Sluicing and Stranding

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Sluicing

With Correlate:

- ▶ **Someone** left the room yesterday, but I don't know **who**.
- ▶ **Someone** left the room yesterday. I wonder **who**.
- ▶   A: **Someone** left the room yesterday.
      B: **Who**?

Sprouting:

- ▶ They gave away the farm, but I don't know **to whom**.
- ▶ They gave away the farm. I don't know **to whom**.
- ▶   A: They gave away the farm.
      B: **To whom**?

3 Theories of Sluicing

- ▶ Deletion (Ross 1969, Sag 1976, Merchant 2001, ...)

- ▶ Classified as Surface Anaphora by Hankamer and Sag 1976 and Sag and Hankamer 1984

- ▶ LF Copying (Williams 1977, Chung, Ladusaw, & McCloskey 1995,...)
- ▶ Direct Interpretation (Ginzburg & Sag 2000, Culicover & Jackendoff 2005, ...)

LF Copying

▶ S-Structure: **Someone** left the room yesterday.
LF: **[Someone x]** [$_{IP}$ **x** left the room yesterday].

▶ LF: but I don't know [$_{CP}$ **[who x]** [$_{IP}$]].⤳
but I don't know [$_{CP}$ **[who x]** [$_{IP}$ **x** left the room yesterday]].

Ginzburg & Sag 2000

$$
\begin{bmatrix}
\text{SYN} & \text{S} \\
\text{SEM} & \lambda\Sigma\Phi \\
\text{CNTXT} & \begin{bmatrix}
\text{SAL-UTT} & \left\{ \begin{bmatrix} \text{SYN} & [\text{CAT XP}] \\ \text{SEM} & [\text{IND } i] \end{bmatrix} \right\} \\
\text{MAX-QUD} & \lambda\{\ \}\Phi
\end{bmatrix}
\end{bmatrix}
\rightarrow
\begin{bmatrix}
\text{SYN} & [\text{CAT XP}] \\
\text{SEM} & [\text{IND } i] \\
\text{STORE} & \Sigma
\end{bmatrix}
$$

where Σ is a nonempty set of parameters.

Deletion (Merchant 2001)

- but I don't know $[_{CP}$ $[_{+Q}$ $]$ $[_{IP}$ Kim likes **[who]**$]]$.
- but I don't know $[_{CP}$ $[_{+Q}$ **who**$_i]$ $[_{IP}$ Kim likes __ $_i$ $]]$.

- $\leadsto$ but I don't know $[_{CP}$ $[_{+Q}$ **who**$_i]$ $]$
  just in case
  '**[someone i** [Kim likes **i**]]' is 'e-given'.

Road Map

Ever popular view: Deletion Theory of Sluicing (Merchant's)

► Arguments for Deletion

P-Stranding Generalization

Evidence Against Deletion

Sprouting

A Revision of Ginzburg and Sag 2000

Conclusions

The Semantic Basis of Ellipsis

- Ellipsis is fundamentally semantic in nature: the content of an elliptical utterance is determined by the content of an appropriate linguistic antecedent.

- Content = meaning fixed in context.

- Deletion provides a seemingly simple account of the interpretation of elliptical utterances.

Semantic Motivation for Deletion Analyses

- ▶ But what is the identity condition licensing ellipsis?
- ▶ Syntactic form of remnant and antecedent may differ:

- ▶ Kim doesn't want anything, but Lee does ⟨want something⟩.
- ▶ These people have gall bladders, but I don't ⟨have a gall bladder⟩.
- ▶ I went home when they wouldn't ⟨go home⟩.
- ▶ I can't play quarterback. I don't even know how ⟨to play quarterback ⟩.
- ▶ I remember meeting him, but I don't remember when ⟨I met him ⟩.

A Purely Semantic Identity Condition

from Sag and Hankamer 1984 Toward a Theory of Anaphoric Processing. *Linguistics and Philosophy* 7: 325–345.

