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Composition determines projection across modalities

Maria Esipova

New York University

ZAS Berlin, 3/12/2019
Posing the question

My research aims at explaining how different types of semantic content, spoken and gestural, pattern along a variety of dimensions, e.g., ability to address questions under discussion, behavior under ellipsis, or **PROJECTION**.

A piece of content **PROJECTS** when it gets interpreted outside the semantic scope of various operators despite appearing to be in their syntactic scope.
Posing the question

(1) **Context:** We are going on a group tour and want to rent a van. The speaker just learned that Stephanie might bring along her only dog. If Stephanie is bringing...

a. her large dog
b. her dog, a large animal

c. her dog\textsuperscript{LARGE}, ...

..., we should get a bigger van.

\textbf{Doesn’t project} \rightarrow Stephanie is bringing her dog.

\textbf{Projects} \rightarrow Stephanie’s dog is large.
Posing the question

(1) Context: We are going on a group tour and want to rent a van. *The speaker just learned that Stephanie might bring along her only dog.* If Stephanie is bringing...

- a. her large dog
- b. her dog, a large animal
- c. her dog\text{\textsuperscript{LARGE}}

..., we should get a bigger van.

\text{DOESN’T PROJECT} \quad \mapsto \quad \text{Stephanie is bringing her dog.}

\text{PROJECTS} \quad \mapsto \quad \text{Stephanie’s dog is large.}

What are the projection mechanisms illustrated in (1)?
Current picture:

(1) **Context:** We are going on a group tour and want to rent a van. The speaker just learned that Stephanie might bring along her only dog. If Stephanie is bringing...
   a. her **large** dog
   b. her dog, **a large animal**
   c. **her dog**$^{\text{LARGE}}$

..., we should get a bigger van.
→ Stephanie’s dog is large.
Posing the question

Current picture:

(1) **Context**: We are going on a group tour and want to rent a van. The speaker just learned that Stephanie might bring along her only dog. If Stephanie is bringing...

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Current picture:

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c. *her dog*\(^{\text{\text{LARGE}}}\)

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Current picture:

(1) **Context:** We are going on a group tour and want to rent a van. The speaker just learned that Stephanie might bring along her only dog. If Stephanie is bringing...

a. her large dog

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My proposal:

(1) **Context:** We are going on a group tour and want to rent a van. The speaker just learned that Stephanie might bring along her only dog. If Stephanie is bringing...

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My proposal:

(1) **Context:** We are going on a group tour and want to rent a van. The speaker just learned that Stephanie might bring along her only dog. If Stephanie is bringing...

a. her *large* dog

b. her dog, a *large* animal

c. *her dog*_{LARGE} ...

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→ Stephanie’s dog is large.
Sketching the answer

And what determines which mechanism applies when?
Sketching the answer

And what determines which mechanism applies when?

My proposal: composition in the syntax/semantics (both for spoken expressions and compositionally integrated gestures).
1. Introduction

2. Modifiers and supplements

3. Co-nominal gestures vs. adjectives and appositives: experiment

4. Existing analyses of co-speech gestures

5. Proposal: composition determines projection across modalities

6. Cosuppositions as inferences of non-restricting modifiers

7. Conclusion
Modification as a composition strategy

What is a MODIFIER?
What is a **MODIFIER**?

Broad definition: a piece of content that composes with an expression of type $\tau$ yielding another expression of type $\tau$ (≈ Morzycki 2015).
Modification as a composition strategy

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For the purposes of this talk: a piece of content that composes with a set and returns a subset thereof. (So, here and now, MODIFIER $=$ SUBSECTIVE MODIFIER.)
Modification as a composition strategy

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For the purposes of this talk: a piece of content that composes with a set and returns a subset thereof. (So, here and now, **MODIFIER** $=$ **SUBSECTIVE MODIFIER**.)

E.g., *blond* in (2) is a modifier. It composes with the NP *stuntwoman* (type *et*) yielding a subset of its denotation, as evidenced by the **SUBSECTIVE ENTAILMENT** going through in (2).

(2) Zoe is a **blond** stuntwoman.
    $\rightarrow$ Zoe is a stuntwoman.
Supplementation as a composition strategy

What is a **SUPPLEMENT**?
Supplementation as a composition strategy

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Potts (2005) uses the term to refer to a range of linguistic expressions (e.g., appositives, parentheticals, high adverbs).
Supplementation as a composition strategy

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Supplementation as a composition strategy

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For the purposes of this talk: a piece of content that composes with an anchor (e.g., an individual) yielding propositional content about it.

