

# Composition and projection of adnominal content across modalities

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**Abstract** What mechanisms are available for projection of content, and what determines which mechanism applies when? I propose that in many cases how a given type of content projects is determined by how it composes in the syntax/semantics. I furthermore pursue a reductionist approach trying to minimize the inventory of composition/projection strategies available in natural language. In this paper I look at a range of seemingly diverse types of adnominal content, spoken and gestural, that have a potential or a requirement to project from under semantic operators: adnominal adjectives, adnominal appositives, co-nominal gestures, *phi*-features on pronouns, and height specifications on co-verbal gestures. I argue that only two composition strategies exist for this content, depending on where it merges, which also determines how it projects: the modifier strategy, exemplified by adjectives, and the supplement strategy, exemplified by appositives. I reduce the three remaining phenomena to one or the other. In particular, I argue that both strategies are available to gestures, as evidenced by novel experimental data that I adduce here, but when gestures are modifiers, they are preferably non-restricting. I, thus, synthesize the proposals in Ebert & Ebert 2014 and Schlenker 2018a, but also go beyond them by explicitly addressing the question of how gestures integrate into utterances compositionally and re-purposing Schlenker’s cosuppositions as a modality-neutral mechanism of generating projecting interpretations of non-restricting modifiers. I further argue that *phi*-features on pronouns are obligatorily non-restricting modifiers, contra the standard presuppositional analysis (Cooper 1983 et seq.). Similarly, height specifications on co-verbal gestures can be analyzed as modifiers of incorporated individual arguments and further assimilated to *phi*-features on pronouns (in line with Schlenker & Chemla 2018) or adjectives. The benefit of this reductionist approach is that we don’t have to introduce gesture-specific composition/projection strategies into our grammar, nor do we have to stipulate that *phi*-features on pronouns or height specifications on co-verbal gestures trigger presuppositions or posit any non-standard composition strategies for them. Treating *phi*-features as modifiers is also more plausible morphosyntactically.


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## 1. Introduction

This paper focuses on five types of content that have a potential or a requirement to project from under semantic operators. The five types of content are adnominal adjectives, adnominal appositives, co-nominal gestures (i.e., content-bearing gestures co-occurring and associating with nominals), *phi*-features on pronouns, and height specifications on co-verbal gestures (i.e., content-bearing gestures co-occurring and associating with verbal projections). Their projective potential is exemplified in (1), where all the five types of content project from under *if*. At this point I do not say anything about why they project (whether it is due to their own nature or some external reason); I only show that it is possible for them to do so.

- (1) a. *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...  
(i) her large dog *adjective*  
(ii) her dog, {a large animal, who is large} *appositive*  
  
(iii) her dog<sup>LARGE</sup>  *co-nominal gesture*  
..., we should get a bigger van.  
→ Stephanie's dog is large.  
b. If Skyler<sub>i</sub> brings her<sub>i</sub> dog, I'll give you \$10. *gender feature*  
→ Skyler is female.  
c. *Context: Zoe is a stuntwoman. The crew just filmed a scene in which she was fighting an extra, while the director of the movie Uma was away. Uma originally wanted Zoe to stab the extra in that scene, but she just learned that Zoe might have punched the extra in the face instead. Uma says:*

If Zoe punched the extra<sup>PUNCH-HIGH</sup>



, we'll have to reshoot the scene.

*height specification*

→ The extra that Zoe was fighting is taller than Zoe.

Throughout the paper I will often refer to all these five types of content as *adnominal content*, assuming that all of them merge somewhere in the nominal domain in the syntax. This might not be obvious for height specifications on co-verbal gestures; I will assume that they are modifiers of nominal arguments incorporated into verbal gestures (e.g., in (1c) this argument would be the area of contact of the punching movement, i.e., something like ‘in the face’). This is likely not the only possible construal, and I will come back to this issue in section 7.

In this paper I make a case for a composition-driven reductionist approach to projection of adnominal content. In particular, I argue that there are two ways to compositionally integrate such content: (i) as a modifier of a set of individuals, which can but doesn't have to restrict that set, or (ii) as a supplement, which combines with an individual anchor and contributes propositional content about it. The composition strategy used by a given piece of content determines how it projects.