(1)   A: Do you think they'll like **him**$_C$?
       B: Of course they will __ . [__ $= \lambda x[like(x, C)]$]]

(2)   A: Do you think they'll like **me**?
       B: Of course they will __ . [__ $= \lambda x[like(x, A)]$;
    $\neq \lambda x[like(x, B)]$]]

Sag and Hankamer's (1984) Semantic Theory:

Delete VP_e in S_e only if:

- c_e is the Kaplan-context of S_e,
- c_a is the Kaplan-context of some sentence S_a not subsequent to S_e in discourse, and
- there is some VP_a in S_a s.t. for all assignments f,

$$[[VP_e]]^{c_e f} = [[VP_a]]^{c_a f}.$$

(S&H were following Sag (1976) in assuming 'no rebinding of traces')

Merchant's (2001) Semantic Theory

- An expression E counts as e-GIVEN iff E has a salient antecedent A and, modulo $\exists$-type shifting,
  1. A entails F-clo(E), and
  2. E entails F-clo(A)
- Focus condition on VP-ellipsis:

  VP_e can be deleted only if VP_e is e-GIVEN.

Questioning the e-GIVEN Identity Condition

Merchant 2001: an Update

- A VP_e can be deleted only if VP_e is e-GIVEN.
- A VP_e can be deleted only if there is a (salient) VP_a in the surrounding context s.t. for all assignments f:
    1. $[[\text{F-clo}(VP_e)]]^{c_e f} \vdash [[\text{F-clo}(VP_a)]]^{c_a f}$ and
    2. $[[\text{F-clo}(VP_a)]]^{c_a f} \vdash [[\text{F-clo}(VP_e)]]^{c_e f}$.
- i.e. only if $[[\text{F-clo}(VP_e)]]^{c_e f} = [[\text{F-clo}(VP_a)]]^{c_a f}$

  (continuing the 'no rebinding of traces' assumption)

Merchant's Analysis of VPE - the normal case:

(3)   Kim will visit Lee, and then Sandy will ⟨visit Lee⟩.
       $\exists$-clo(VP_a) = F-clo(VP_a) = $\exists$x.x visit Lee.
       $\exists$-clo(VP_e) = F-clo(VP_e) = $\exists$x.x visit Lee.

   ▶ Mutual entailment holds, so VP-ellipsis is possible.

The Relational Opposites Puzzle (Hartmann 2009)

(4) *John will beat someone at chess, and then Mary will
     ⟨lose to someone at chess⟩.

- ∃-clo(VP_a) = F-clo(VP_a)
  = ∃x.x will beat someone at chess.

  ∃-clo(VP_e) = F-clo(VP_e)
  = ∃x.x will lose to someone at chess.

- VP_a and VP_e satisfy mutual entailment modulo ∃-type
  shifting. (If someone will beat someone at chess, then
  someone will lose to someone at chess, and vice versa.)

- Thus VP_e is e-GIVEN, but ellipsis is impossible.

Comparison

- The Relational Opposites Puzzle is problematic for Merchant's (2001) semantic theory of VP-Ellipsis (Hartman 2009).
- Sag & Hankamer's (1984)'s semantic theory of VP-Ellipsis solves the Relational Opposites Puzzle straightforwardly:

  Only the VP content is relevant to the possibility of deletion.

- We think the relevant semantic generalization is naturally stated in a theory without deletion.

Why Deletion? Case Matching Effects

(5) *Er* will jemandem schmeicheln, aber sie wissen
he wants someone.DAT to-flatter but they know
nicht, wem/*wen.
not who.DAT/who.ACC
'He wants to flatter someone, but they don't know who.'

(6) *Er* meinte, er hätte geholfen, aber wir wüssten nicht,
he thought he had helped but we knew not
wem/*wen.
who.DAT/who.ACC
'He claims he had helped, but we couldn't say who'

Case Matching Effects

- There is no syntactic identity condition in Merchant's theory.
- Case matching is explained indirectly by assuming derivations where case marking feeds *WH*-Movement, which feeds Sluicing.
- E-Givenness must be mediated by verb identity, which must have object case identity as a side effect.

- We think the case assignment facts are naturally accounted for without deletion.

Questioning the Indirect Account of the Case-Matching Generalization

Case Matching is a Direct Effect (Jacobson 2011)

(7)   Egy fiút   segített   Mari.
       a   boy.ACC helped.INDEF-CONJ Mary.
       'Mary helped a boy'

(8)   Egy fiúnak   segített Mari.
       a   boy.DAT helped   Mary
       'Mary helped a boy'

Case Matching is a Direct Effect 2

(9)   Q: Kit   segített Mari?
           who.ACC helped Mary
           'who did Mary help?'