E.g., *(who is) a stuntwoman* in (3) is a supplement. It composes with the DP *Zoe* (type *e*) yielding the proposition that Zoe is a stuntwoman.

(3) I invited Zoe, *(who is) a stuntwoman.*
Projection of supplements

Supplements project, and very **STRONGLY**, i.e., they can’t be interpreted locally even under pressure:
Projection of supplements

Supplements project, and very STRONGLY, i.e., they can’t be interpreted locally even under pressure:

(4) a. If you invite Zoe, a stuntwoman, you should show her your muscle car.
→ Zoe is a stuntwoman.
Supplements project, and very **STRONGLY**, i.e., they can’t be interpreted locally even under pressure:

(4)  a. If you invite Zoe, *a stuntwoman*, you should show her your muscle car.
    → Zoe is a stuntwoman.

b. #I don’t know if Zoe is a stuntwoman, but if you invite Zoe, *a stuntwoman*, you should show her your muscle car.
   Intended: ‘...if (Zoe is a stuntwoman and you invite her)...’
Supplements project, and very STRONGLY, i.e., they can’t be interpreted locally even under pressure:

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   Intended: ‘...if (Zoe is a stuntwoman and you invite her)...’

Many accounts for supplement projection (e.g., Potts 2005; AnderBois et al. 2013; Koev 2013)—I will not propose a new one here.
Projection of supplements

Supplements project, and very STRONGLY, i.e., they can’t be interpreted locally even under pressure:

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Many accounts for supplement projection (e.g., Potts 2005; AnderBois et al. 2013; Koev 2013)—I will not propose a new one here.

Apparent exceptions to supplement projection (e.g., Schlenker 2013; Jasinskaja & Poschmann 2018) don’t apply to the cases discussed here.
(Non-)restrictive and (non-)restricting content

Modifiers are always RESTRICTIVE, i.e., they have a potential to restrict the sets they combine with (return proper subsets thereof).
(Non-)restrictive and (non-)restricting content

Modifiers are always **RESTRICTIVE**, i.e., they have a potential to restrict the sets they combine with (return proper subsets thereof).

But specific instances of modifiers don't always realize this potential, i.e., they aren't always **RESTRICTING** (see, e.g., Schlenker To appear).
(Non-)restrictive and (non-)restricting content

Modifiers are always RESTRICTIVE, i.e., they have a potential to restrict the sets they combine with (return proper subsets thereof).

But specific instances of modifiers don’t always realize this potential, i.e., they aren’t always RESTRICTING (see, e.g., Schlenker To appear).

E.g., if you have the relevant world knowledge, you know that female is restricting in (5a) and non-restricting in (5b).

(5) a. the female director of ‘Four Rooms’ RESTRICTING
    b. the female director of ‘Mi Vida Loca’ NON-RESTRICTING
(Non-)restrictive and (non-)restricting content

Modifiers are always **RESTRICTIVE**, i.e., they have a potential to restrict the sets they combine with (return proper subsets thereof).

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E.g., if you have the relevant world knowledge, you know that *female* is restricting in (5a) and non-restricting in (5b).

(5) a. the **female** director of ‘Four Rooms’  
    b. the **female** director of ‘Mi Vida Loca’

Supplements don’t have the compositional potential to restrict their anchors, so they are **NON-RESTRICTIVE**. (Following AnderBois et al. 2013, I take the apparent exceptions discussed in Wang et al. 2005; Nouwen 2014 not to be such.)
Non-restricting modifiers (NRM) are truth-conditionally vacuous (Leffel 2014, examples adopted from there):

(6)  a. I will eliminate every harmful chemical.

       ⊳ I will eliminate every chemical.

       b. I will eliminate every harmful carcinogen.

