The 'Sticky Reading' of Pronouns under VP Ellipsis

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Ellipsis, Binding and Logical Form
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1 Parallel Binding

Pronouns give rise to strict-sloppy identity under VP Ellipsis (Sag 1976).

(1) [Jane likes her supervisor]$_{\text{A-Cl}}$. But [Ruoying doesn't (like her supervisor)]$_{\text{E-Cl}}$.
   a. Jane likes Jane's supervisor, Ruoying doesn't like Jane's supervisor (strict)
   b. Jane likes Jane's supervisor, Ruoying doesn't like Ruoying's supervisor (sloppy)

The standard approach assumes an ambiguity in the antecedent clause (Sag 1976, Dalrymple, Shieber & Pereira 1991, Rooth 1992, Fiengo & May 1994, Büring 2005).

(2)

	A(ntecedent)-Cl(ause)	**E(llipsis)-Cl(ause)**
Strict	Jane likes her$_{\text{Jane}}$ supervisor	Ruoying does not (like her$_{\text{Jane}}$ supervisor)
Sloppy	Jane^{x} likes her$_{x}$ supervisor	Ruoying^{x} does not (like her$_{x}$ supervisor)
***Mixed**	Jane likes her$_{\text{Yara}}$ supervisor	Ruoying^{x} does not (like her$_{x}$ supervisor)

Parallel Binding

- If the elided VP contains a free pronoun, the corresponding pronoun in the antecedent VP must be free (and coreferential).
- If the elided VP contains a bound pronoun, the corresponding pronoun in the antecedent VP must be bound.

2 Rooth's Parallelism Condition

Rooth's (1992) **Parallelism Condition** semantically ensures that Parallel Binding holds:[1]

(3) *Parallelism Condition*
There must be a constituent PD_E that reflexively dominates VPE and a constituent PD_A that reflexively dominates the antecedent VP such that $[\![\text{PD}_A]\!]^g \in \|\text{PD}_E\|^g$ for all g.

- $[\![\alpha]\!]^g$ is the ordinary semantic value of α.
- $\|\alpha\|^g$ is the focus semantic value of α

[1] Rooth (1992) also postulates a syntactic identity condition at the VP-level.

3 The Sticky Reading

We observe cases where parallel binding is violated.

(4) Each of the authors proofread his paper. So the editor didn't have to ( ).

- **Strict:** There's a particular man *A*. Each of the authors proofread *a*'s paper. So the editor didn't have to proofread *A*'s paper.
- **Sloppy:** Each of the authors *x* proofread *x*'s paper. So the editor didn't have to proofread the editor's paper.
- **Sticky:** Each of the authors *x* proofread *x*'s paper. So the editor didn't have to proofread the authors' papers.

More examples:

(5) None of the authors revised his paper, so the editor had to ( ).

(6) Every student revised his paper, and then Bill did ( ). (Dalrymple et al. 1991:429)

(7) Many students think they are smart, but the professor doesn't ( ).
(Fiengo & May 1994:101)

Rooth's Parallelism Condition is too strong.

(8) [None of the authors]^x proofread his$_x$ paper. So the editor did ⟨proofread their$_A$ papers⟩ instead.

a. $[\![$[None of the authors]^x proofread his$_x$ paper$]\!]^g$
$= \lambda w.$ none of the authors proofread his own paper in w

b. $||$[The editor]$_F$ did (proofread their$_A$ papers) $||^g$
$= \{ \lambda w.\ Q(\lambda x.\ x \text{ proofread } A\text{'s papers in } w) \mid Q \in D_{\langle et,t \rangle} \}$

Since (8a) $\notin$ (8b), the sticky reading is incorrectly ruled out.

We need a looser (semantic) identity condition, but we still need to rule out mixed readings in general.

4 Telescoping Account

Dalrymple et al. (1991) point out that one reading for (9) is paraphrasable as in (10):

(9) Every student revised his paper, and then Bill did ( ). (Dalrymple et al. 1991:429)

(10) Every student revised his paper, and then Bill revised it.