         A: Egy fiút.   *Egy fiúnak
           a boy.ACC *a boy.DAT

(10)   Q: Kinek   segített Mari?
           who.DAT helped Mary

         A: *Egy fiút.   Egy fiúnak
           a boy.ACC   a boy.DAT

Why Deletion? Sluicing Remnants are Clauses

- ▶ Sluices have the external distribution of clauses:

  We all wondered **who**. (embedded environments)

  It was unclear **who**. (extraposition)

- ▶ This is explained by assuming sluiced remnants are clauses (CPs) in which deletion has applied.

- ▶ We agree that sluices are clauses; This fits perfectly with the direct analysis of Ginzburg and Sag 2000.

Merchant's P-Stranding Generalization

- A Language *L* will allow preposition-stranding under Sluicing just in case *L* allows preposition stranding under regular *WH*-Movement. (Merchant 2001, 107)

- Explained by assuming derivations where *WH*-Movement feeds Sluicing.

- Potential problem for a theory without deletion, like that of Ginzburg & Sag 2000.

- **Preposition-Stranding Languages**
- English

  Peter was talking with someone, but I don't know (with) who.

  Who was he talking with?
- Frisian, Swedish, Norwegian, Danish, Icelandic

- **Non-Preposition-Stranding Languages**
- German

  Anna hat mit jemandem   gesprochen,

  Anna has with someone.DAT spoken,

  aber ich weiss nicht *(mit) wem.

  but I   know not   *(with) whom.DAT

  *Wem hat sie mit gesprochen?
- Greek, Yiddish, Czech, Russian, Slovene, Polish, Bulgarian, Serbo-Croatian, Persian, Hebrew, Moroccan Arabic, Basque.

Questioning the P-Stranding Generalization

Typological Evidence

Problematic data for the PSG have been noted from all the following languages:

- English (Chung et al. 1995, Fortin 2007)
- Spanish (Vicente 2006, 2008, Rodrigues et al. 2009)
- Polish (Szczegielniak 2008)
- Bahasa Indonesia (Fortin 2007)
- Amis (Wei 2011)
- Serbo-Croatian (Stjepanović 2008)
- Brazilian Portuguese (Almeida and Yoshida 2007, Lasnik 2007, Rodrigues et al. 2009)

Rescuing the Preposition-Stranding Generalization

- **Pseudo-Sluicing**

  A *wh*-interrogative or an interrogative cleft underlies a Sluicing remnant. (Vicente 2008, Rodrigues et al. 2009, Szczegielniak 2008, van Craenenbroeck 2010)

- **P-Deletion Transformation**

  P-omission in Sluicing arises through preposition deletion at PF. Hence *WH*-Movement need not strand prepositions. (Stjepanović 2008)

Spanish

Merchant (2001, 99):

(11) ??Juan ha hablado con alguien, pero no sé   cuién.
      Juan has talked with someone, but not know who
      'Juan talked with someone, but I don't know who.'

Almeida & Yoshida 2007; Rodrigues et al. 2009:

(12) Juan ha hablado con una chica, pero no sé   cuál
      Juan has talked to a girl but not know which.

      'Juan has talked to a girl, but I don't know which.'

Rodrigues et al. 2009

'Pseudosluicing' (Cleft Ellipsis)

(13)   Juan ha hablado con una chica, pero no sé   cuál
         Juan has talked   to   a   girl   but not know which
         [~~es la chica con la que ha hablado Juan.~~]
         [~~is the girl with the that has talked Juan~~]
         'Juan has talked to a girl, but I don't know which (girl it
         is that he has talked to).'

(14)   Juan ha hablado con una chica, pero no sé cuál **ES**.

'The strongest implication of this analysis is that all languages that
appear to violate this generalization [...] should be reducible to a
pseudosluicing analysis.'

Is the Cleft Analysis Cross-Linguistically Viable?

- **Clefts in Polish:**

  The pivot must be in the instrumental case.

- **Prepositionless Sluicing Remnants:**

  NPs appear in a variety of cases, as long as the case of the remnant matches that of the correlate (the standard pattern):

  (15)   Adam regularnie dostaje prezenty od
              Adam regularly gets   presents from
              kogoś,   ale nie wiem
              someone.GEN but not I know
              kogo/*kim.
              who.GEN/*who.INST
              'Adam regularly gets presents from someone, but I
              don't know who.'

Is the Cleft Analysis Cross-Linguistically Viable?

No!

Preposition Deletion?