          → I will eliminate every carcinogen.
Non-restricting modifiers (NRM) are truth-conditionally vacuous (Leffel 2014, examples adopted from there):

\[(6)\]
\[
a. \text{I will eliminate every } \text{harmful} \text{ chemical.} \\
\quad \not\rightarrow \text{I will eliminate every chemical.}
\]
\[
b. \text{I will eliminate every } \text{harmful} \text{ carcinogen.} \\
\quad \rightarrow \text{I will eliminate every carcinogen.}
\]

Instead, NRMs give rise to strongly projecting inferences that all members of the input set satisfy the modifier’s description, NRM INFERENCES.
Non-restricting modifiers and projection

NRM inferences project strongly (cf. existence inferences of definites):
Non-restricting modifiers and projection

NRM inferences project strongly (cf. existence inferences of definites):

(7) Context: Zoe, Lucy, and Pam are going on a camping trip. Pam is coming from Boston to New York to join the rest of the group. Zoe and Lucy are discussing how to get to the camping site from New York. ...
Non-restricting modifiers and projection

NRM inferences project strongly (cf. existence inferences of definites):

(7) Context: Zoe, Lucy, and Pam are going on a camping trip. Pam is coming from Boston to New York to join the rest of the group. Zoe and Lucy are discussing how to get to the camping site from New York. ...

a. ...They have agreed that they need a car, no matter how big. Lucy: ?Well, Pam is coming from Boston. I don't know if she has a car, but if she’s coming in her car, we can use it to get to the camping site. ‘...if (she has a car and she’s coming in her car)…’
Non-restricting modifiers and projection

NRM inferences project strongly (cf. existence inferences of definites):

(7) Context: Zoe, Lucy, and Pam are going on a camping trip. Pam is coming from Boston to New York to join the rest of the group. Zoe and Lucy are discussing how to get to the camping site from New York. ...

a. ...They have agreed that they need a car, no matter how big. Lucy:
  ?Well, Pam is coming from Boston. I don’t know if she has a car, but if she’s coming in her car, we can use it to get to the camping site. ‘...if (she has a car and she’s coming in her car)’

b. ...They have agreed that they need a large car to fit all their supplies. Lucy knows that Pam has a car. Lucy:
  #Well, Pam is coming from Boston. I don’t know if her car is large, but if she’s coming in her large car, we can use it to get to the camping site. Intended: ‘...if (she has a large car and she’s coming in her large car)’
Non-restricting modifiers and projection

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(7) Context: Zoe, Lucy, and Pam are going on a camping trip. Pam is coming from Boston to New York to join the rest of the group. Zoe and Lucy are discussing how to get to the camping site from New York. ...

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b. ...They have agreed that they need a large car to fit all their supplies. Lucy knows that Pam has a car. Lucy: #Well, Pam is coming from Boston. I don't know if her car is large, but if she's coming in her large car, we can use it to get to the camping site. Intended: ‘...if (she has a large car and she’s coming in her large car)...’

Local interpretations of (weak) presuppositions are standardly derived via **LOCAL ACCOMMODATION** (e.g., Heim 1983; Schlenker 2009). Local accommodation saves the day in (7a), but not in (7b).
Non-restricting modifiers and projection

Bottom line:
Non-restricting modifiers and projection

Bottom line:

- Based on spoken adjective data alone, we need a mechanism to assure projection of NRM inferences.
Non-restricting modifiers and projection

Bottom line:

- Based on spoken adjective data alone, we need a mechanism to assure projection of NRM inferences.
- We need to make sure this mechanism doesn’t allow for local accommodation of NRM inferences.
Experiment: posing the question

Let’s take a tally:
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- **Adnominal (subsective) adjectives** are modifiers. They adjoin to NPs (type *et*), are restrictive, but not always restricting. When they are non-restricting, they have to project.
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- **Adnominal appositives** are supplements. They adjoin to DPs (type *e*), are non-restrictive, so never restricting. They have to project.
Experiment: posing the question

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- **Adnominal (subsective) adjectives** are modifiers. They adjoin to NPs (type *et*), are restrictive, but not always restricting. When they are non-restricting, they have to project.

- **Adnominal appositives** are supplements. They adjoin to DPs (type *e*), are non-restrictive, so never restricting. They have to project.

