Which QuD?

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Introduction

Sluicing: clausal ellipsis in a *wh*-question, leaving the *wh*-phrase overt
(e.g.Ross 1969; Chung et al. 1995; Merchant 2001)

(1) Mary called someone, but I don't know who. $[_{CP_A}$ Mary called someone$]$, BIDK $[_{CP_E}$ who $[_{TP}$ ~~Mary called *t*~~ $]$ $]$.

Some terminology:

- *Remnant*: any *wh*-phrase left overt in sluicing.
- *Correlate*: an indefinite corresponding to the remnant.
- *Antecedent, sluice*.

Introduction

- **Ellipsis represents a radical mismatch between PF and LF.**

A central question: How is ellipsis licensed?

A consensus: Ellipsis is licensed under **identity** with an antecedent.

Q: How is identity computed?

- Syntactic identity
- Semantic identity
- Growing consensus: Hybrid accounts
  Semantic identity alongside some degree of syntactic identity
  (Chung 2006, 2013; AnderBois 2011; Weir 2014)

Today We focus on the semantic component of the identity condition.

Introduction

Three kinds of semantic equivalence approaches:

1. **Ordinary semantic content** (Sag 1976; Williams 1977)
2. **Focus-semantic content** (Rooth 1992; Fox 2000; Romero 1998; Merchant 2001)
3. **Q-equivalence** (equivalence to a question *raised by the antecedent*) (Ginzburg and Sag 2000; AnderBois 2011; Barros 2014; Weir 2014; Kotek and Barros to appear)

We argue against Q-equivalence
and for a return to focus-based approaches.

Roadmap

Roadmap

§1 **Background**

- Focus and alternatives
- Modeling questions
- Modeling propositions

§2 Proposal: A focus-theoretic account

§3 Against Q-equivalence

§4 e-GIVENness reconsidered

§5 Beyond sluicing

§6 Conclusion

Consider two examples that differ only in the placement of **focus**:

(2) MARY ran.

(3) Mary RAN.

Focus triggers the computation of **alternatives** which vary in the focused position (Rooth, 1985, 1992, a.o.).

These alternatives correspond to alternatives at the proposition level:

(2') $\left\{ \begin{array}{l} \lambda w.\ \underline{\text{Mary}}\ \text{ran in } w, \\ \lambda w.\ \underline{\text{Abby}}\ \text{ran in } w, \\ \lambda w.\ \underline{\text{Betty}}\ \text{ran in } w, \\ \lambda w.\ \underline{\text{Cathy}}\ \text{ran in } w \end{array} \right\}$

(3') $\left\{ \begin{array}{l} \lambda w.\ \text{Mary } \underline{\text{ran}}\ \text{in } w, \\ \lambda w.\ \text{Mary } \underline{\text{jumped}}\ \text{in } w, \\ \lambda w.\ \text{Mary } \underline{\text{walked}}\ \text{in } w, \\ \lambda w.\ \text{Mary } \underline{\text{swam}}\ \text{in } w \end{array} \right\}$

Each sentence will now have an *ordinary value* $[\![\cdot]\!]^o$ and a *focus-semantic value* $[\![\cdot]\!]^f$ (Rooth, 1985, a.o.). For our simple example (2):

(4) a. $[\![\text{Mary}_{\mathbf{F}} \text{ ran}]\!]^o = \lambda w.$ Mary ran in w — proposition

b. $[\![\text{Mary}_{\mathbf{F}} \text{ ran}]\!]^f = \left\{ \begin{array}{l} \lambda w.\text{ Mary ran in } w, \\ \lambda w.\text{ Abby ran in } w, \\ \lambda w.\text{ Betty ran in } w, \\ \lambda w.\text{ Cathy ran in } w \end{array} \right\}$ — set of *alt.* propositions

Sluicing involves **questions**:

(1) Mary called someone, but I don't know who$_i$ ~~Mary called t$_i$~~.