- ▶ Proposed for Serbo-Croat by Stjepanović (2008).
- ▶ Stjepanović shows P-Deletion cannot apply elsewhere.
- ▶ P-Deletion applies only to Sluicing remnants.
- ▶ P-Deletion has no independent motivation.
- ▶ Removes all empirical content from the Preposition-Stranding Generalization.

English 1

- Prepositions that don't strand may be omitted in Sluicing (Rosen 1976, Chung et al. 1995, Fortin 2007)

  (16)   They will all leave town barring certain circumstances/except for one guest/astride a certain horse, but we don't know **which**.

  (17)   *We don't know which circumstance they will leave barring ___ .

  (18)   *We don't know which guest they will leave town except for ___ .

  (19)   *We don't know which horse they will leave astride ___ .

English 2

- Prepositions that don't strand in a particular construction may be omitted in Sluicing

  (20) What happened with the car? What car?

  (21) Thank you for the talk. What talk?

- Not instances of Sluicing?

Historical Evidence

- ▶ P-stranding with *wh*-interrogatives arose in the Middle English period (1150-1500)
- ▶ Middle English had clefts similar to the Spanish examples cited by Rodrigues et al., even with P-stranding:

    (22)   But seide to Gamelyn myldely and stille
            Come a-fore oure maistre and sai to him thi wille
            yonge men saide Gamelyn bi youre lewte
            What man is your maister that ye with be
            [c. 1400 Chaucer's Canterbury Tales, Royal MS 18 C ii folio 65a]

Historical Evidence

- English P-stranding—a relic of an Old English (c. 500-1150) construction.
- P-stranding expanded via loss of case marking.
- Clefts existed in parallel.
- No records of P-omission in Sluicing until the Early Modern English Period (1500-1800).
- This temporal gap is unlikely to be accidental.

Interim Remarks

- Pseudo-Sluicing is unable to explain all the cross-linguistic variation.
- P-Deletion analyses eviscerate the content of the PSG.
- Historical record seems inconsistent with the PSG.
- Pseudo-Sluicing or P-Deletion analyses of PSG violations in Bahasa Indonesian have been argued against by Fortin (2007).
- Pseudo-Sluicing or P-Deletion analyses of PSG violations in Amis have been argued against by Wei (2011).
- The Preposition-Stranding Generalization is either incorrect or vacuous.

Pattern

- Although, the PSG is incorrect, the literature shows a pattern: More linguistically complex remnants paired with more complex correlates are preferred: (23) > (24)

  (23) I called the loan company and they said the loan was turned over to a collection agency but they don't know which.   >

  (24) I called the loan company and they said the loan was turned over to someone but they don't know who.

Pattern

- Spanish
- Polish
- Serbo-Croatian
- Bahasa Indonesia ?
- Amis ?
- Brazilian Portuguese ?
- German
- French
- Russian

Psycholinguistic Evidence 1

- Acceptability judgment studies of Polish P-omission under sluicing
- Hypothesis (following from cross-linguistic patterns, Ariel's Accessibility theory (1990, 2001), Hofmeister et al. (2007), and Hofmeister and Sag (2010)):

  A less complex correlate and remnant induce a P-omission penalty.
- This has been mistaken for a categorical grammaticality contrast in the literature.

Psycholinguistic Evidence 2

▶ Complexity manipulated via preposition complexity (*in* vs. *against*) or phrasal complexity of the correlate (NP vs. indefinite pronoun, e.g. *somebody*) and remnant (*what/who* vs. *what/which*-NP)

▶ Hypothesis confirmed, but no evidence that less complex correlates and remnants are categorically unacceptable; only evidence of degradation in acceptability wrt complex correlates and remnants.

Questioning the Predictions of the
Movement plus Deletion Analysis of Sluicing:

Island Constraints

Island Amnesty 1

(25) Bo talked to the people who discovered **something**, but we don't know what (*Bo talked to the people who discovered). [CNPC/Subjacency]

(26) Terry wrote an article about Lee and a book about **someone else from East Texas**, but we don't know who (*Terry wrote an article about Lee and a book about) [CSC (Element Constraint)]

(27) He wants a detailed list, but I don't know how detailed (*he wants a list). [LBC] (Merchant 2001, p. 167)

Island Amnesty 2

- Previous account 1: Some kind of pseudo-sluicing (no island violation)
- Previous account 2: 'certain island effects are not necessarily structural in the usual sense, but rather should be located at PF' (Merchant 2001, p. 200)
- The well-formedness of these sluicing examples follows immediately from a direct analysis of sluiced clauses.
  No movement ⊢ No island constraints in effect.
- Complexity factors? Pragmatic factors?
  Informational/Prosodic factors?