Adjectives exemplify the modifier strategy, and appositives exemplify the supplement strategy. Non-restricting instances of adjectives are truth-conditionally vacuous, but contribute strongly projecting inferences (Leffel 2014), and so do appositives (Potts 2005 et seq.), thus, we need mechanisms to assure projection in both cases. What I propose is that there is no need to posit any additional composition strategies or projection mechanisms for the remaining three types of content (co-nominal gestures, *phi*-features on pronouns, and height specifications on co-verbal gestures).

In particular, I argue that both the modifier and the supplement strategies are available to co-nominal gestures, but when they are modifiers, there is a pragmatic pressure for them to be non-restricting, which is why they preferably project. I, thus, unify the analyses of co-speech gestures (i.e., content-bearing gestures co-occurring and associating with spoken expressions) in Ebert & Ebert 2014, who propose that co-speech gestures are supplements, and Schlenker 2018a, who argues that co-speech gestures trigger a special kind of presuppositions, *cosuppositions*. I adduce experimental data showing that neither of these two analyses can account for available and unavailable interpretations of co-nominal gestures on its own. I furthermore suggest that even though Schlenker's cosuppositional algorithm can't possibly apply to all co-nominal gestures, it can be re-purposed as a general, modality-neutral mechanism of generating projecting inferences contributed by non-restricting modifiers.

As for *phi*-features on pronouns, I argue that they are obligatorily non-restricting modifiers, which explains why they always project. This proposal has an edge over the standard presuppositional analysis of *phi*-features on pronouns (e.g., Cooper 1983; Heim & Kratzer 1998; Elbourne 2005; Sudo 2012), since it doesn't need to stipulate that *phi*-features on pronouns lexically trigger presuppositions that are, furthermore, “strong” (i.e., they can't be locally accommodated), nor does it need to assume any non-standard composition strategies

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<sup>1</sup>In spoken expression<sup>GESTURE</sup> the gesture co-occurs with the spoken expression; the underlining loosely indicates temporal alignment of the gesture, without making any syntactic commitments. I add pictures to illustrate new gestures or whenever the exact shape of the gesture is particularly relevant.

for *phi*-features on pronouns. Treating *phi*-features on pronouns as modifiers is also more plausible from the morphosyntactic point of view. Throughout the paper I mostly use gender features as a case in point, since the projection data for these are easier to engage with than similar data for person and number, but the analysis I propose applies to all *phi*-features.

Finally, height specifications on co-verbal gestures can be analyzed as modifiers of incorporated individual arguments. They can be further assimilated to *phi*-features on pronouns (in line with the generalizations made in Schlenker & Chemla 2018 for height specifications on gestures that have their own time slot) or to adjectives.

The rest of the paper is organized as follows. Section 2 provides an overview of the empirical parallels across the different types of adnominal content. Section 3 discusses the two composition strategies in the nominal domain and how they are instantiated by adjectives and appositives, respectively. Section 4 argues that both strategies are available to gestures. Section 5 re-purposes Schlenker’s cosuppositions as a general mechanism of generating projecting inferences of non-restricting modifiers. Section 6 proposes an analysis of *phi*-features on pronouns as obligatorily non-restricting modifiers. Section 7 discusses height specifications on co-verbal gestures. Section 8 talks about some open questions, in particular, prospects of extending the composition-driven reductionist approach to projection in the verbal domain as well as how non-standard types of focus interact with projection. Section 9 concludes.

## 2. Empirical parallels across different types of content

Throughout the paper I develop both empirical and conceptual arguments for a composition-driven reductionist approach to projection in the nominal domain. The empirical argument is built around the following generalizations: all the five types of content discussed here can have projecting non-restricting interpretations (pending the exact analysis of height specifications on co-verbal gestures), some but not all can have restricting interpretations, and none can have non-projecting non-restricting interpretations. A good analysis of projection of adnominal content would be one under which the observed parallels are not accidental.