We adopt the view that **questions denote sets of propositions** that are possible answers to the question (Hamblin 1973; Karttunen 1977):

(5) a. *Who* did Mary call?

b. $\left\{ \text{Mary called Abby, Mary called Betty, Mary called Cathy} \right\}$

c. $\lambda p.\exists x(p = \lambda w.\ \textit{Mary called x in w})$

- Here, the source of the alternatives is the *wh*-word (e.g. Hamblin 1973; Ramchand 1997; Kratzer and Shimoyama 2002; Beck 2006; Cable 2010; Kotek 2014).

Propositions are **sets of worlds** that satisfy certain truth conditions:

(6) $[\![\text{Mary ran}]\!]^o = \lambda w.$ Mary ran in w
$\rightsquigarrow$ the collection of all of the worlds in which Mary ran.

We can define a **union operation** over propositions: $\cup$

(7) $[\![\text{Mary ran}]\!]^o$ or $[\![\text{Sue ran}]\!]^o =$
$[\lambda w.$ Mary ran in $w] \cup [\lambda w.$ Sue ran in $w]$
$\rightsquigarrow$ the collection of all of the worlds in which either Mary ran or Sue ran (or both).

Brief summary

- Sentences have *ordinary* and ***focus semantic values***.
- A focus semantic value is a **set of propositions**.
- A question also denotes a **set of propositions**.
- A proposition is a **set of worlds** that satisfy certain truth-conditions.
- We can define operations on these sets, such as $\cup$.

Roadmap

§1 Background

§2 **Proposal: A focus-theoretic account**

- Simple cases
- Sprouting

§3 Against Q-equivalence

§4 e-GIVENness reconsidered

§5 Beyond sluicing

§6 Conclusion

Proposal

(8) **Proposal:**
Sluicing may apply in CP_E provided

a. CP_E has a salient antecedent, CP_A, and

b. the set of worlds used to construct the alternatives in $[\![CP_E]\!]^f \leftrightarrow$ the set of worlds used to construct the alternatives in $[\![CP_A]\!]^f$.

- For our purposes today, amounts to the following:
  $\cup[\![CP_A]\!]^f \leftrightarrow \cup[\![CP_E]\!]^f$

In other words, sluicing is possible provided the **antecedent and sluice have the same focus-theoretic propositional content**.

Proposal

simple sluices

Let's begin by looking at a simple example with an indefinite correlate:

(9) $[_{CP_A}$ Mary called someone], BIDK $[_{CP_E}$ who ~~Mary called~~]. (= 1)

- Condition (a) of our proposal is met:
  CP_E has a salient antecedent CP_A.
  - Sluiced clause CP_E: who$_i$ ~~Mary called t$_i$~~
  - Antecedent clause CP_A: Mary called someone

Proposal

simple sluices

- Condition (b) of our proposal is also met: $\cup[\![\text{CP}_A]\!]^f \leftrightarrow \cup[\![\text{CP}_E]\!]^f$

(9) $[_{CP_A}$ Mary called someone], BIDK $[_{CP_E}$ who ~~Mary called~~].

a. $[\![[_{CP_E}$ Who ~~Mary called~~$]]\!]^f = \lambda p.\exists x(p = \lambda w.\, \textit{Mary called x in w})$

b. $\cup[\![[_{CP_E}$ Who ~~Mary called~~$]]\!]^f = \lambda w.\exists x(\textit{Mary called x in w})$

c. $\cup[\![[_{CP_A}$ Mary called someone$]]\!]^f = \lambda w.\exists x(\textit{Mary called x in w})$

d. (9b) $\leftrightarrow$ (9c)

Proposal

Sprouting

Sprouting: When the remnant lacks an explicit linguistic correlate (Chung et al. 1995, a.o.).

(10) Jack ate, but I don't know what.

(11) Jack left, but I don't know { when / with whom / in which car / why / how / where to / … }.

Proposal

Adjunct sprouting

- Our proposal licenses adjunct sprouting:

(12) $[_{CP_A}$ Jack left $]$, BIDK $[_{CP_E}$ when ~~Jack left~~ $]$.

a. $[\![\text{When } \sout{\text{Jack left}}]\!]^f = \lambda p.\exists t(p = \lambda w.\ \textit{Jack left at time t in w})$

b. $\cup[\![\text{When } \sout{\text{Jack left}}]\!]^f = \lambda w.\exists t(\textit{Jack left at time t in w})$

c. $\cup[\![\text{Jack left}]\!]^f = \lambda w.\ \textit{Jack left in w}$

d. (12b) $\leftrightarrow$ (12c)

The trick: If Jack left in w, then Jack left at a certain time t in w.