Our Analysis

Based on Jonathan Ginzburg and Ivan A. Sag. 2000.
Interrogative Investigations: the form, meaning, and use of English Interrogatives. Stanford: CSLI Publications.
[Distributed by University of Chicago Press]

- ▶ Direct Generation of Sluiced Clauses (likewise Stripping (BAE))
- ▶ Indirect Licensing of Remnants by Elements of Surrounding Context [Ginzburg & Sag 2000]
- ▶ Reasonably complete analysis of reprise uses, as well. (These are pretty much completely ignored in the literature.)
- ▶ 'Simpler Syntax' Hypothesis [Culicover and Jackendoff 2005] and 'Concrete Minimalism' [Culicover 1999]

A Grammar is a Recursive System of Constructions (Constraints that license signs)

- $sign_0 \rightarrow sign_1 \ldots sign_n$

- $$\begin{bmatrix} \text{FORM} & [...] \\ \text{SYN} & [...] \\ \text{SEM} & [...] \\ \text{CTXT} & [...] \end{bmatrix} \rightarrow \begin{bmatrix} \text{FORM} & [...] \\ \text{SYN} & [...] \\ \text{SEM} & [...] \\ \text{CTXT} & [...] \end{bmatrix} \ldots \begin{bmatrix} \text{FORM} & [...] \\ \text{SYN} & [...] \\ \text{SEM} & [...] \\ \text{CTXT} & [...] \end{bmatrix}$$

Semantic Assumptions

- Questions are propositional abstracts (Hull 75, Hausser 83, Scha 83, G&S 00)

  Unary *wh*-question: $\lambda\{\pi^i\}[love(K, i)]$ 'who does Kim love?'

  Multiple *wh*-question: $\lambda\{\pi^i, \pi^j\}[love(j, i)]$ 'who loves who?'

  Polar question: $\lambda\{\ \}[love(K, L)]$ 'Does Kim love Lee?'

- A parameter consists of an index and a set of restricting propositions.

- the content of *who*: $\pi^i_{\{person(i)\}}$

$$\begin{bmatrix} \text{PHON} & \langle \text{ whose, book, do, you, like } \rangle \\ \text{SYN} & \text{S}[\text{GAP } \langle \, \rangle] \\ \text{SEM} & \lambda\{\pi^i_{\{person(i)\}}\}[you\ like\ i's\ book] \\ \text{STORE} & \{\ \} \end{bmatrix}$$

$$\boxed{1}\begin{bmatrix} \text{PHON} & \langle \text{ whose, book } \rangle \\ \text{SYN} & \text{NP} \\ \text{SEM} & i's\ book \\ \text{STORE} & \{\pi^i_{\{person(i)\}}\} \end{bmatrix} \qquad \begin{bmatrix} \text{FORM} & \langle \text{ do, you, like } \rangle \\ \text{SYN} & \text{S}[\text{GAP } \langle\boxed{1}\rangle] \\ \text{SEM} & you\ like\ i's\ book \end{bmatrix}$$

$$\begin{bmatrix} \text{PHON} & \langle \text{ whose } \rangle \\ \text{SYN} & \text{NP} \\ \text{SEM} & i \\ \text{STORE} & \{\pi^i_{\{person(i)\}}\} \end{bmatrix} \qquad \begin{bmatrix} \text{PHON} & \langle \text{ book } \rangle \\ \text{SYN} & \text{NP} \\ \text{SEM} & book \end{bmatrix}$$

Theory of Dialogue

from Ginzburg, Jonathan. in press. *The Interactive Stance: Meaning for Conversation.* Oxford University Press.

- ▶ Dialogues are described via a Dialogue GameBoard (DGB) where the contextual parameters are 'anchored' and where there is a record of who said what to whom, what/who they were referring to, ...

- ▶ DGB monitors which questions are 'under discussion', what answers have been provided, by whom, etc.

- ▶ The conversational events are tracked by various conversational 'Moves' that have specific preconditions and effects.

- ▶ The main claim is that Non-Sentential Utterances (NSU)s are resolved to the contextual parameters of the DGB.

Back to Sluicing!

