Bill read *the same book*.
      = there exists some book *x*, such that both Anna and Bill read *x* separately

      → Only possible when the licensing NP *Anna and Bill* is interpreted distributively
      → Context-dependent (deictic) reading still available.

- Availability of sentence-internal reading depends on material outside of the DP containing *same*:

  (3) a. The *same* waiter served John.
  b. The *same* waiter served everyone.

  → Sentence (a) lacks the sentence-internal reading available in (b)

- On the sentence-internal reading, *same* can distribute over:
    - NP denotations (see (2) above)

- o Events (or perhaps situations…)

  (4) a. John hit and killed the *same* man.
  ≠ John hit a man, thereby killing him
  = John hit a man, and also killed him (at some other time)

  b. John read the *same* book yesterday and today.
  ≠ John read book *x* for 48 hours straight.
  = John book *x* yesterday, and also read book *x* today.

- *same* requires type-identity, not token-identity:

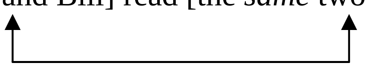
  (5) I drive a Ford Falcon and Enzo drives the *same* car.

→ Perhaps better characterized as a matter of degree (Lasersohn 2000)

3. Previous approaches

- Non-compositional accounts of *same* as a (discontinuous) quantifier.

  (6) [Anna and Bill] read [the *same* two books]



  - ▪ *Anna and Bill…the same two books* treated as a discontinuous predicate, taking relations like **read** as an argument.

- o Keenan (1992): formal proof that no compositional analysis of *same* as generalized quantifier(s) is possible.

- o But *same* is an adjective! It's neither a determiner nor an NP; and it can take an intensifier (e.g. *the very same*).

  - ▪ No reason to expect an account in terms of generalized quantifiers.

  - ▪ If items other than NPs can take scope, then scopal properties of *same* can be explained without resorting to a generalized quantifer analysis.

- o Non-compositional approaches disregard syntactic constituency → not 'directly compositional'

- Compositional accounts with pragmatically-controlled free variables.

  - o Can the internal reading of *same* be reduced to the deictic reading?

- Deictic reading is always available.

- On a parallel with pronouns: variables that can be either pragmatically controlled (deixis), or bound sentence-internally.

(7) $[\![same]\!] = \lambda N.\lambda x \exists f : \{x\} = f(N) \wedge \forall c < C : Rxc$ [Dowty]

- *N* is a (nominal) predicate

- *f(N)* is a choice function, returning a singleton set {x} whose only member is in the denotation of *N*.

- Contextual variables: comparison class *C* (of individuals), relation *R* (over individuals)

- But the contextually-determined comparison class *C* overgenerates possible readings of sentences containing *same*:

  (8) The men discussed a house. John read the *same* book.
  ≠ John read the same book that the men read.

- *C* / *R* also fail to generate available readings

  (9) The men or the women read the same book.

  C: {the men}, {the women}, {{the men} ∪ {the women}}

  → No choice of *C* will provide the correct (disjunctive) truth conditions for (9).

  (10) Ann read and Bill reviewed the same book

  → *R*: **read**, **review**, **read-and-review**

  → No choice of *R* will provide the correct truth conditions for (10).

- Suspicious regularities:

  - If either *C* or *R* gets its value from an element in the clause containing *same*, so does the other variable…

  - …and on the internal reading, *R* is the *full* portion of the clause that remains after removing the element from which *C* is taken.

(11) Anna and Bill must have read the same book.
R = **must-have-read**
$R \neq$ **read**

- Carlson (1987): sentence-internal reading requires distributing over multiple events
  - But NP-internal *same* allows for sentence-internal reading with only one event.

    (12) [Two men with the *same* name] are sitting in this room.

    - Suggests changing the precondition to distributing over *multiple situations*.

4. Denotation for *same*

- *same* is essentially quantificational.
  - Shows a "truth-conditional sensitivity to mere existence" that is characteristic of existential quantification (419):

    (13) Two men with the *same* name are sitting in this room.
    (can be true without a specific name in mind)

  - Can be captured with a choice function:

    (14) $\exists f_{\texttt{choice}}$. two men with the f name are sitting in this room.

    - f_{choice} takes a predicate P as an argument and returns a singleton set whose only member is in the denotation of P
      - E.g. f_{choice} (**name**) → {Fauntleroy}
      - Similar choice function present in Dowty (1985) denotation for *same* in (7).