- What about **co-nominal gestures**? Are they more like adjectives or more like appositives?
Experiment: design

Acceptability judgement experiment:
Experiment: design

Acceptability judgement experiment:

- Participants: 122 (33 female, 89 male), recruited on MTurk.
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- Task: read contexts, watch videos of sentences uttered in those contexts, rate those sentences on a scale from ‘Totally unnatural’ to ‘Totally natural’ (mapped to 0–100).
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Acceptability judgement experiment:

- Participants: 122 (33 female, 89 male), recruited on MTurk.
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- Items:

<table>
<thead>
<tr>
<th>Content Type</th>
<th>Projecting Restricting</th>
<th>Interpretation</th>
<th>Non-projecting non-restricting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjective</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Appositive</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Gesture</td>
<td>4</td>
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Items:

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<th>Non-projecting</th>
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<tbody>
<tr>
<td></td>
<td>non-restricting</td>
<td></td>
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</tr>
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<td>4</td>
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</tr>
<tr>
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<td>4</td>
<td>4</td>
<td>4</td>
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- Each participant saw 1 randomly selected item per condition and 2 additional check items.
Experiment: design

Typical trial:

Context: We are going on a group tour. Anna and Maria are responsible for renting a van. Maria just told Anna that **Stephanie, who has two pets, a small cat and a large dog, is planning to bring along one of her pets. Anna, who has seen both Stephanie's pets before**, says:

![Video](image)

Given the context, how natural is the sentence in the video?

Totally unnatural

Totally natural

Drag the slider
Experiment: design

(8)  **Context:** We are going on a group tour. Anna and Maria are responsible for renting a van. Maria just told Anna that...

a. **PROJECTING NON-RESTRICTING** ...Stephanie, who has two pets, a small cat and a large dog, is planning to bring along one of her pets. Anna, who has seen both Stephanie’s pets before, says:
Do you know which one of Stephanie’s pets is coming with us? ’Cause if she’s bringing...
(i) her **small cat**
(ii) her **cat, a small animal**
(iii) her **cat**
..., we’ll be fine, but if she’s bringing...
(i) her **large dog**
(ii) her **dog, a large animal**
(iii) her **dog**
..., we should get a bigger van.
Experiment: design

(8)  b. **RESTRICTING** ...Stephanie, who has two dogs, a small Pug and a large Great Dane, is planning to bring along one of her dogs. Anna, who has seen both Stephanie’s dogs before, says: Do you know which one of Stephanie’s dogs is coming with us? ’Cause if she’s bringing...

(i) her **small** dog
(ii) her dog, a **small** animal

(iii) her **dog**\textsuperscript{SMALL} ...

..., we’ll be fine, but if she’s bringing...

(i) her **large** dog
(ii) her dog, a **large** animal

(iii) her **dog**\textsuperscript{LARGE} 

..., we should get a bigger van.
Experiment: design

(8) c. NON-PROJECTING NON-RESTRICTING ...Stephanie is planning to bring along her dog. Anna knows that Stephanie only has one dog, but has never seen it. She says:

Do you know how big Stephanie’s dog is? ’Cause if she’s bringing...

(i) her small dog

(ii) her dog, a small animal

(iii) her dog_{\text{small}}

..., we’ll be fine, but if she’s bringing

(i) her large dog

(ii) her dog, a large animal

(iii) her dog_{\text{large}}

..., we should get a bigger van.
Experiment: results

Results:
Experiment: results

Results:

Fig. 1: % acceptability of the 3 interpretations for each content type. Error bars show standard error. Dots represent individual responses (with minor jitter added).
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Co-speech gestures: supplemental analysis (Ebert & Ebert 2014)

Ebert & Ebert 2014: co-speech gestures are supplements, akin to appositives.
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Problem: this predicts that restricting interpretations of co-speech gestures are unavailable.
Co-speech gestures: supplemental analysis (Ebert & Ebert 2014)

Ebert & Ebert 2014: co-speech gestures are supplements, akin to appositives.

Problem: this predicts that restricting interpretations of co-speech gestures are unavailable.

The addition of “exemplification” uses of co-speech gestures in Ebert 2017 doesn’t help generate restricting interpretations either.
Schlenker 2018a: co-speech gestures trigger assertion-dependent presuppositions, **COSUPPOSITIONS:**
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- **Cosupposition** of $[[S]^G]$: $S \Rightarrow G$ ($S$ is the spoken expression, $G$ is the gesture, and $\Rightarrow$ is generalized entailment)
Schlenker 2018a: co-speech gestures trigger assertion-dependent presuppositions, **COSUPPOSITIONS:**

- **Cosupposition** of \([S^G]\): \(S \Rightarrow G\) (\(S\) is the spoken expression, \(G\) is the gesture, and \(\Rightarrow\) is generalized entailment)