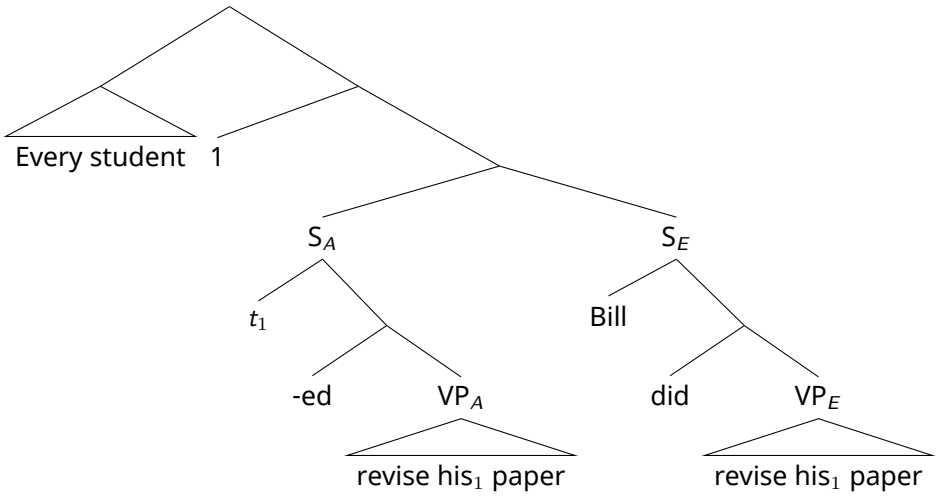
It is known that some quantifiers can (apparently) extend their scope across sentential boundaries, binding pronouns in a subsequent sentence (**telescoping**, Poesio & Zucchi 1992).

(11) a. Each degree candidate accepted his diploma and **his** mother took a picture.

b. Each degree candidate walked to the stage. **He** took **his** diploma from the Dean and returned to **his** seat. (Keshet 2008:324; emphasis added)

Can the sticky reading be accounted for via telescoping?

(12) [Every student] ($\lambda x.$ x revised x's paper and then Bill did revise x's paper)



We will raise six problems of this analysis below.

4.1 Negative Quantifiers

(13) None of the authors proofread his paper. So the editor did ( ).

What would be the predicted reading?

4.2 Scopal Interaction with the Connective

(4) Each of the authors revised his paper. So/For this reason, the editor didn't ( ).

4.3 Scope Islands

A finite clause is a scope island.

(14) Someone told me that every author proofread his paper. ($\exists > \forall$, *$\forall > \exists$)

(15) #John told me that [every author]^x proofread his$_x$ paper. In that case, the editor mustn't have proofread his$_x$ paper.

Now consider:

(16) John told me that every author proofread his paper.
In that case, the editor mustn't have ( ).

4.4 Number Morphology in Overt Versions

A continuation with a singular definite is heavily degraded.

(17) a.?*Each of the authors revised his paper. So the editor didn't proofread his paper/it.
b.?*None of the authors revised his paper. So the editor proofread his paper/it.

Plural versions are much better.

(18) a. Each of the authors proofread his paper. So the editor didn't proofread their papers/them.
b. None of the authors proofread his paper. So the editor proofread their papers/them.

The elided pronoun should be plural.

4.5 Cumulativity

(19) None of the authors proofread his paper. So three editors did ( ) (instead).

This does not entail that each editor proofread each paper.

Compare:

(20) a. None of the authors proofread his paper. So three editors proofread **their** papers instead.
b. None of the authors revised his paper. So three editors revised **his** paper instead.

4.6 Coherence Relations

Keshet (2008) observes that telescoping is sensitive to the *coherence relations*. For example, Kehler's EXPLANATION coherence relation doesn't license telescoping.

(21) #Each of my friends is dishonest. Because he's a politician.

But the sticky reading is fine:

(22) Each of the authors proofread his paper. Because the editor didn't ( ) .

5 Our Account

(23) Each of the authors proofread his paper. Because the editor didn't (proofread the authors' papers)

(24) *Yan likes her$_{Jane}$ supervisor, but Ruoying^{x} doesn't (like her$_{x}$ supervisor) .

Intuition to capture: A-Cl and E-Cl must be about the 'same thing'. For (23), proofreading the authors' papers. For (24), the two clauses are not about the 'same thing'.

Proposal

- **Focus Condition**: $\|\text{E-Cl}\|^g$ must entail $\|\text{A-Cl}\|^g$.
- **Discourse Condition**: E-Cl must be 'discourse-dependent' on A-Cl.