- Denotation for *same*:

  (15) $[\![same]\!] = \lambda F_{\langle \text{Adj,N} \rangle} \lambda X_{\mathsf{e}} . \exists f_{\texttt{choice}} \forall x < X : Ffx$

- f_{choice} : takes the denotation of a property $P_{\langle e, t \rangle}$ (i.e. a set of individuals of type e), and returns a different a property $H_{\langle e, t \rangle}$, which holds of exactly one member of $[\![P_{\langle e, t \rangle}]\!]$.
  - f_{choice} returns a property of type $\langle e, t \rangle$, rather than an individual of type $\langle e \rangle$, because *same N* co-occurs with a determiner, and determiners take arguments of type $\langle e, t \rangle$.

- X: a variable ranging over plural individuals, i.e. ‘non-atomic entities’
    - Builds distributivity properties of *same* into its denotation ($\ldots \forall x < X_e \ldots$)
        - x is a proper subpart of non-atomic individual X
    - After function application ⟦*same*⟧ ($F_{\langle \text{Adj,N} \rangle}$), we’re left with a λ-expression denoting a property of type $\langle e, t \rangle$, holding of non-atomic individuals, than can serve as an argument for a generalized quantifier.
        - E.g. ⟦*two men with the same name*⟧ =
          $\mathbf{two}(\lambda X.\exists f\, \forall x < X : [\mathbf{with}(\mathbf{the}(f(\mathbf{name})))(\mathbf{men})]\,(\mathrm{x}))$
- No reference to events, as suggested by NP-internal uses of *same* like (see (12) above)

5. *same* and nominal scope

- Where does *same* take scope?
    - If we allow *same* to take scope outside its containing DP – e.g., at the clause level – we derive inappropriate truth conditions:

      (16) John met **fewer** than three men with the **same** name.

        - scope: *same* >> *fewer*
        - $\exists f$. John met fewer than three men with the f name.
            - Truth conditions are too weak: (15) predicted to be true if there is any name (e.g. Fauntleroy) such that John has met fewer than three people with that name.
    - Expected if NP is a scope island, as in Barker (2002) and elsewhere.
    - So *same* takes scope at the level of the nominal: [three men with the same name]
- Barker assumes a categorial grammar (discussed in more detail in §7 below):
    - Categories A\B and B/A are constructed from atomic categories $\{NP_e, N_{et}, S_t\}$
    - Slashes lean towards the expected argument.
    - Categories A\B and B/A are of type $\langle A', B' \rangle$

- LIFT
    - Basic type-shifting operation.
    - Expressions of category A are also expressions of category B/(A\B)

    - NP → S/(NP\S)
    - ⟨e⟩ → ⟨⟨e, t⟩, t⟩
    - Individual-denoting NP → generalized quantifier
    - Non-scope-taking → scope-taking

- Not all LIFTed NPs have a (lexical) semantics that interacts with scope-taking properties of generalized quantifiers.

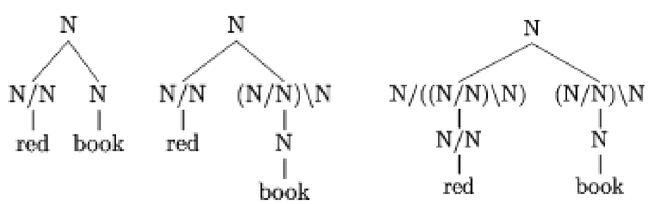
    - Some raising of LIFTed NPs will be semantically vacuous.

- Adjectives are of category N/N (i.e. ⟨⟨e, t⟩, ⟨e, t⟩⟩)

    - LIFT (Adj): N/N → N/((N/N)\N)

    - LIFT (noun): N → (N/N)\N

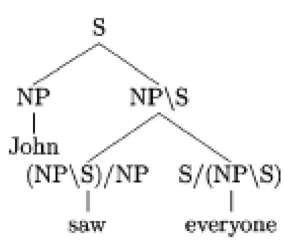
    (17)



- Quantifier Raising (QR)

    - In direct object position, generalized quantifiers give rise to a type clash:

    (18)



    - Following Heim and Kratzer (1998), type clash is resolved by QR.