Proposal

Argument sprouting

- Our proposal also licenses argument sprouting:

(13) $[_{CP_A}$ Jack ate $]$, BIDK $[_{CP_E}$ what ~~Jack ate~~ $]$.

a. $[\![\text{what } \sout{\text{Jack ate}}]\!]^f = \lambda p.\exists x(p = \lambda w.\ \textit{Jack ate } x \textit{ in } w)$

b. $\cup[\![\text{what } \sout{\text{Jack ate}}]\!]^f = \lambda w.\exists x(\textit{Jack ate } x \textit{ in } w)$

c. $\cup[\![\text{Jack ate}]\!]^f = \lambda w.\ \textit{Jack ate in } w$

d. (13b) $\leftrightarrow$ (13c)

The trick: If Jack ate in w, then Jack ate a certain thing x in w.

Proposal

Summary

- A focus-based account

  Sluicing is possible provided the **antecedent and sluice have the same focus-theoretic propositional content**.

Roadmap

§1 Background

§2 Proposal: A focus-theoretic account

§3 **Against Q-equivalence**

- Background: Q-equivalence approaches
- Sprouting
- Non-issue antecedents
- The answer ban
- Antecedent sharing

§4 e-GIVENness reconsidered

§5 Beyond sluicing

§6 Conclusion

Against Q-equivalence

Background: Q-equivalence approaches

The intuition: antecedents with expressions like indefinites and disjunctions implicitly raise questions as to which alternative holds.

(14) Someone left $\rightsquigarrow$ Who left?

(15) Abby or Betty left $\rightsquigarrow$ Which one left?

Sluicing is possible when the sluice is equivalent to the question raised by the antecedent (Ginzburg and Sag 2000; AnderBois 2011; Barros 2014; Weir 2014; Kotek and Barros to appear).

Against Q-equivalence

Background: Q-equivalence approaches

Q: How do we determine precisely what question is raised?

- AnderBois 2011: the question raised by the antecedent is its Inquisitive-Semantic inquisitive denotation (called an *issue*)
- Algorithmic approaches: heuristically arrive at a Question under Discussion (QuD), in the sense of Roberts 1996/2012 (Büring 2003; Barros 2012, 2014).

(16) **The algorithm in Barros 2014:**

a. Replace the indefinite/disjunction with the corresponding *wh*-phrase.

b. Front the *wh*-phrase.

c. The result is the QuD raised by the antecedent.

Against Q-equivalence

Sprouting

Sprouting is famously flexible.

For Q-equivalence approaches, different *issues* or *QuDs* must be available for the antecedent to license ellipsis in each case.

(17) a. Jack met someone, BIDK { who/when }.

b. Jack left, BIDK { when/how/in which car/why/where to, … }

- **To what extent is *the antecedent* responsible for raising any particular issue/QuD at all?**

Our answer: It is, in fact, *the sluice* that is responsible for determining the relevant issue.

Against Q-equivalence

Non-issue antecedents

1. Explicit *non*-issues can be sluiced/sprouted.

(18) Someone, anyone, needs to make sure the plants get watered daily, it doesn't matter {who, when}.

(19) There's going to be another faculty meeting, but no one cares what about. (Lucas Champollion p.c.)

Issues/QuDs are discourse moves, accepted by conversational participants, who have agreed to collaboratively address the issue. But,

- In (18), does the antecedent really raise a *who* question?
- In (19), we have to accommodate that the antecedent raises a *what about* issue —i.e., that *what about* matters, despite our explicit denial.

Against Q-equivalence

The Answer Ban

2. **The answer ban**: Sluicing antecedents cannot address, or even partially address the issue raised by the sluice (Barker 2013).

(20) * Chris knows that Jack left, but Sally doesn't know who ~~left~~.

