What Syntax Feeds Semantics?

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Division of labor between Syntax and Semantics

Frege’s Principle of Compositionality:

The meaning of a complex expression is a function of the meaning of its parts and the way they are combined.
Phenomena at issue

- Quantifier scope
- Ellipsis
- Reconstruction and Connectivity
- Variables and binding
- Etc.
Quantifier scope

- **Ambiguity** (Pollard 2008; Uchida 2008; also Luo 2008)
  (1) A student admires every professor.
  a. $\exists x[\text{student}(x) \land \forall y[\text{prof}(y) \rightarrow \text{adm}(x,y)]]$
  b. $\forall y[\text{prof}(y) \rightarrow \exists x[\text{student}(x) \land \text{adm}(x,y)]]$

- **Split scope & alike** (Richter & Sailer 2008; Egg 2008)
  (2) [Not everyone] can win.
  (3) [Nicht jeder] kann gewinnen.

$\iff \neg \rightarrow \text{CAN} > \forall \checkmark$
Quantifier Scope

- **Boundeness**: roughly to the first tensed clause
  1. A student wants to visit every professor. $\forall \exists \checkmark$
  2. A student said that he visited every professor. $\forall \exists$ (May 1985; Uchida 2008)

- **Immediate scope**: e.g. nested QuNPs
  (Larson 1985, Joshi et al. 2007)

  3. Two policemen spy on someone from every city.
     a. $2 > \exists > \forall$
     b. $\exists > \forall, 2$
     c. $2 > \forall > \exists$
     d. $\forall > \exists > 2$
     e. $\forall > 2 > \exists$
Ellipsis

The ellipsis site and recoverability:

(1) John didn’t like the play, but Paul did ▲.

ﬂSyntactic material? [VP like the play]
ﬂSemantic anaphora? ∧x. like(x, BUFFER[play(y)])
Ellipsis as semantic anaphora

- The elided VP may precede its antecedent, but it cannot c-command, as in pronominal anaphora (Ross 1967).

(1) a. If she$_1$ can work, Mag$_1$ will work.
   b. * She$_1$ will work, if Mag$_1$ can work.

(2) a. If I can ▲, I will [work on it]
   b. * I will ▲, if I can [work on it].

(Dalrymple et al. 1991, Jacobson 1992, Hardt 1999, etc.)
Ellipsis as involving syntax

A *wh*-phrase binding into the elided VP obeys syntactic islands (data from Hardt 1999).

(1) Who did Angleton believe that Philby suspected t?
(2) * Who did Angleton wondered why Philby suspected t?
(3) Dulles suspected everyone that Angleton believed that Philby did ▲.
(4)* Dulles suspected everyone that Angleton wondered why Philby did ▲.
Ellipsis as involving syntax

(4)* Dulles suspected everyone that Angleton wondered why Philby did ▲.

▷ Syntactic material: \([_{\text{VP}} \text{suspect } t]\) ✓

▷ Semantic anaphora: \([e]\)

▷ Semantic anaphora plus Pseudogapping: \([_{\text{VP}}[e] t]\).

(5) a. * John sat near Pat, and Mary did \([e]\) Sue.
   b. John sat near everyone that Mary did \([e] t\).

(Lasnik 1995; Kennedy 1997)

Ellipsis and syn/sem identity

- Some syntactico/semantic differences are ignored between the antecedent and the syntax/semantics of the ellipsis site (Heim 1995; Maier 2008)

(1) I turned in my homework, but most of the other students didn’t.
   <turn in their homeworks>

(2) You didn’t eat anything, but I did.
   <eat something> *<eat anything>
Ellipsis: Fragments

- In question/answer pairs (Merchant 2004)
  (1) Q: Who did John see?  
      A: Mary.

- Other fragments in dialog (Kempson et al. 2008)
  (2) A: Bob left.  
      B: (Yeah,) the accounts guy.
Reconstruction & Connectivity

- Scope reconstruction:
  (1) How many papers did every student read?
    a. $\exists n \forall x [ \text{paper}(x) \land \forall y [\text{student}(y) \rightarrow \text{read}(y,x)] ]$
    b. $\forall y [\text{student}(y) \rightarrow \exists n \forall x [ \text{paper}(x) \land \text{read}(y,x)] ]$

- Variable binding reconstruction:
  (2) What friend of hers did every woman invite?
    Her best friend.
Scope reconstruction in covert syntax:

(1) How many papers did every student read?
   a. How many papers did every student read how many papers
      \[ \exists_n \exists x \left[ \text{paper}(x) \land \forall y [\text{student}(y) \rightarrow \text{read}(y,x)] \right] \]
   b. How many papers did every student read how many papers
      \[ \forall y [\text{student}(y) \rightarrow \exists_n \exists x \left[ \text{paper}(x) \land \text{read}(y,x) \right] ] \]

Variable binding reconstruction in covert syntax. E.g.:

(2) What friend of hers did every woman invite?
   \[ \forall f \left[ \exists z \left[ \text{woman}(z) \rightarrow \text{invite}(z, f(\lambda x. \text{friend-of}(x,z))) \right] \right] \]

Semantic Reconstruction: Higher Type Traces

- Lower scope through higher trace $T$:
  1. How many papers did every student read?
     a. How many papers did every student read $t_{1,e}$
        $?n: \exists_n x \ [ \text{paper}(x) \land \forall y[\text{student}(y) \rightarrow \text{read}(y,x)] \]$
     b. How many papers did every student read $T_{1,<et,t>$
        $?n: \forall y[\text{student}(y) \rightarrow \exists_n x \ [ \text{paper}(x) \land \text{read}(y,x)] \]$

- Variable binding via Skolem function:
  2. What friend of hers did every woman invite?
     $?f_{<e,e>} [\forall x \in \text{Dom}(f): \text{friend-of}(f(x), x)]: \forall z[\text{woman}(z) \rightarrow \text{invite}(z, f(z))]$

Reconstruction & Connectivity without Movement

- In specificational copular sentences (Higgins 1979, Sharvit 1999, Romero 2005):

  (1) a. The number of planets is large. PREDICATIONAL
      b. The number of planets is nine. SPECIFICATIONAL

  (2) a. What John is is important to himself / *him.
      b. What he is is important to him / *John.

- In other constructions: e.g. resumption (Guilliot 2008)
Variables and Binding

- **World/situation variables in NPs:** (Cresswell 1990, Farkas 97)

  (1) $\lambda s_0$. If ${s'}_s$ every **poor** child ${s'}_{s_0}$ was rich instead, I’d be happy.

  $\Rightarrow$ Non-local binding $\checkmark$

- **World/situations variables in (ad)verbal elements:**

  (2) $\lambda s_0$. John sometimes ${s'}_s$ beat ${s'}_s$ the winner ${s'}_{s_0}$

  “John beat at times the overall winner.”
Variables and Binding

- **World/situation variables in NPs:** (Cresswell 1990, Farkas 97)
  (1) \( \lambda s_0 \cdot \text{If}_{s'} \text{ every poor child}_{s_0} \text{ was rich instead, I’d be happy.} \)
  - Non-local binding ✓

- **World/situations variables in (ad)verbal elements:**
  (2) \( \lambda s_0 \cdot \text{John sometimes}_{s'} \text{ beat}_{s_0} \text{ the winner}_{s'} \)
  * “John beat in the overall game the winner of some round”
  - Non-local binding ✓

The meaning of a complex expression is a function of the meaning of its parts and the way they are combined.
Back to compositionality

Back to Frege’s Compositionality

The meaning of a complex expression is a function of the meaning of its parts and the way they are combined.
Back to Compositionality

The meaning of the parts:

• Hendriks-style Argument-Raising in Categorial Grammar: Uchida 2008
• Richer semantic contribution of the Chinese distributor *dou* in GB/Minimalism: Luo 2008
Back to compositionality

Back to Frege’s Compositionality

The meaning of a complex expression is a function of the meaning of its parts and the way they are combined.
Back to Compositionality

The way the parts are combined…

… in the syntactic structure:

- Derivation Tree in Tree Adjoining Grammar: Joshi’s work
Back to compositionality

The way the parts are combined…
… in the interpretation procedure:

- Variable-free semantics in Categorial Grammar: Guilliot 2008
- Lexical Resource Semantics in HSPG: Richter and Sailer 2008
- (Semantic/pragmatic) Higher-order unification: Maier 2008
Back to Compositionality

The way the parts are combined…
… both in the syntactic structure and in the interpretation procedure.

- Dynamic syntax: Kempson et al. 2008
- Convergent Grammar: Pollard 2008
Back to compositionality

Back to Frege’s Compositionality

The meaning of a complex expression is a function of the meaning of its parts and the way they are combined.
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The meaning of a complex expression…
…as an underspecified semantic representation.

- Constraint Lg for Lambda Structures: Egg 2008
- Lexical Resource Semantics: Richter and Sailer 2008
- Minimal Recursion Semantics: Joshi’s work
References

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