- **Projection** of the cosupposition: \(c' \Rightarrow (S \Rightarrow G)\) (\(c'\) is the pragmatic local context of \([S^G]\), as in Schlenker 2009)
Cosuppositional analysis of co-speech gestures (Schlenker 2018)

Schlenker 2018a: co-speech gestures trigger assertion-dependent presuppositions, COSUPPOSITIONS:

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Schlenker 2018a: co-speech gestures trigger assertion-dependent presuppositions, **COSUPPOSITIONS:**

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- **Local accommodation** of the cosupposition under pressure: $S \& (S \Rightarrow G)$, equivalent to $S \& G$ ($\&$ is generalized conjunction)

- $S$, $G$, and $c'$ have to be of the same semantic type, so it matters where the gesture adjoins.
Cosuppositional analysis of co-speech gestures (Schlenker 2018)

Schlenker’s cosuppositions yield good results for NP-level gestures:
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(9) Stephanie brings her \([\text{NP dog}]^{\text{LARGE}}\).
Schlenker’s cosuppositions yield good results for **NP-level gestures:**

(9) Stephanie brings her \([\text{[NP dog]}^{\text{LARGE}}]\).

a. spoken expression \(S\):
   \[
   \langle\text{dog} \rangle = \lambda x. \text{dog}(x)
   \]
   ‘being a dog’
Schlenker’s cosuppositions yield good results for NP-level gestures:

(9) Stephanie brings her \([\text{NP} \text{ dog}]^{\text{LARGE}}\).

a. spoken expression \(S\):
   \[[\text{dog}] = \lambda x. \text{dog}(x)\]

b. gesture \(G\):
   \[[\text{LARGE}_{\text{NP}}] = \lambda x. \text{large}(x)\]

We proceed with the derivation as usual and get:

\(\text{bring} (\lambda x. \text{dog}(x)^{\text{LARGE}})^{\text{poss}} (\text{s}; x))\)

‘Stephanie brings her large dog.’
Schlenker’s cosuppositions yield good results for **NP-level gestures**:

(9) Stephanie brings her [[[NP dog]^{LARGE}]].

- **a.** spoken expression \( S \):
  \[
  \llbracket \text{dog} \rrbracket = \lambda x. \text{dog}(x)
  \]
  ‘being a dog’

- **b.** gesture \( G \):
  \[
  \llbracket \text{LARGE}_{\text{NP}} \rrbracket = \lambda x. \text{large}(x)
  \]
  ‘being large’

- **c.** cosupposition \( S \Rightarrow G \):
  \[
  \lambda x. \text{dog}(x) \rightarrow \text{large}(x)
  \]
  ‘being such that if you’re a dog, you’re large’
Cosuppositional analysis of co-speech gestures (Schlenker 2018)

Schlenker’s cosuppositions yield good results for NP-level gestures:

(9) Stephanie brings her [[[NP dog]\textsuperscript{LARGE}]].

- a. spoken expression \(S\):
  \[ [[\text{dog}]] = \lambda x. \text{dog}(x) \]
  ‘being a dog’

- b. gesture \(G\):
  \[ [[\text{LARGE}_\text{NP}]] = \lambda x. \text{large}(x) \]
  ‘being large’

- c. cosupposition \(S \Rightarrow G\):
  \( \lambda x. \text{dog}(x) \rightarrow \text{large}(x) \)
  ‘being such that if you’re a dog, you’re large’

- d. local context \(c’\):
  \( \lambda x. \text{bring}(s, x) \land \text{poss}(s, x) \)
  ‘being smth that Stephanie brings and owns’
Schlenker’s cosuppositions yield good results for NP-level gestures:

(9) Stephanie brings her \[\text{[NP dog]}^{\text{LARGE}}\].