        - Adjoins the generalized quantifier in direct object position to its scope target (here, S)

        - Leaves a variable (trace) *in situ*

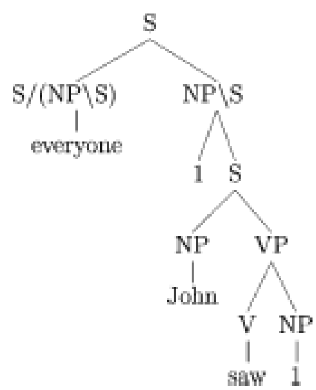
- The same variable is adjoined to the scope target

  - Prevents type clash from being repeated at the adjunction site.

  - Serves as a λ-abstract

  - Intermediate node created by this adjunction is category NP\S, the appropriate category for an argument of the raised generalized quantifier.

(19)



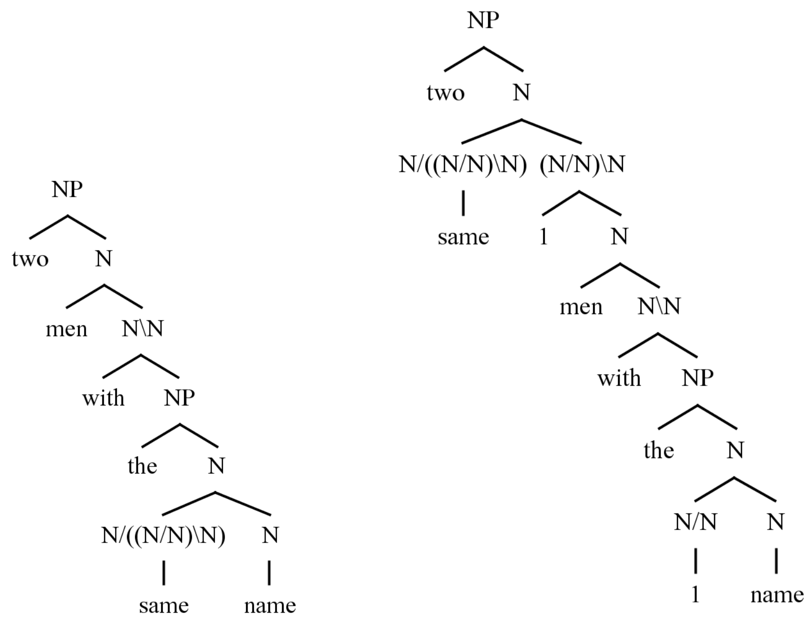
- More generally, if the raised scope-taking element is of category R/(P\T) (= *q*(P, T, R)), then the intermediate node will be of category P\T

  - 〈*P* ', *T* '〉 is the correct type to serve as the argument of the raised scope-taking element, which has the type 〈〈*P* ', *T* '〉, *R* '〉.

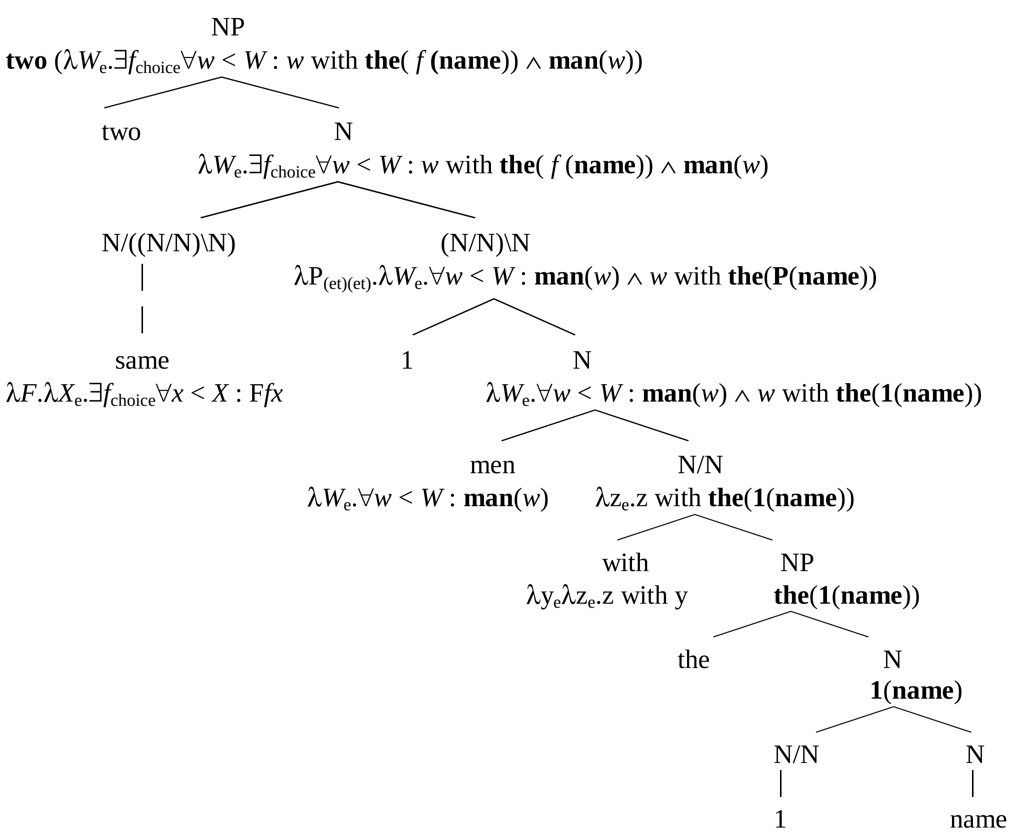
- Just as with NPs, raising a LIFTed scope-taking element – like an adjective – only makes a semantic contribution if the denotion of the scope-taking element is quantificational.