The Focus Condition captures the intuition above. But it's weaker than Rooth's Parallelism Condition. We will take care of potential overgeneration problems by the Discourse Condition.

Our account below can only deal with cases of stricky readings where both A-Cl and E-Cl are unembedded declarative sentences. But we will make suggestions about how to extend it to other cases.

5.1 Question Semantics

Both $\|\text{A-Cl}\|^g$ and $\|\text{E-Cl}\|^g$ are sets of propositions. We want to talk about entailment between sets of propositions. This idea has already been developed in question semantics.

Questions denote sets of propositions (Hamblin 1973, Karttunen 1977, Groenendijk & Stokhof 1984).

(25) $[\![\text{Is Nathan American?}]\!]^g = \left\{ \begin{array}{l} \lambda w.\ \text{Nathan is American in } w, \\ \lambda w.\ \text{Nathan is not American in } w \end{array} \right\}$

(26) $[\![\text{Who is American?}]\!]^g = \left\{ \begin{array}{l} \lambda w.\ \text{John is American in } w, \\ \lambda w.\ \text{Bill is American in } w, \\ \lambda w.\ \text{Mary is American in } w, \\ \ldots \end{array} \right\} = \{\, \lambda w.\ x \text{ is American in } w \mid x \in D_e \,\}$

Because we will mostly be interested in quantified sentences, we will type-shift (26) to (27).

(27) $[\![\text{Who is American?}]\!]^g = \{\, \lambda w.\ Q(\lambda x.\ x \text{ is American in } w) \mid Q \in D_{\langle et,t \rangle} \,\}$

Definition 1 (Answerhood)

- Proposition p is a *partial answer* to question Q iff p entails the truth or falsity of at least one member of Q.
- Proposition p is a *complete answer* to question Q iff p entails the truth or falsity of each member of Q.

Examples:

- *At least Daniel is American* is a partial answer to (27).
- *Only Daniel is American* is a complete answer to (27).

Definition 2 (Entailment between sets of propositions) A set Q of propositions entails a set Q' of propositions iff every complete answer to Q is a complete answer to Q'.

An entailing question is a 'broader question' than an entailed question.

(28) a. $[\![\text{Who likes semantics?}]\!]$ entails $[\![\text{Which boys like semantics?}]\!]$, but not vice versa.
b. $[\![\text{What time is it now?}]\!]$ entails $[\![\text{Is it 10 am now?}]\!]$, but not vice versa.
c. $[\![\text{Who ate what?}]\!]$ entails $[\![\text{Who ate pasta?}]\!]$ and $[\![\text{Did John eat sushi?}]\!]$, but not vice versa.

5.2 The Focus Condition

Focus Condition: $\|\text{E-Cl}\|^g$ must entail $\|\text{A-Cl}\|^g$.

Under the strict and sloppy readings, the Focus Condition is generally satisfied.

(29) YASU$_F$ is proud of his$_{\text{Yasu}}$ dissertation. IRENE$_F$ isn't (proud of his$_{\text{Yasu}}$ dissertation) .
a. $\|\text{A-Cl}\|^g = \{\, \lambda w.\ x \text{ is proud of Yasu's dissertation in } w \mid x \in D_e \,\}$
b. $\|\text{E-Cl}\|^g = \{\, \lambda w.\ x \text{ isn't proud of Yasu's dissertation in } w \mid x \in D_e \,\}$

(30) YASU^x_F is proud of his$_x$ dissertation. PATRICK^x_F isn't (proud of his$_x$ dissertation) .
a. $\|\text{A-Cl}\|^g = \{\, \lambda w.\ x \text{ is proud of } x \text{ dissertation in } w \mid x \in D_e \,\}$
b. $\|\text{E-Cl}\|^g = \{\, \lambda w.\ x \text{ isn't proud of } x \text{ dissertation in } w \mid x \in D_e \,\}$

The following mixed reading violates the Focus Condition.