Let me start with adjectives. Adjectives can, but don’t have to have restricting interpretations; when an adjective is non-restricting, it gives rise to an inference about all the members of the set denoted by the NP it adjoins to. This inference cannot be interpreted locally, under semantic operators, such as *if*, i.e., it has to project. These generalizations are illustrated in (2), where I set up three contexts (i.e., combinations of an extralinguistic and a linguistic context) that maximally support the three potential interpretations to see which ones are available. Thus, (2a) supports the projecting non-restricting interpretation: the set of Stephanie’s dogs<sup>2</sup> contains only one dog, so the adjective doesn’t restrict it, but instead contributes a relevant inference about the size of all Stephanie’s dogs (i.e., her only dog), which projects from under *if*. The focus in the *if*-clause is on *dog*,<sup>3</sup> signaling that the question under discussion (QUD; Roberts 1996/2012 et seq.) is about which of her pets Stephanie is bringing. The utterance is felicitous. In both (2b) and (2c) the focus in the

<sup>2</sup>Here and for all similar examples I am assuming that the modifier is operating on the set of contextually relevant dogs, i.e., Stephanie’s dogs only. However this domain restriction is operationalized, it seems to be empirically solid: we don’t get an inference about all the dogs in the world, only Stephanie’s. I’ll briefly come back to this assumption in section 8.2.

<sup>3</sup>Throughout the paper focus marking via vocal prosody is indicated by **bolding** the word it occurs on;  $\llbracket_F$  indicates semantic focus, i.e., the part that changes across the focus alternatives.

*if*-clause is on *large*. (2b) supports the restricting interpretation: the QUD is about which of her dogs Stephanie is bringing; the adjective is restricting the set of Stephanie’s dogs, and no inference about the size of all her dogs is obtained. The utterance is felicitous. (2c) supports the non-projecting non-restricting interpretation: the QUD is about the size of Stephanie’s only dog, so the adjective isn’t restricting the set of Stephanie’s dogs; instead, the inference about the size of all her dogs contributed by the adjective is meant to be interpreted locally, as a conjunct under *if*. While this interpretation is maximally supported by the context, it is not available—the utterance is sharply infelicitous.

- (2) *Context: We are going on a group tour and want to rent a van. The speaker just learned that Stephanie...*
- a. **Projecting non-restricting:** ..., who has two pets, a small cat and a large dog, is planning to bring along one of her pets.  
I don’t know which one of Stephanie’s pets is coming with us, but if she’s bringing her large [**dog**]<sub>F</sub>, we should get a bigger van.  
→ All Stephanie’s dogs are large.
  - b. **Restricting:** ..., who has two dogs, a small and a large one, is planning to bring along one of her dogs.  
I don’t know which one of Stephanie’s dogs is coming with us, but if she’s bringing her [**large**]<sub>F</sub> dog, we should get a bigger van.  
↯ All Stephanie’s dogs are large.
  - c. **Non-projecting non-restricting:** ...is planning to bring along her only dog.  
#I don’t know how big Stephanie’s dog is, but if she’s bringing her [**large**]<sub>F</sub> dog, we should get a bigger van.  
Intended: ‘...if (all Stephanie’s dogs are large and she’s bringing her large dog)...’

Appositives (nominal appositives and appositive relative clauses) can’t be restricting, nor can they (normally) be interpreted under operators like *if*, so they can only have projecting non-restricting interpretations (the extralinguistic contexts are the same as in (2)):

- (3)
- a. **Projecting non-restricting**  
I don’t know which one of Stephanie’s pets is coming with us, but if she’s bringing her [**dog**]<sub>F</sub>, {a large animal, who is large}, we should get a bigger van.  
→ Stephanie’s dog is large.
  - b. **Restricting**  
#I don’t know which one of Stephanie’s dogs is coming with us, but if she’s bringing her dog, {a [**large**]<sub>F</sub> animal, who is [**large**]<sub>F</sub>}, we should get a bigger van.
  - c. **Non-projecting non-restricting**  
#I don’t know how big Stephanie’s dog is, but if she’s bringing her dog, {a [**large**]<sub>F</sub> animal, who is [**large**]<sub>F</sub>}, we should get a bigger van.  
Intended: ‘...if (Stephanie’s dog is large and she is bringing her dog)...’

The relevant paradigm for co-nominal gestures is given in (4) (the extralinguistic contexts are as in (2)). Like adjectives and appositives, co-nominal gestures can easily have projecting non-restricting interpretations but can’t have non-projecting non-restricting interpretations. However, the availability of restricting interpretations for co-nominal gestures, as in (4b),

is gradient and variable across speakers, setting them apart from both adjectives and appositives. In section 4.1, I adduce experimental evidence for the judgement patterns for co-nominal gestures (as compared to adjectives and appositives) reported here.