- Raising *same*:

(20)



(21) Rough sketch of composition for *two men with the same name*:

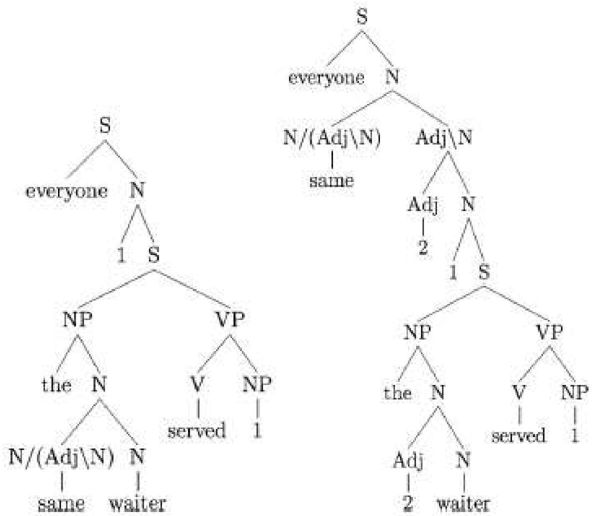


- Note that *same* adjoins above the nominal *men* (at a node of category N) rather than above the determiner *two* (at a node of category NP)
    - *two* is the wrong category (NP) to serve as the scope-target of LIFTed *same* (N/((N/N)\N))
    - In principle, nothing prevents *same* from being lifted to NP/((N/N)\NP)…
        - …but the lexical semantics of *same* require an argument of type $\langle\langle et, et\rangle, et\rangle$ (i.e. $F_{\langle \text{Adj, N}\rangle}$), and adjunction at the NP node would give an argument of type $\langle\langle et, et\rangle, e\rangle$ (i.e. (N/N)\NP)
- If *same* takes scope at some dominating N, why not at the N node that immediately dominates it (trivial scope)?
    - Consider **two same men*
        - "…the property denoted by *same men* would be true of a non-atomic entity X just in case there is some choice function f and every proper subpart of X is f(**men**)." (427)
        - Let *same* take scope at *men*, and assume that X = ⟦*Bill and Cam*⟧ = **b**⊕**c**
        - f(**men**) = {**b**} and f(**men**) = {**c**}, since f only returns singleton sets, and every $x < X$ must be in f(**men**)
            - But **b** and **c** are supposed to be distinct; here they are identical.