Just about any Indexed NP can be a Correlate:

- ▶ Indefinite NP: **Some senator** is arriving. Who?
- ▶ Quantified NP: I talked to **most of the players**. Oh yeah, Who, exactly?
- ▶ MON↓ Quantified NP: I talked to **few infielders** yesterday. But how many outfielders?
- ▶ Definite NP: **The tallest guy on the team** is here. Who else?
- ▶ Proper Noun: I met **Kim Lee**. Who else?
- ▶ Pronoun: **She** came to the party. Who else?

  More complex NP: **Kim or Lee** will visit me. Which one?

As Long as the Dialogue Can Accommodate a Compatible 'MAX-QUD' (Maximal Question-under-Discussion):

- **No one** arrived. *Who?

  The question of who arrived is no longer under discussion.

- **Kim Chang** arrived. *Who?

  The question of who arrived is no longer under discussion.

- **Kim** arrived. Who else?

  'Else' changes the MAX-QUD.

- **Kim or Lee** will visit Pat. Which one?

  The question of whether Kim or Lee will visit Pat is still under discussion.

- **Kim and Lee** will visit Pat. *Which one?/*Who?

  The question of who will visit Pat is no longer under discussion.

Question Introduction Appropriateness Condition (QIAC)

▶ A question q can be introduced into QUD by A only if there does not exist a fact τ such that $\tau \in$ FACTS and τ resolves q.

▶ (Informally:) Resolved questions can't be under discussion.

Maybe modify to: 'Don't introduce a question that is already partially resolved'.

Context Updating 1:

▶ $\begin{bmatrix} \text{FORM} & \langle \text{Kim, loves, some, pacifist} \rangle \\ \text{SEM} & \textbf{someone}^i_{\{\textbf{pacifist}(i)\}}[\textbf{love}(\textbf{Kim}, i)] \end{bmatrix}$

▶ **Uttering**(Kim loves $\boxed{\text{some pacifist}}$) $\rightsquigarrow$

$$\begin{bmatrix} dgb \\ \\ \text{MAX-QUD} & \begin{bmatrix} \text{FEC} & \begin{bmatrix} \text{PHON} & \langle \text{some, pacifist} \rangle \\ \text{SYN} & \text{NP} \\ \text{SEM} & i \end{bmatrix} \\ \text{Q} & \lambda\{\pi^i_{\{\textbf{pacifist}(i)\}}\}[\textbf{love}(\textbf{Kim}, i)] \end{bmatrix} \end{bmatrix}$$

Context Updating 2:

▶ $\begin{bmatrix} \text{FORM} & \langle \text{Kim, loves, some, senators} \rangle \\ \text{SEM} & \textbf{some}^{i}_{\{\textbf{senator}(i)\}}[\textbf{love}(\textbf{Kim}, i)] \end{bmatrix}$

▶ **Uttering**(Kim loves $\boxed{\text{some senators}}$) $\rightsquigarrow$

$\begin{bmatrix} dgb \\ \\ \text{MAX-QUD} & \begin{bmatrix} \text{FEC} & \begin{bmatrix} \text{PHON} & \langle \text{some, senators} \rangle \\ \text{SYN} & \text{NP} \\ \text{SEM} & i \end{bmatrix} \\ \\ \text{Q} & \lambda\{\pi^{i}_{\{\textbf{senator}(i)\}}\}[\textbf{love}(\textbf{Kim}, i)] \end{bmatrix} \end{bmatrix}$

Context Updating 3:

- Kim loves some pacifist. I wonder who.
  $\lambda\{\pi^i_{\{\mathbf{pacifist}(i)\}}\}[\mathbf{love}(\mathbf{Kim}, i)]$

- Kim loves some senators. I wonder which democrats.
  $\lambda\{\pi^i_{\{\mathbf{senator}(i),\mathbf{democrat}(i)\}}\}[\mathbf{love}(\mathbf{Kim}, i)]$