Barros 2013 claims that the answer ban follows from Q-equivalence:

- QuDs/Issues only obtain when they are unanswered.
- The sluice in (20) simply lacks an antecedent QuD/Issue.
- This correctly rules sluicing out.

Against Q-equivalence

The Answer Ban

However, the Answer Ban is stated as a constraint on *antecedents*, while QuDs/Issues are *discourse objects* — an ontological problem.

- Moreover, contrary to the predictions of Q-equivalence approaches, it is possible to sluice an "answered question":

(21) Bill left at 5 PM, so we know both *that* he left, and when ~~he left~~.

(22) Bill left at 5 PM, so we know both *that* someone left at 5 PM, and who ~~left at 5 PM~~.

Under Barros's 2013 reasoning, it is unclear why it matters whether it's the antecedent or the context that answers the sluice's question.

Against Q-equivalence

The Answer Ban

- Under our approach, the Answer Ban follows from the fact that $\cup[\![\text{antecedent}]\!]^f \neq \cup[\![\text{sluice}]\!]^f$ whenever the antecedent answers the sluice.

(23) * Jack left, but Sally doesn't know who ~~left~~.
$\cup[\![\text{Jack left}]\!]^f = \lambda w.\textit{Jack left in } w$
$\cup[\![\text{who left}]\!]^f = \lambda w.\exists x(x \textit{ left in } w)$

In (22) the sluice and antecedent are equivalent in our terms:

(22) Bill left at 5 PM, so we know both $[_{CP_A}$ *that* someone left at 5 PM],
and $[_{CP_E}$ who ~~left at 5 PM~~].

Against Q-equivalence

Antecedent sharing

3. Cases that we dub **Antecedent Sharing** raise further challenges.

(24) Jack met someone, BIDK who ~~he met~~, or when ~~he met them~~.

Q-equivalence accounts undergenerate:

- Such cases require that antecedents be associated with multiple issues simultaneously (one for each sluice).
- Current proposals don't allow for more than one question/issue at a time — since it's the antecedent that must raise the question/issue.

Which QuD?

Antecedent sharing

- Under our approach, antecedent sharing is no different than any other case of sluicing/sprouting.

(24) Jack met someone, BIDK who ~~he met~~, or when ~~he met them~~.

a. $\cup[\![\text{Jack met someone}]\!]^f = \lambda w.\ \exists x(\textit{Jack met x in w})$

b. $\cup[\![\text{who } \sout{\text{Jack met}}]\!]^f = \lambda w.\ \exists x(\textit{Jack met x in w})$

c. $\cup[\![\text{when } \sout{\text{Jack met (them)}}]\!]^f = \lambda w.\ \exists t \exists x(\textit{Jack met x at t in w})$

Equivalence holds, given that meeting x in w necessitates meeting x at time t in w (cf 12).

Against Q-equivalence

Interim summary

- This challenges Q-equivalence **on principled explanatory grounds**.
  - Q-equivalence approaches attribute ellipsis licensing to QuDs/Issues **raised by the antecedent**. But…
    - In sprouting, the question is intuitively accommodated posthoc, once the sprout is uttered.
    - Non-issue antecedents can license sluicing.
    - Resolved questions can license sluicing (the answer ban).
    - A singe antecedent can license multiple sluices (antecedent sharing).
  - …It is the **sluice** that guides the choice of issue.

We shouldn't place the burden of raising the issue on the antecedent, contra the very foundation of Q-equivalence approaches.

Roadmap

e-GIVENness reconsidered

Our approach, like Merchant's 2001 influential proposal, is a focus-theoretic one.

- We consider whether a return to Merchant's proposal is warranted…
- …and conclude that this is not possible.

e-GIVENness reconsidered

(25) **Merchant's 2001 focus condition on ellipsis:**
A constituent, XP_E may be elided iff it is e-GIVEN.