(31) Klaus^x_F is proud of his$_{Patrick}$ dissertation. Yasu^x_F isn't (proud of his$_x$ dissertation) .
a. $\|\text{A-Cl}\|^g = \{\, \lambda w.\ x \text{ is proud of Patrick's dissertation in } w \mid x \in D_e \,\}$
b. $\|\text{E-Cl}\|^g = \{\, \lambda w.\ x \text{ isn't proud of } x \text{ dissertation in } w \mid x \in D_e \,\}$

The Focus Condition is satisfied under the sticky reading.

(32) [NONE$_F$ of the authors]^x proofread his$_x$ paper.
So [the Editor]$_F$ did (proofread the authors' papers) (instead).
a. $\|\text{A-Cl}\|^g = \{\, \lambda w.\ Q(\lambda x.\ x \text{ is an author in } w)(\lambda x.\ x \text{ proofread } x\text{'s paper in } w) \mid Q \in D_{\langle et,\langle et,t\rangle\rangle} \,\}$
b. $\|\text{E-Cl}\|^g = \{\, \lambda w.\ x \text{ proofread the authors' papers} \mid x \in D_e \,\}$

Prediction: The focus structure matters. For instance, (33) has no sticky reading.

(33) [None of the AUthors]^x_F proofread his$_x$ paper. So [the Editor]$_F$ did ( ) (instead).
a. $\|\text{A-Cl}\|^g = \{\, \lambda w.\ Q(\lambda x.\ x \text{ proofread } x\text{'s paper in } w) \mid Q \in D_{\langle et,t\rangle} \,\}$
b. $\|\text{E-Cl}\|^g = \{\, \lambda w.\ x \text{ proofread the authors' papers} \mid x \in D_e \,\}$

Our focus condition is weaker than Rooth's Parallelism Condition. We have to make sure that we won't overgenerate.

5.3 The Discourse Condition

Many have pointed out the relevance of discourse to VPE.[2]

- Rooth's (1992) Parallelism Condition is a way to capture a very similar idea. The focus value of PD$_E$ is the question PD$_E$ is about, and there must be some PD$_A$ that answers this question.
  - However this is too strict for the sticky reading.
  - Hardt & Romero (2004) argue that it is also too weak. It merely requires the existence of some PD$_A$, e.g. it incorrectly predicts (34) to be ambiguous.

(34) a. Agnes arrived after John ate. But Bill didn't (arrive after John ate) .

[2] See AnderBois (2011) and Hardt & Romero (2004) for sluicing, and Weir (2013) for fragment answers.

b. *Agnes arrived after John ate. But Bill didn't (eat).
(adapted from Hardt & Romero 2004:384)

- Hardt & Romero (2004) add to Rooth's theory a discourse requirement that PD_A and PD_E be in a particular discourse structural relation (couched in a syntactic theory of discourse). But this still rules about the sticky reading.
- Coherence Theory (Kehler 2002, Kehler & Büring 2008): Kehler observes that not only the discourse configuration but the nature of the discourse relation between PD_A and PD_E matters for licensing of certain VPE (and other ellipsis phenomena). However he gives no explicit licensing conditions.

Observation: When A-Cl and E-Cl stand in a **PARALLEL** coherence relation (Kehler 2002), the sticky reading is unavailable.

(35) Q1: Who^x proofread his$_x$ own paper?
A1: [None of the seMANticists]^x_F proofread his$_x$ paper.
A2: But [one of the syntacTIcians]^y_F did (proofread his$_y$ paper).
A2':#But [one of the syntacTIcians]^y_F did (proofread them).

This is because in this discourse configuration, the above focus structure is forced.

5.4 Discourse Dependency

- Each discourse move (assertion or question) must be **discourse-dependent** on some prior discourse move.
  - An assertion answers some prior (explicit or implicit) question in the discourse.
  - A question is a follow-up of a prior discourse move.
- **Discourse Condition**: The question that E-Cl is discourse-dependent on must be discourse-dependent on the question that A-Cl is discourse-dependent on.

(Recall that we will only deal with cases where both A-Cl and E-Cl are unembedded assertions)

Definition 3 (Discourse-Dependency for Assertions) An assertion A is **discourse-dependent** on a question Q if A is a partial answer to Q and A is congruent to Q.

Definition 4 (Congruence) A is **congruent to** Q (wrt g) iff $[\![\mathrm{Q}]\!]^g = \|\mathrm{S}\|^g$.