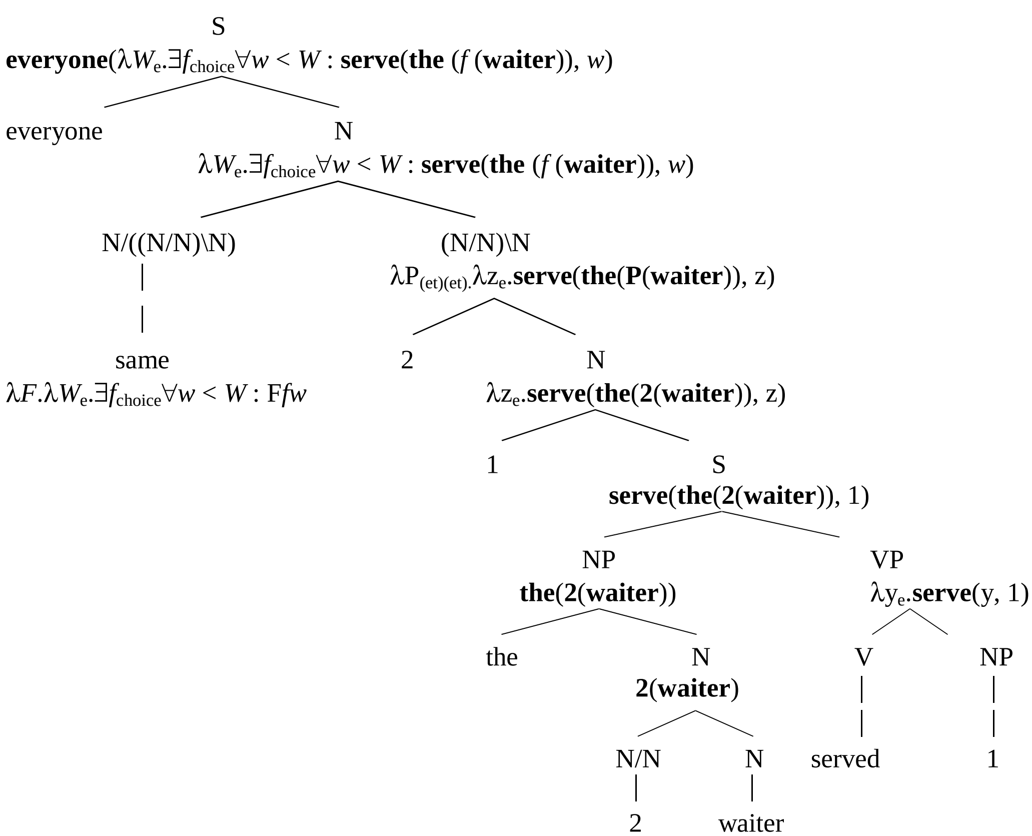
6. Parasitic scope

- LIFTed *same* takes scope by adjoining to some higher N node.
- QR of a generalized quantifier NP inserts a node of category N at the adjunction site.
- This N node, which *did not exist* until the generalized quantifier NP was raised, can now serve as the scope target for raising of *same* – hence the term 'parasitic scope'

(22) *The same waiter served everyone*.



(23) Rough sketch of composition for *The same waiter served everyone*:



- Plural NPs are often the key ingredient that allows for a sentence-internal reading of *same* (compare (1) and (2) above)

- Assume that plural NPs are always LIFTed to scope-taking category S/(NP\S)

    - LIFTing plural NPs is already needed to allow coordination with a generalized quantifier:

      (24) *Every woman and the men* left.

    - Allows plural NPs to undergo QR, creating an intermediate adjunction site for (parasitic) raising of *same*.

- Same reasoning holds for singular NPs – but the result of QR on a singular NP would be incoherent!

    - Denotation of *same* makes reference to the proper subparts of its NP argument (… $\forall x < X$ …), but singular NPs do not have the appropriate proper subparts.

- Is it a problem that *same*, which quantifies over non-atomic entities, interacts with *everyone*, which quantifies over atomic entities?

    - *Everyone* can occur with collective predicates generally

      (25) #John gathered in the living room.
      (26) Everyone gathered in the living room.

    - Barker assumes we can extend any analysis of (25) and (26) to cover *same* as well.

7. A cursory outline of Type Logical Grammar and continuations

- Type Logical grammar is a formal deductive system.

    - Expressions like NP, N, etc. can be thought of as *premises* or *assumptions*, which are used to draw conclusions.

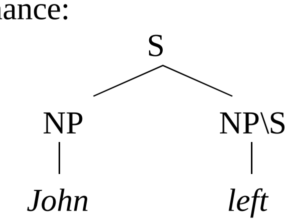
    - Non-terminal nodes can be thought of as conclusions, derived from the nodes (i.e. premises) they dominate.

- Since the well-formedness of a natural language expression is often sensitive to linear order (*John left* vs. *left John*), so is TLG

    - A\B ⇔ A → B, and A must be to the left of A\B
    - B/A ⇔ A → B, and A must be to the right of B/A