a. spoken expression \(S\):
   \[\text{[dog]} = \lambda x.\text{dog}(x)\] \(\text{‘being a dog’}\)

b. gesture \(G\):
   \[\text{[LARGE}_{\text{NP}}] = \lambda x.\text{large}(x)\] \(\text{‘being large’}\)

c. cosupposition \(S \Rightarrow G\):
   \(\lambda x.\text{dog}(x) \rightarrow \text{large}(x)\) \(\text{‘being such that if you’re a dog, you’re large’}\)

d. local context \(c’\):
   \(\lambda x.\text{bring}(s, x) \land \text{poss}(s, x)\) \(\text{‘being smth that Stephanie brings and owns’}\)

e. projection \((c’ \Rightarrow (S \Rightarrow G))\):
   \(\forall x. (\text{bring}(s, x) \land \text{poss}(s, x)) \rightarrow (\text{dog}(x) \rightarrow \text{large}(x))\)
   \(\text{‘If Stephanie brings a dog of hers, then that dog is large.’}\)
Schlenker’s cosuppositions yield good results for **NP-level gestures**: 

(9) Stephanie brings her \([\text{NP dog}^{\text{LARGE}}]\).

a. spoken expression \(S\):
   \([\text{dog}] = \lambda x.\text{dog}(x)\)  
   ‘being a dog’

b. gesture \(G\):
   \([\text{LARGE}_{\text{NP}}] = \lambda x.\text{large}(x)\)  
   ‘being large’

c. cosupposition \(S \Rightarrow G\):
   \(\lambda x.\text{dog}(x) \rightarrow \text{large}(x)\)  
   ‘being such that if you’re a dog, you’re large’

d. local context \(c’\):
   \(\lambda x.\text{bring}(s, x) \land \text{poss}(s, x)\)  
   ‘being smth that Stephanie brings and owns’

e. projection \((c’ \Rightarrow (S \Rightarrow G))\):
   \(\forall x.(\text{bring}(s, x) \land \text{poss}(s, x)) \rightarrow (\text{dog}(x) \rightarrow \text{large}(x))\)  
   ‘If Stephanie brings a dog of hers, then that dog is large.’ ✔

f. local accommodation \((S \land (S \Rightarrow G))\):
   \(\lambda x.\text{dog}(x) \land \text{large}(x)\)  
   ‘being a large dog’

We proceed with the derivation as usual and get:

\(\text{bring}(\lambda x.\text{dog}(x) \land \text{large}(x) \land \text{poss}(s, x))\)  

‘Stephanie brings her large dog.’ ✔
Cosuppositional analysis of co-speech gestures (Schlenker 2018)

But local accommodation yields bad results for DP-level gestures:
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(10) Stephanie brings $[[\text{DP her dog}]^\text{LARGE}]$.  


Cosuppositional analysis of co-speech gestures (Schlenker 2018)

But local accommodation yields bad results for DP-level gestures:

(10) Stephanie brings \([\text{DP her dog}]^{\text{LARGE}}\).

a. spoken expression \(S\):

\[\lambda P. (\lambda x. \text{dog}(x) \land \text{poss}(s, x))\]  

‘her dog’
Cosuppositional analysis of co-speech gestures (Schlenker 2018)

But local accommodation yields bad results for **DP-level gestures**:

(10) Stephanie brings \([\text{[DP her dog]}^{\text{LARGE}}]\).

a. spoken expression \(S\):

\[
\text{[[her dog],i]}^g = \lambda P. P(\ell x. \text{dog}(x) \land \text{poss}(s, x))
\]

‘her dog’

b. Attempt 1, DP-level gestures denote existential quantifiers:

(i) gesture \(G\):

\[
\text{[[LARGE}_\text{DP}]] = \lambda P. \exists x [\text{large}(x) \land P(x)]
\]

‘a large object’

(ii) **local accommodation** \((S \& (S \Rightarrow G))\), end result:

\[
\text{bring}(s, \ell x. \text{dog}(x) \land \text{poss}(s, x)) \land \exists x [\text{large}(x) \land \text{bring}(s, x)]
\]

‘Stephanie brings her dog and a large object.’

\(\checkmark\)
Cosuppositional analysis of co-speech gestures (Schlenker 2018)

But local accommodation yields bad results for DP-level gestures:

(10) Stephanie brings \([[[\text{DP her dog}]]_{\text{LARGE}}]]\).