(26) A constituent, XP_E counts as e-GIVEN
iff XP_E has a salient antecedent, XP_A, and, modulo $\exists$-type shifting,

a. XP_A entails F-clo(XP_E), and

b. XP_E entails F-clo(XP_A)

(27) F-clo(XP) is the result of replacing focused parts of XP with existentially bound variables of the same type as XP.

e-GIVENness reconsidered

An illustration of e-GIVENness at work:

(28) $[_{TP_A}$ Someone left], but I don't know who $[_{TP_E}$ ~~left~~].

a. F-clo(TP_E) = $\lambda w.\exists x(x \textit{ left in } w)$

b. F-clo(TP_A) = $\lambda w.\exists x(x \textit{ left in } w)$

c. $TP_A \models$ F-clo(TP_E)

d. $TP_E \models$ F-clo(TP_A)

$\rightarrow$ e-GIVENness is met, sluicing correctly predicted to be possible

e-GIVENness reconsidered

- Taking the union of the Roothian focus-semantic value of some XP comes very close to Merchant's appeal to Existential Focus Closure.
  - (See Weir 2014 for this observation with Fragment Answers.)

(29) a. $\cup[\![\text{Who left?}]\!]^f = \lambda w.\exists x(x \textit{ left in } w)$

b. F-clo(Who left?) = $\lambda w.\exists x(x \textit{ left in } w)$

For the most part, e-GIVENness will achieve what our account has so far, unlike of Q-equivalence approaches.

However, e-GIVENness falls short for sluices with quantified correlates.

e-GIVENness reconsidered

Multiple sluicing (sluicing with more than one remnant), may involve quantified NPs as correlates (Lasnik 2011; Kotek and Barros to appear).

(30) Everyone was dancing with someone, but I can't recall who with whom.

The sluiced issue here is, intuitively, a "pair-list" question, seeking which pairs of individuals were dancing together.

- e-GIVENness is not met, however.

e-GIVENness reconsidered

(30) $[_{TP_A}$ Everyone was dancing with someone],
but I can't recall who ~~$[_{TP_E}$ was dancing]~~ with whom.

a. $\text{TP}_A = \text{F-clo}(\text{TP}_A) =$
$\forall x(person(x) \rightarrow \exists y(person(y) \wedge dancing\text{-}with(x, y)))$

b. $\text{TP}_E = \text{F-clo}(\text{TP}_E) =$
$\exists x \exists y(person(x) \wedge person(y) \wedge dancing\text{-}with(x, y))$

c. $\text{TP}_A \models \text{F-clo}(\text{TP}_E)$, but

d. $\text{TP}_E \not\models \text{F-clo}(\text{TP}_A)$

$\rightarrow$ e-GIVENness is not met, sluicing incorrectly predicted to be impossible.

e-GIVENness reconsidered

This extends beyond multiple sluicing, to sluices with unambiguously quantificational correlates:

(31) She read most of the books, but we don't know which ones ~~she read~~.

a. TP_A entails F-clo(TP_E) (there are books that Sally read), but

b. but TP_E does not entail F-clo(TP_A).

$\rightarrow$ e-GIVENness is not met, sluicing incorrectly predicted to be impossible.

e-GIVENness reconsidered

- Under our approach the multiple sluicing facts and those with quantified correlates are predicted.
  - We adopt the approach to pair-list Questions in Dayal 1996.
  - Pair-list Qs denote a set of exhaustive pairings of individuals in the domain. In a toy model with 4 individuals:

(30) Everyone was dancing with someone, but I can't recall who ~~was dancing~~ with whom.

(32) $[\![\text{Who } \sout{\text{was dancing}} \text{ with whom}]\!]^o =$

$$\left\{ \begin{array}{l} a \text{ and } b \text{ danced and } c \text{ and } d \text{ danced}, \\ a \text{ and } c \text{ danced and } b \text{ and } d \text{ danced}, \\ a \text{ and } d \text{ danced and } b \text{ and } c \text{ danced} \end{array} \right\}$$

Each alternative is a graph of the "dance with" relation.

e-GIVENness reconsidered

The union of the multiple sluice meaning, then, is the proposition "everyone danced with someone":

(33) $\cup \left\{ \begin{array}{l} a \text{ and } b \text{ danced and } c \text{ and } d \text{ danced, } a \text{ and } c \text{ danced and} \\ b \text{ and } d \text{ danced, } a \text{ and } d \text{ danced and } b \text{ and } c \text{ danced} \end{array} \right\}$

- This is the set of worlds where a, b, c, and d danced with someone.
- This is equivalent to $\cup[\![\text{Everyone danced with someone}]\!]^f$.