- Notation:
  - • : the *product connective*
    - Neutral as to the linear order of its arguments.
    - Can be thought of as a placeholder for '/' or '\'
  - Γ, Σ: arbitrary sets of formulas
  - Σ[*p*]: a formula containing a distinguished occurence of the term *p*.
  - \L, \\L, /L, //L ('left rules'): function application
  - \R, \\R, /R, //R ('right rules'): λ-binding of a variable
- Underlining indicates which portions of the preceding line (i.e. which premises) are being used to derive (i.e. conclude) the following line.
  - Underlining is akin to representing dominance:

$$\dfrac{\dfrac{\mathrm{NP} \vdash \mathrm{NP} \qquad \mathrm{S} \vdash \mathrm{S}}{\mathrm{NP} \bullet \mathrm{NP}\backslash \mathrm{S} \vdash \mathrm{S}}\backslash L}{John \bullet left \vdash \mathrm{S}}\mathrm{LEX}$$



  - Not an exact correspondence in Barker (2007); but see Barker (2003) for a simplified exposition of type logical grammar.
- In TLG, LIFT is a theorem, and need not be stipulated:

(27) LIFT

$$\dfrac{\dfrac{\Gamma \vdash A \qquad B \vdash B}{\Gamma \bullet A\backslash B \vdash B}\backslash L}{\Gamma \vdash B/(A\backslash B)}/R$$

- Curry-Howard correspondence**:**
  - There is a direct mapping between syntactic and semantic composition.
    - {A\B, B/A} → ⟨A, B⟩

Logic	λ-calculus	TLG
formulas	types	syntactic categories
proofs	terms	syntactic derivation (= semantic composition)

(Barker 2003:7)

- o So demonstrating that a sentence is is syntactically well-formed (i.e. carrying out a derivation) is equivalent to determining the (non-lexical) meaning of the sentence.

(28)

$$\vdots$$
$$\mathrm{NP} \bullet (\mathit{read} \bullet (\mathit{the} \bullet (\mathrm{N/N} \bullet \mathit{book}))) \vdash \mathrm{S}$$
$$\overline{\mathrm{NP} \circ \lambda x(x \bullet (\mathit{read} \bullet (\mathit{the} \bullet (\mathrm{N/N} \bullet \mathit{book})))) \vdash \mathrm{S}}\ \lambda$$
$$\overline{\lambda x(x \bullet (\mathit{read} \bullet (\mathit{the} \bullet (\mathrm{N/N} \bullet \mathit{book})))) \vdash \mathrm{NP}\backslash\!\!\backslash \mathrm{S}}\ \backslash\!\!\backslash R$$
$$\overline{\mathrm{N/N} \circ \lambda y \lambda x(x \bullet (\mathit{read} \bullet (\mathit{the} \bullet (y \bullet \mathit{book})))) \vdash \mathrm{NP}\backslash\!\!\backslash \mathrm{S}}\ \lambda$$
$$\overline{\lambda y \lambda x(x \bullet (\mathit{read} \bullet (\mathit{the} \bullet (y \bullet \mathit{book})))) \vdash (\mathrm{N/N})\backslash\!\!\backslash(\mathrm{NP}\backslash\!\!\backslash \mathrm{S})}\ \backslash\!\!\backslash R \qquad \mathrm{NP}\backslash\!\!\backslash \mathrm{S} \vdash \mathrm{NP}\backslash\!\!\backslash \mathrm{S}$$
$$\overline{(\mathrm{NP}\backslash\!\!\backslash \mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{NP}\backslash\!\!\backslash \mathrm{S})) \circ \lambda y \lambda x(x \bullet (\mathit{read} \bullet (\mathit{the} \bullet (y \bullet \mathit{book})))) \vdash \mathrm{NP}\backslash\!\!\backslash \mathrm{S}}\ /\!\!/ L$$
$$\overline{\lambda x(x \bullet (\mathit{read} \bullet (\mathit{the} \bullet ((\mathrm{NP}\backslash\!\!\backslash \mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{NP}\backslash\!\!\backslash \mathrm{S})) \bullet \mathit{book})))) \vdash \mathrm{NP}\backslash\!\!\backslash \mathrm{S}}\ \lambda \qquad \mathrm{S} \vdash \mathrm{S}$$
$$\overline{\mathrm{S}/\!\!/(\mathrm{NP}\backslash\!\!\backslash \mathrm{S}) \circ \lambda x(x \bullet (\mathit{read} \bullet (\mathit{the} \bullet ((\mathrm{NP}\backslash\!\!\backslash \mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{NP}\backslash\!\!\backslash \mathrm{S})) \bullet \mathit{book})))) \vdash \mathrm{S}}\ /\!\!/ L$$
$$\overline{\mathrm{S}/\!\!/(\mathrm{NP}\backslash\!\!\backslash \mathrm{S}) \bullet (\mathit{read} \bullet (\mathit{the} \bullet ((\mathrm{NP}\backslash\!\!\backslash \mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{NP}\backslash\!\!\backslash \mathrm{S})) \bullet \mathit{book}))) \vdash \mathrm{S}}\ \lambda$$
$$\overline{\mathit{everyone} \bullet (\mathit{read} \bullet (\mathit{the} \bullet (\mathit{same} \bullet \mathit{book}))) \vdash \mathrm{S}}\ \mathrm{LEX}$$