- (4) a. **Projecting non-restricting**  
 I don't know which one of Stephanie's pets is coming with us, but if she's bringing her [dog]<sub>F</sub><sup>LARGE</sup>, we should get a bigger van.  
 → All Stephanie's dogs are large.
- b. **Restricting**  
 %?I don't know which one of Stephanie's dogs is coming with us, but if she's bringing her dog<sup>[LARGE]<sub>F</sub></sup>, we should get a bigger van.  
 ↗ All Stephanie's dogs are large.
- c. **Non-projecting non-restricting**  
 #I don't know how big Stephanie's dog is, but if she's bringing her dog<sup>[LARGE]<sub>F</sub></sup>, we should get a bigger van.  
 Intended: '...if ({Stephanie's dog is large, all Stephanie's dogs are large} and she is bringing her dog)...'


In (5) I replicate the contrast between projecting non-restricting and non-projecting non-restricting interpretations for gender features on the pronoun *her*. In (5a) we have two potential suspects of different genders, but it is the identity of the curse caster that's at issue, not their gender. The inferences about the genders of the two suspects, thus, can and do project. This—entirely felicitous—example is meant to be a counterpart of, in particular, (2a), where we also have two potential referents (Stephanie's cat and dog) with two contrasting properties (along the size dimension), but those properties are not at issue, and the inferences about them project. Conversely, in both (5b) and (2c), we only have one referent, whose identity is not at issue, but we are trying to make one of its properties (gender and size, respectively) at issue instead, thus, preventing them from projecting—and fail.

- (5) *Context: In a magical universe, the speaker is inspecting a victim of a curse that is especially powerful when a woman casts it.*
- a. **Projecting non-restricting:** *The speaker thinks that either Lucius (a man) or Bellatrix (a woman) cast the curse.*  
 I don't know if it was Lucius or Bellatrix<sub>i</sub> who cast the curse, but if **she<sub>i</sub>** cast it, the victim is unlikely to recover.  
 → Bellatrix is female.
- b. **Non-projecting non-restricting:** *The speaker has no suspects.*  
 #I don't know the gender of [the person who cast the curse]<sub>i</sub>, but if **she<sub>i</sub>** cast it, the victim is unlikely to recover.  
 Intended: '...if ( $x_i$  is female and  $x_i$  cast it)...'

Finally, a similar contrast holds for height specifications on co-verbal gestures, although a minority of speakers find (6b) marginally acceptable (they still get a contrast with (6a)).

- (6) *Context: Zoe is a stuntwoman. The crew just filmed a scene in which Zoe was punching an extra while the director of the movie Uma was away.*

- a. **Projecting non-restricting or restricting:** *Uma knows who the extra was and that he is much taller than Zoe. Uma originally wanted Zoe to punch him in the face, not in the sternum. Uma says:*

If Zoe punched him<sup>PUNCH-[HIGH]<sub>F</sub></sup> , that's OK,

but if she punched him<sup>PUNCH-[LOW]<sub>F</sub></sup> , we'll have to reshoot the scene.

→ The extra's face is higher than Zoe's face; his sternum is at Zoe's face level.

- b. **Non-projecting non-restricting:** *Uma doesn't know who the extra was, but she knows that he was punched in the face, and she originally wanted the extra to be much taller than Zoe. Uma says:*

%??If Zoe punched him<sup>PUNCH-[HIGH]<sub>F</sub></sup>, that's OK, but if she punched him<sup>PUNCH-[LOW]<sub>F</sub></sup>, we'll have to reshoot the scene.

Intended: '...if (his face is (higher than Zoe's face, at Zoe's face level) and Zoe punched him)...

The most straightforward way to zoom in onto the parallel between this case and the ones above is to construe the gestures in (6) as containing an incorporated area-of-contact argument, which the height specifications on the gestures are modifying. Then in (6a) we have two potential areas of contact (the extra's face and the extra's sternum) with two contrasting but not-at-issue properties. In (6b) we only have one area of contact (the extra's face), and we are trying to make a certain property thereof (namely, its position, determined by the extra's height) at issue, which prevents it from projecting and results in degradedness. Whether (6a) should be thought of as a projecting non-restricting or restricting case depends on how we construe the incorporated argument; I will come back to this issue in section 7.