Sluiced Interrogative Clause Construction

$$
\begin{bmatrix}
\text{SYN} & \text{S} \\
\text{SEM} & \lambda\{\pi^i_{\sigma1 \cup \sigma2}\}[\Phi] \\
\text{DGB} & \begin{bmatrix} \text{MAX-QUD} & \begin{bmatrix} \text{FEC} & [\text{SYN } [\text{CAT } \text{XP}]] \\ \text{Q} & \lambda\{\pi^i_{\sigma1}\}[\Phi] \end{bmatrix} \end{bmatrix}
\end{bmatrix}
\rightarrow
\begin{bmatrix}
\text{SYN} & [\text{CAT } \text{XP}] \\
\text{STORE} & \{\pi^i_{\sigma2}\}
\end{bmatrix}
$$

where: $\quad \pi^i_\sigma = \begin{bmatrix} \textit{parameter} \\ \text{IND} & \text{i} \\ \text{RESTR} & \sigma \end{bmatrix}$

$$\begin{bmatrix} \text{FORM} & \langle \text{ who } \rangle \\ \text{SYN} & \text{S} \\ \text{SEM} & \lambda\{\pi^i_{\sigma \cup \{\textbf{person}(i)\}}\}[\textbf{love}(\textbf{Kim}, i)] \\ \text{DGB} & \begin{bmatrix} \text{FEC} & \text{NP}_i \\ \text{MAX-QUD} & \lambda\{\pi^i_\sigma\}[\textbf{love}(\textbf{Kim}, i))] \end{bmatrix} \end{bmatrix}$$

$$\begin{bmatrix} \text{FORM} & \langle \text{ who } \rangle \\ \text{SYN} & \text{NP} \\ \text{SEM} & i \\ \text{STORE} & \{\pi^i_{\{\textbf{person}(i)\}}\} \end{bmatrix}$$

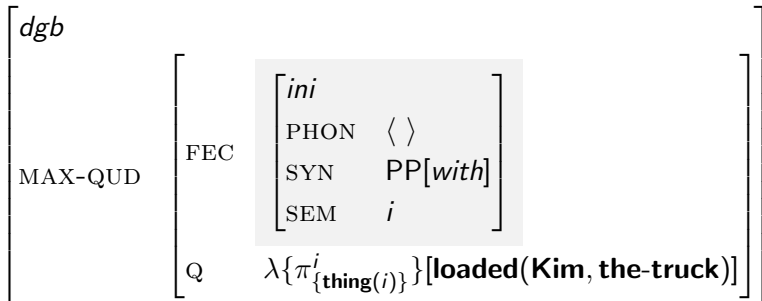# Context Updating (Argument Sprouting 1):

- $\begin{bmatrix} \text{FORM} & \langle \text{Kim, loaded, the, truck} \rangle \\ \text{SEM} & \textbf{loaded}(\textbf{Kim}, \textbf{the-truck}) \end{bmatrix}$

- $\begin{bmatrix} \text{FORM} & \langle \text{loaded} \rangle \\ \\ \text{ARG-ST} & \left\langle \text{NP, NP,} \begin{bmatrix} \textit{ini} \\ \text{SYN PP}[\textit{with}] \\ \text{SEM } i \end{bmatrix} \right\rangle \end{bmatrix}$
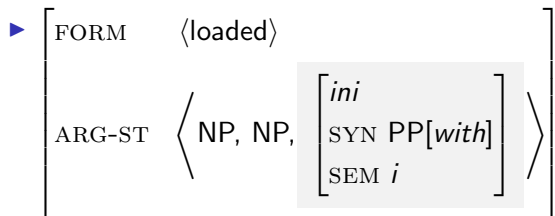
where '*ini*' is Fillmore's *indefinite null instantiation*

Context Updating (Argument Sprouting 2):

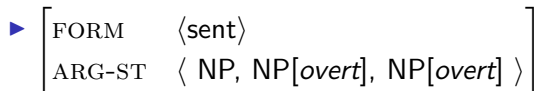▶ **Uttering**(Kim loaded the truck) $\rightsquigarrow$

$$
\begin{bmatrix}
dgb \\
\\
\text{MAX-QUD} \quad \begin{bmatrix}
\text{FEC} & \begin{bmatrix}
ini \\
\text{PHON} & \langle \ \rangle \\
\text{SYN} & \text{PP}[with] \\
\text{SEM} & i
\end{bmatrix} \\
\\
\text{Q} & \lambda\{\pi^i_{\{\mathbf{thing}(i)\}}\}[\mathbf{loaded}(\mathbf{Kim}, \mathbf{the\text{-}truck})]
\end{bmatrix}
\end{bmatrix}
$$

Context Updating (Argument Sprouting 3):

- $\begin{bmatrix} \text{FORM} & \langle \text{loaded} \rangle \\ \\ \text{ARG-ST} & \left\langle \text{NP, NP,} \begin{bmatrix} ini \\ \text{SYN PP}[with] \\ \text{SEM } i \end{bmatrix} \right\rangle \end{bmatrix}$