- o Line 4 shows application of QR to N/N (ultimately *same*)
- o Lines 5-6 show application of LIFT to *same*

- Continuations

  - o "continuations are nothing more than a perspective" (Barker 2002:5)

  - o Intuitively, the continuation for some expression *P* in a sentence *S* is the part of *S* that 'remains' when *P* is 'removed'

    - ▪ "a continuation represents the entire (default) future for the computation" (qtd. in Barker 2002:4)

  - o *John saw Mary*

    - ▪ Default future of *John*: have the property of seeing Mary predicated of it.

      - So the continuation of **j** is λx. **saw (m,x)**…
      - …and the continuation of *saw Mary* is λP.P(**j**)

- A continuation of a term P (of type α) is thus a function from the type of P to $\langle t \rangle$, the type of sentences.
    - In general, a continuation on P_α – written as $\underline{P}$ – is of type $\langle \alpha, t \rangle$
    - NPs of type $\langle e, t \rangle$ will have continuations of the type $\langle \langle e, t \rangle, t \rangle$ - the type of a generalized quantifier!
- Denotations can also be 'continuized': $[\![P_\alpha]\!] \Rightarrow \{\{P_\alpha\}\}$
    - $[\![P_\alpha]\!]$ is a function of type $\langle \alpha, t \rangle$
    - $\{\{P_\alpha\}\}$ is a function of type $\langle \langle \alpha, t \rangle, t \rangle$
        - E.g. a continuized VP is a function from VP continuations to truth values.
- There are multiple ways to 'continuize' a given expression:

(29) S → NP VP

a. $\lambda \underline{p}.\{\{\text{VP}\}\}\ (\lambda P.\{\{\text{NP}\}\}(\lambda \text{x}.\underline{p}(P\text{x})))$
b. $\lambda \underline{p}.\{\{\text{NP}\}\}\ (\lambda x.\{\{\text{VP}\}\}(\lambda P.\underline{p}(P\text{x})))$

- This is equivalent to reversing the functor-argument relation between NP and VP, exactly what we do with type-shifting.
- Corresponds to different orders of computation/evaluation/execution.

- Order of evaluation gives us scope relations, so writing truth conditions in terms of continuations automatically gives us:
    - Scope ambiguity, from distinct continuizations of the same expression.
        - VP >> NP, if we interpret NP as providing the continuation for VP, i.e. VP is functor for argument NP (29a)
        - NP >> VP, if we interpret VP as providing the continuation for NP, i.e. NP is functor for argument VP (29b)
    - Scope displacement.
- Since any syntactic category can be continuized, any syntactic category can participate in differing scope relations.
    - As before, the semantic consequences depend on the lexical semantics of the scope items.

- The generality of continuization, and LIFT, allows us to explain how *same* functions with non-NP triggers:
    - Requires generalizing lexical entry for *same,* using α , a metavariable over categories.

      (30)

      $$\text{Old:}\quad (\mathrm{NP}\backslash\!\!\backslash \mathrm{S}) /\!\!/ ((\mathrm{N}/\mathrm{N}) \backslash\!\!\backslash (\mathrm{NP}\backslash\!\!\backslash \mathrm{S}))$$
      $$\text{New:}\quad (\alpha\backslash\!\!\backslash \mathrm{S}) /\!\!/ ((\mathrm{N}/\mathrm{N}) \backslash\!\!\backslash (\alpha\backslash\!\!\backslash \mathrm{S}))$$

        - Semantically, allow *X* in denotation to range over any type, not just ⟨*e*⟩.

      (31) *John hit and killed the same man.*

        - Set α = (NP\S)/NP, the type of a transitive verb.