a. spoken expression \(S\):
\[\llbracket[\text{her dog}]_i\rrbracket^g = \lambda P. P(t.x.\text{dog}(x) \land \text{poss}(s, x))\] ‘her dog’

b. Attempt 1, DP-level gestures denote existential quantifiers:
   (i) gesture \(G\):
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   \[\text{bring}(s, t.x.\text{dog}(x) \land \text{poss}(s, x)) \land \exists x[\text{large}(x) \land \text{bring}(s, x)]\]
   ‘Stephanie brings her dog and a large object.’ \(\times\)

c. Attempt 2, DP-level gestures are anaphorically linked to the DPs they adjoin to:
   (i) gesture \(G\):
   \[\llbracket\text{LARGE}_{\text{DP}_i}\rrbracket^g = \lambda P. P(g(i)) \land \text{large}(g(i))\] ‘that object, and it is large’
   (ii) local accommodation \((S \& (S \Rightarrow G))\), end result:
   \[\text{bring}(s, t.x.\text{dog}(x) \land \text{poss}(s, x)) \land \text{large}(t.x.\text{dog}(x) \land \text{poss}(s, x))\]
   ‘Stephanie brings her dog and her dog is large.’ \(\times\)
Proposal: composition determines projection across modalities

Applying Schlenker’s cosuppositions to DP-level gestures forces us to compose them conjunctively with the DPs they adjoin to, but no spoken DP-level adjuncts do that.
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I propose the ‘NO GESTURE-SPECIFIC COMPOSITION’ principle: when gestures integrate compositionally into an utterance, they do so just like spoken content.
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Independent motivation:
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Independent motivation:

- No need to explain how gesture-specific composition strategies emerge or are acquired.
- This view is compatible with late lexical insertion.
Proposal: composition determines projection across modalities

E.g., two construals for $her \ dog^{LARGE}$:
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- LARGE is a property (akin to large), adjoins to the NP $\text{dog}$, composes as a modifier, can be restricting or non-restricting, projects if non-restricting like other NRM inferences.
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E.g., two construals for her dog^{LARGE}:

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- LARGE is a nominal (akin to a large object), adjoins to the DP her dog, composes as a supplement, can’t be restricting, always projects like other supplements.
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E.g., two construals for $\textit{her dog}^{\text{LARGE}}$:

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- LARGE is a nominal (akin to $\textit{a large object}$), adjoins to the DP $\textit{her dog}$, composes as a supplement, can’t be restricting, always projects like other supplements.

But, following Schlenker 2018a, co-speech gestures prefer to be truth-conditionally vacuous due to their secondary modality nature. Thus, modifier gestures prefer to be non-restricting; this preference can be overridden to a gradient and variable extent.
Cosuppositions as inferences of non-restricting modifiers

So, gestural NRM inferences project in the same way as other NRM inferences. But what is this way?
Cosuppositions as inferences of non-restricting modifiers

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I re-conceptualize Schlenker’s cosuppositions as NRM inferences cross-modally.
Cosuppositions as inferences of non-restricting modifiers

A tweak: in $[\beta [\text{NRM }][\alpha ] ]$, let’s switch from cosuppositions of the form $\alpha \Rightarrow \text{NRM}$ to $\alpha \Rightarrow \beta$—which is a generalized definition of non-restricting modification.
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A tweak: in $[β [NRM ][α ]]$, let’s switch from cosuppositions of the form $α \Rightarrow NRM$ to $α \Rightarrow β$—which is a generalized definition of non-restricting modification.

Now the modifier can be of any type as long as the constituent being modified and the result of modification are of the same type, e.g.:
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Now the modifier can be of any type as long as the constituent being modified and the result of modification are of the same type, e.g.:

(11) a. $\lambda x.\text{skillful}(\text{cellist}, x) \land \text{cellist}(x)$

b. cosupposition $\text{NP}_1 \Rightarrow \text{NP}_2$:
$\lambda x.\text{cellist}(x) \rightarrow \text{skillful}(\text{cellist}, x)$
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A tweak: in \([\beta \ [\text{NRM} \ [\alpha ]]\], let’s switch from cosuppositions of the form \(\alpha \Rightarrow \text{NRM}\) to \(\alpha \Rightarrow \beta\)—which is a generalized definition of non-restricting modification.