Roadmap

Beyond sluicing

Q-equivalence approaches imply a conceptually unattractive conclusion about identity in ellipsis:

- VP ellipsis and NP ellipsis are subject to independent semantic equivalence conditions on licensing than sluicing
  (Chung et al. 1995, 2010; AnderBois 2011).

On the other hand, e-GIVENness in Merchant 2001 had broad empirical coverage deriving VP, NP, and TP ellipsis.

- ▶ We show how to extend our proposal to achieve similar coverage, and in fact improve on e-GIVENness.

Beyond sluicing

Hartman 2009 points out a set of cases where, for VP ellipsis, e-GIVENness overpredicts identity when *relational opposites* are involved.

(34) * Mary will $[_{VP_A}$ beat someone at chess, and John will ~~$[_{VP_E}$ lose to someone at chess$]$~~ (too).

a. $VP_A = \text{F-clo}(VP_A) = \exists x, y(x \textit{ will beat } y \textit{ at chess})$

b. $VP_E = \text{F-clo}(VP_E) = \exists x, y(x \textit{ will lose to } y \textit{ at chess})$

$\rightarrow$ e-GIVENness is met, sluicing incorrectly predicted to be possible.

Beyond sluicing

Hartman appeals to *semantic equivalence* to prevent these cases. (See Hartman 2009 for details.)

- $\text{VP}_A = \lambda x.\ x \textit{ won at chess}$
- $\text{VP}_E = \lambda x.\ x \textit{ lost at chess}$
- $\text{VP}_A \neq \text{VP}_E$

Beyond sluicing

- In an important way, our proposal is in this spirit.

By making reference to the propositional content of the focus semantic values of antecedent and sluice, we come close to Hartman's intuition.

Our approach can be generalized to cover VPE in the same way as Hartman's proposal.

(35) **Our Proposal Generalized Beyond Sluicing**
XP_E may be elided provided it has a salient antecedent, XP_A, and $\cup[\![XP_E]\!]^f = \cup[\![XP_A]\!]^f$.

Beyond sluicing

(36) a. $\cup[\![[_{VP_E}\ \text{lost at chess}]]\!]^f = \cup\{\ \lambda x.\ x\ \textit{lost at chess}\ \} =$
$\lambda x.\ x\ \textit{lost at chess}$

b. $\cup[\![[_{VP_E}\ \text{won at chess}]]\!]^f = \cup\{\ \lambda x.\ x\ \textit{won at chess}\ \} =$
$\lambda x.\ x\ \textit{won at chess}$

Since these are not equivalent, our generalized condition achieves Hartman's goal just the same.

- This proposal achieves the same coverage as e-GIVENness — and improves on it by dealing with relational opposites, by virtue of making reference to non-propositional content.

Our Proposal in a Broader Context

- **Can we go even further?**

Observation: Hartman 2009's problem goes beyond VP-ellipsis, and also affects deaccenting.

(37) * Mary will beat someone at chess, and John will lose to someone at chess.

We conclude that this points to a **unified condition for ellipsis and deaccenting**, along the lines of Fox 2000.

Roadmap

Conclusion

- **Ellipsis is a radical mismatch between PF and LF. How is it licensed?**

1. The propositional content of the focus semantic value of the antecedent must be equivalent to that of the sluice: $\cup[\![\text{CP}_A]\!]^f \leftrightarrow \cup[\![\text{CP}_E]\!]^f$.
2. This proposal accounts for simple cases of sluicing, and also for:
   - sprouting
   - non-issue antecedents
   - the answer ban
   - antecedent sharing
3. Challenges for Q-equivalence approaches and for e-GIVENness.
   - antecedents shouldn't be responsible for raising issues
   - sluicing with quantified correlates; relational opposites
4. Generalizing beyond sluicing:
   - VP ellipsis
   - (Ongoing work: deaccenting)

Thank you!

Thank you! Questions?

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