- Kim loaded the truck. *(With) what? (cf. CLM 95, CLM 10))
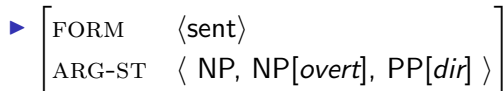
- $\begin{bmatrix} \text{FORM} & \langle \text{sent} \rangle \\ \text{ARG-ST} & \langle \text{ NP, NP}[overt], \text{PP}[dir] \rangle \end{bmatrix}$
- $\begin{bmatrix} \text{FORM} & \langle \text{sent} \rangle \\ \text{ARG-ST} & \langle \text{ NP, NP}[overt], \text{NP}[overt] \rangle \end{bmatrix}$
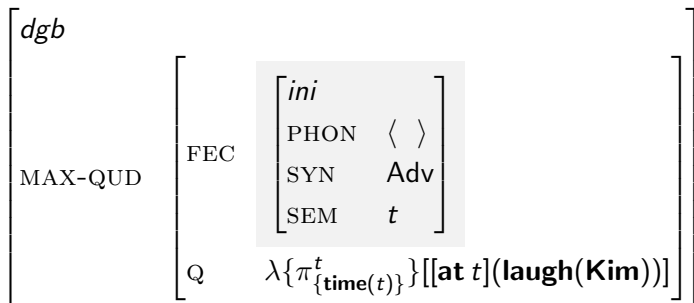- Bo sent flowers. Where/*(To) who?

Context Updating (Adjunct Sprouting 1):

▶
$$\begin{bmatrix} \text{FORM} & \langle \text{Kim, laughs} \rangle \\ \text{SEM} & [\textbf{at } t](\textbf{laugh}(\textbf{Kim})) \end{bmatrix}$$

▶
$$\begin{bmatrix} \text{FORM} & \langle \text{laughs} \rangle \\ \\ \text{ARG-ST} & \left\langle \text{NP, NP, } \begin{bmatrix} \textit{ini} \\ \text{SYN Adv} \\ \text{SEM } t \end{bmatrix} \right\rangle \end{bmatrix}$$

Context Updating (Adjunct Sprouting 2):

- **Uttering**(Kim laughs) $\leadsto$

$$
\begin{bmatrix}
dgb \\
\\
\textsc{max-qud} & \begin{bmatrix}
\textsc{fec} & \begin{bmatrix}
ini \\
\textsc{phon} & \langle \ \rangle \\
\textsc{syn} & \mathsf{Adv} \\
\textsc{sem} & t
\end{bmatrix} \\
\\
\textsc{q} & \lambda\{\pi^t_{\{\mathbf{time}(t)\}}\}[[\mathbf{at}\ t](\mathbf{laugh}(\mathbf{Kim}))]
\end{bmatrix}
\end{bmatrix}
$$

Contrast with CLM

Our analysis differs from the LF-Copying analysis of Chung, Ladusaw and McCloskey (1995, 2011) in that:

► It has no problem avoiding *Who^x did you see someone^x? (cf. Merchant 2001, p. 150)

► It solves the semantic problems for ellipsis theories noted by Sag & Hankamer (1984).

► It solves the problem of case matching between remnant and correlate. (raised by Merchant 2001, p. 150)

► It provides a basis for dealing with cases of 'content clash' (*She has five CATS, but I don't know how many DOGS.*) via focus-induced changes to MAX-QUD.

Conclusions

- ▶ Unified analysis of Sluicing: Merger and Sprouting.
- ▶ Our analysis relies on discourse information (via DGB) and constantly evolving 'Questions Under Discussion'...
- ▶ Our adaptation of GS-00 solves the semantic problems for ellipsis theories noted by Sag & Hankamer (1984).
- ▶ But it also relies on syntactic information specified by the Focus-Establishing Constituent.
- ▶ Our analysis correctly separates P-omission (very common, cross-linguistically) from P-stranding (very rare, cross-linguistically).
- ▶ It also solves key problems raised by Merchant as objections to CLM-95.

Finally

- No pragmatic control (exophoric uses)?
- Hankamer 1978, Pullum 2000.
- Stainton 1998, Stanley 2000, GS-00, Merchant 2004, Culicover and Jackendoff 2005.
- Our analysis might leave room for nonlinguistic introduction of MAX-QUD with implicit FEC under extreme circumstances.

Thank You!