Now the modifier can be of any type as long as the constituent being modified and the result of modification are of the same type, e.g.:

(11) a. \[\lambda x.\text{skillful}(\text{cellist}, x) \land \text{cellist}(x)\]

\[\begin{array}{c}
\text{AdjP} \\
\text{skillful} \\
\lambda P \lambda x.\text{skillful}(P, x) \land P(x) \\
\end{array}
\]

\[\begin{array}{c}
\text{NP}_1 \\
\text{cellist} \\
\lambda x.\text{cellist}(x) \\
\end{array}
\]

b. cosupposition \(\text{NP}_1 \Rightarrow \text{NP}_2\):
\[
\lambda x.\text{cellist}(x) \rightarrow \text{skillful}(\text{cellist}, x)
\]

This view of cosuppositions actually works better for some cases discussed by Schlenker (2018b) himself.
Cosuppositions as inferences of non-restricting modifiers

Local accommodation is no longer a meaningful notion under the view of cosuppositions as NRM inferences. It was needed for restricting uses of gestures, but now modifier gestures can be restricting by default.
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Now we have a general mechanism for projecting NRM inferences in place, which we can apply to other types of content, such as phi-features on pronouns, various iconic geometric properties of gestures/signs, modifiers in the verbal domain.
Conclusion: summary

I have applied a composition-driven approach to projection of co-nominal gestures, accounting for how they can(not) be interpreted without any gesture-specific composition or projection rules.
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Two programmatic take-home points:
Conclusion: summary

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Two programmatic take-home points:

- We should use the composition-driven approach as a general heuristic for other types of non-sublexical content that can or have to project.
Conclusion: summary

I have applied a composition-driven approach to projection of co-nominal gestures, accounting for how they can(not) be interpreted without any gesture-specific composition or projection rules.

Two programmatic take-home points:

- We should use the composition-driven approach as a general heuristic for other types of non-sublexical content that can or have to project.
- If we want to approach gestures as linguistic objects, we should do so at all levels of representation.
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Anna Alsop  Rob Pasternak

References I


Co-nominal gestures: empirical picture

Results (stats):

Table 1: % acceptability of different interpretations for each content type: statistics.

<table>
<thead>
<tr>
<th>Content</th>
<th>Mean % acceptability</th>
<th>Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PNR</td>
<td>R</td>
</tr>
<tr>
<td>Adjectives</td>
<td>86.0</td>
<td>85.9</td>
</tr>
<tr>
<td></td>
<td>Beta = .001</td>
<td>t = .03</td>
</tr>
<tr>
<td></td>
<td>Beta = .568</td>
<td>t = 10.842</td>
</tr>
<tr>
<td>Appositives</td>
<td>78.9</td>
<td>47.4</td>
</tr>
<tr>
<td></td>
<td>Beta = .49</td>
<td>t = 10.35</td>
</tr>
<tr>
<td></td>
<td>Beta = −.077</td>
<td>t = −1.628</td>
</tr>
<tr>
<td>Gestures</td>
<td>84.6</td>
<td>68.4</td>
</tr>
<tr>
<td></td>
<td>Beta = .301</td>
<td>t = 6.298</td>
</tr>
<tr>
<td></td>
<td>Beta = .277</td>
<td>t = 5.459</td>
</tr>
</tbody>
</table>

**Beta** values range from .001 to .568, **t** values range from 1.628 to 10.842, and **p** values range from 2.59e–07 to .976.
Proposal: *phi*-features on pronouns as obligatorily non-restricting modifiers

Person and number work analogously to gender; the cosuppositions are computed for each modifier \((X_1 \Rightarrow X_2, X_2 \Rightarrow X_3, \text{ and } X_3 \Rightarrow X_4)\):

\[
(12) \quad she \in \lambda x.\neg\exists y[y \leq x \land \text{[speaker}(y) \lor \text{addressee}(y))] \land \text{atom}(x) \land \text{female}(x) \land x = g(i)
\]

\[
\lambda P.\lambda x.P(x) \quad X_4
\]

\[
\lambda x.\neg\exists y[y \leq x \land \text{[speaker}(y) \lor \text{addressee}(y))] \land \text{atom}(x) \land \text{female}(x) \land x = g(i)
\]

\[
[3] \quad \lambda x.\neg\exists y[y \leq x \land \text{[speaker}(y) \lor \text{addressee}(y))]
\]

\[
\lambda x.\text{atom}(x) \land \text{female}(x) \land x = g(i)
\]

\[
[\text{sg}] \quad \lambda x.\text{atom}(x) \land \lambda x.\text{female}(x) \land x = g(i)
\]

\[
[\text{fem}] \quad \lambda x.\text{female}(x) \land \lambda x.x = g(i)
\]