      (32)

$$
\begin{array}{ll}
\vdots & \\
john \bullet (\mathrm{V} \bullet (the \bullet (\mathrm{N/N} \bullet man))) \vdash \mathrm{S} & \\
\hline
\mathrm{V} \circ \lambda x(john \bullet (x \bullet (the \bullet (\mathrm{N/N} \bullet man)))) \vdash \mathrm{S} & \lambda \\
\hline
\lambda x(john \bullet (x \bullet (the \bullet (\mathrm{N/N} \bullet man)))) \vdash \mathrm{V}\backslash\!\!\backslash\mathrm{S} & \backslash\!\!\backslash R \\
\hline
\mathrm{N/N} \circ \lambda y \lambda x(john \bullet (x \bullet (the \bullet (y \bullet man)))) \vdash \mathrm{V}\backslash\!\!\backslash\mathrm{S} & \lambda \\
\hline
\lambda y \lambda x(john \bullet (x \bullet (the \bullet (y \bullet man)))) \vdash (\mathrm{N/N})\backslash\!\!\backslash(\mathrm{V}\backslash\!\!\backslash\mathrm{S}) \qquad \mathrm{V}\backslash\!\!\backslash\mathrm{S} \vdash \mathrm{V}\backslash\!\!\backslash\mathrm{S} & \backslash\!\!\backslash R \\
\hline
(\mathrm{V}\backslash\!\!\backslash\mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{V}\backslash\!\!\backslash\mathrm{S})) \circ \lambda y \lambda x(john \bullet (x \bullet (the \bullet (y \bullet man)))) \vdash \mathrm{V}\backslash\!\!\backslash\mathrm{S} & /\!\!/ L \\
\hline
\lambda x(john \bullet (x \bullet (the \bullet ((\mathrm{V}\backslash\!\!\backslash\mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{V}\backslash\!\!\backslash\mathrm{S})) \bullet man)))) \vdash \mathrm{V}\backslash\!\!\backslash\mathrm{S} \qquad \mathrm{S} \vdash \mathrm{S} & \lambda \\
\hline
\mathrm{S}/\!\!/(\mathrm{V}\backslash\!\!\backslash\mathrm{S}) \circ \lambda x(john \bullet (x \bullet (the \bullet ((\mathrm{V}\backslash\!\!\backslash\mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{V}\backslash\!\!\backslash\mathrm{S})) \bullet man)))) \vdash \mathrm{S} & /\!\!/ L \\
\hline
john \bullet (\mathrm{S}/\!\!/(\mathrm{V}\backslash\!\!\backslash\mathrm{S}) \bullet (the \bullet ((\mathrm{V}\backslash\!\!\backslash\mathrm{S})/\!\!/((\mathrm{N/N})\backslash\!\!\backslash(\mathrm{V}\backslash\!\!\backslash\mathrm{S})) \bullet man))) \vdash \mathrm{S} & \lambda \\
\hline
John \bullet (hit\text{-}and\text{-}killed \bullet (the \bullet (same \bullet man))) \vdash \mathrm{S} & \mathrm{LEX}
\end{array}
$$

    - Line 4 shows application of QR to N/N (ultimately *same*)
    - Lines 5-6 show application of LIFT.

8. Some remaining puzzles

- Definiteness: *same* must appear with the definite determiner *the*
    - But *same* doesn't have the existence presupposition characteristic of definite descriptions:

      (33) John and Bill didn't read the long book.
      (34) John and Bill didn't read the same book.

      (35) Did John and Bill read the long book?
      (36) Did John and Bill read the same book?

- Use of *the* might result from presence of f_{choice} in the denotation of *same*, which denotes a property $H_{\langle e,\, t\rangle}$ that in turn denotes a singleton set.

- Still unclear why existence presupposition of *the* is suspended in *the same NP* constructions.

- *Each* can co-occur with *same*, and allows a sentence-internal reading.

(37) *Each* student follows the *same* core curriculum.
(38) …you can furnish *each* student with the *same* tessellating shape.

  - But *each* seems to require a predicate that holds of atomic entities only

(39) #Each person gathered in the living room.

    - Remember that *same* denotes a predicate that holds of non-atomic entities.

  - A possible solution: revise the denotation of *same* to make use of *covers*

    - Cover function Cov (*X*) turns subgroups of atomic individuals into various non-atomic individuals.

    - Other scope-taking adjective, like *different*, seem to require covers:

(40) The men and the women gathered in different rooms.

  - So *each* forces an atomic cover – but why?

  - Moreover, *each* is the canonical overt distributivity operator – if we need to make use of covers here, why not everywhere else as well?

- Buying, selling, and *same*.

(41) John bought and Mary sold the same book.

  - (41) can only be read as describing two different events – so *same* treats buying and selling as distinct situations/events.

References

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