(36) $[\![\text{Who}^x \text{ proofread his}_x \text{ own paper?}]\!]^g = \{\, \lambda w'.\ Q(\lambda x.\ x \text{ proofread } x\text{'s paper in } w') \mid Q \in D_{\langle et,t\rangle} \,\}$

(37) a. $\big\|[\text{None of the seMANticists}]^x_F \text{ proofread his}_x \text{ paper}\big\|^g$
$= \{\, \lambda w'.\ Q(\lambda x.\ x \text{ proofread } x\text{'s paper in } w') \mid Q \in D_{\langle et,t\rangle} \,\}$

b. $\big\|[\text{NONE}_F \text{ of the semanticists}]^x \text{ proofread his}_x \text{ paper}\big\|^g$
$= \{\, \lambda w'.\ Q(\lambda x.\ x \text{ is a semanticist in } w')(\lambda x.\ x \text{ proofread } x\text{'s paper in } w') \mid Q \in D_{\langle et,\langle et,t\rangle\rangle} \,\}$

(38) a. $\big\|[\text{one of the syntacTIcians}]^y_F \text{ did (proofread his}_y \text{ paper)}\big\|^g$
$= \{\, \lambda w'.\ Q(\lambda x.\ x \text{ proofread } x\text{'s paper in } w') \mid Q \in D_{\langle et,t\rangle} \,\}$

b. $\big\|[\text{one of the syntacTIcians}]^y_F \text{ did (proofread them)}\big\|^g$
$= \{\, \lambda w'.\ Q(\lambda x.\ x \text{ proofread the semanticists' papers in } w') \mid Q \in D_{\langle et,t\rangle} \,\}$

Prediction: An antecedent VP in a question never licenses the sticky reading.

(39) Q: [Which of the authors]^x proofread his$_x$ paper?
A: #The editor did (proofread them) .

E-Cl can be a question:

(40) Q: [NONE$_F$ of the authors]^x proofread his$_x$ paper.
A: Then who$_F$ did (proofread them) ?

Questions can be implicit:

(41) Q1: ([Which of the authors]^x proofread his$_x$ paper?)
A1: [NONE of the authors]^x proofread his$_x$ paper.
Q2: (Then who proofread the papers?)
A2: The editor did (proofread them) instead.

Definition 5 (Discourse-Dependency for questions) Question Q_2 is **discourse-dependent** on question Q_1 iff Q_2 is a Follow-up Question to Q_1.

Definition 6 (Follow-up Questions) A question Q is a **Follow-up Question (FuQ)** to another question Q' in discourse D, if any of the following is the case.

- Q' has not been completely answered in D, and Q' contextually entails Q. **Subquestion**
- A partial answer p to Q' has been given in D before Q, and a partial answer to Q explains p. **Reason**
- A partial answer p to Q' has been given in D before Q, and p explains a partial answer to Q. **Consequence**
- A partial answer p to Q has been given in D before Q', and p makes a partial answer to Q' unlikely. **Concessive**

This is arguably a non-exhaustive list of possible discourse relations, but it's not hard to add more, if necessary (cf. Hobbs 1979, Kehler 2002, Hardt & Romero 2004).

(42) Q1: Who is going to Banja Luka?
A1: All the girls is going there.
Q2: What's happening there? **Reason FuQ**
A2: The EGG Summer School.
Q3: Are all the boys also going there too? **Subquestion FuQ**
A3: No, only Bill is going.

Discourse Condition: The question that E-Cl is discourse-dependent on must be discourse-dependent on the question that A-Cl is discourse-dependent on.

In (41) Q2 is a Consequence Question of Q1.

6 Further Problems

6.1 Intra-sentential Sticky Readings

(43) If [none of the authors]^x proofread his$_x$ paper, the editor will (proofread their papers) .

(44) [None of the boys]^x proofread his$_x$ paper, even although the editor didn't (proofread their papers) either.

We need to extend the QuD framework + FuQs to embedded sentences. This is not at all trivial (see Kehler 2011, Keshet 2013).

6.2 Existential Sentences

(45) [SOME$_F$ of the authors]^x didn't proofread their$_x$ papers. So [the Editor]$_F$ did (proofread them)

This reading is not accounted for since the focus values do not stand in an entailment relation.

Idea (to be worked out): dynamic semantics

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