Note that in this paper I will only be looking at examples with co-verbal gestures whose content is mostly redundant given the verbs they co-occur with—except for the height specifications. The same observations can be made for co-verbal gestures whose content is not redundant or for gestures that have their own time slot (Schlenker & Chemla 2018 focus on the latter). The reason I am avoiding the former is to make the inferences in the examples simpler, and the reason I am avoiding the latter is to avoid any prosodic integration issues typical of gestures with their own time slot. Yet, I believe any analysis of examples like (6) should generalize to non-redundant co-verbal gestures and gestures with their own time slot.

I summarize the patterns above in Table 1. Given the discrepancies in the 'restricting' column, we can already conclude that we likely need at least two composition strategies for the five types of adnominal content under consideration. In what follows I argue that we also need at most two strategies, and the empirical parallels observed above are not accidental.

### 3. Two composition strategies: modifiers and supplements

In this section I lay out the two composition strategies for adnominal content, *the modifier strategy* and *the (anchored) supplement strategy*, and discuss the two most obvious examples thereof, adjectives and appositives.

Table 1: Interpretations of adnominal content.

	projecting non-restricting	restricting	non-projecting non-restricting
adjectives	✓	✓	✗
appositives	✓	✗	✗
co-nominal gestures	✓	%?	✗
<i>phi</i> -features on pronouns	✓	✗	✗
height specifications on gestures		✓	%??

### 3.1. Modifiers as exemplified by adjectives

I define *modifiers* as pieces of content that combine with constituents denoting sets of entities (i.e., individuals or events<sup>4</sup>) and return subsets thereof. In the nominal domain modifiers thus combine with constituents of type *et*, as opposed to those of type *e* or  $\langle et, t \rangle$ . Thus, I am using the term *modifier* differently from Potts (2005), who calls any adnominal adjuncts, including supplements, modifiers, regardless of how they compose. The intuition I am trying to capture with this use of terms is that modifiers can *modify* sets while supplements don't modify anything, they just add propositional content about their anchors.

Adnominal adjectives adjoin to NPs (Noun Phrases), which are of type *et*, and are thus modifiers. Other types of adnominal modifiers include, for example, NP-adjoining PPs (as in *the book on the table*) and restrictive relative clauses (as in *the dog that is large*).

Since modifiers combine with sets and return subsets thereof, they are always *restrictive*, but a given instance of a modifier doesn't have to be *restricting*, i.e., it doesn't have to pick out a proper subset of the input.<sup>5</sup> For example, the adjective *large* is always restrictive, but in (7b) it is restricting, as it picks out a proper subset of Stephanie's dogs.<sup>6</sup> In (7a), however, it is non-restricting; it adds information about Stephanie's only dog, but doesn't pick out a proper subset of the singleton set it combines with (which could only be the empty set).

(7) a. **Projecting non-restricting**

I don't know which one of Stephanie's pets is coming with us, but if she's bringing her large [**dog**]<sub>F</sub>, we should get a bigger van.

→ All Stephanie's dogs are large.

b. **Restricting**

I don't know which one of Stephanie's dogs is coming with us, but if she's bringing her [**large**]<sub>F</sub> dog, we should get a bigger van.

↗ All Stephanie's dogs are large.

c. **Non-projecting non-restricting**

#I don't know how big Stephanie's dog is, but if she's bringing her [**large**]<sub>F</sub> dog, we should get a bigger van.

Intended: '...if (all Stephanie's dogs are large and she's bringing her large dog)...

<sup>4</sup>Assuming standard Neo-Davidsonian treatment of modification in the verbal domain (Carlson 1984; Parsons 1990, a.o.).

<sup>5</sup>The *restrictive* vs. *restricting* distinction was explicitly introduced in Schlenker To appear.

<sup>6</sup>I repeat the paradigm for adjectives from (2) in (7), but without the extralinguistic contexts.



Note that the claim that adnominal adjectives are always restrictive doesn't hinge on whether a given adjective is intersective or subsective, gradable or non-gradable. It refers to a very general property of adjectives that they operate on sets of individuals and returns subsets thereof. Whether they do so via set intersection or functional application, or whether they take a degree argument first is immaterial to the very broad distinctions I'm making in this section. However, whether adjectives denote sets of individuals or functions from sets of individuals to sets of individuals will become important in section 5. I will set apparently non-subsective adjectives such as *alleged* aside completely for the purposes of this paper.

Now, compositionally speaking, there is no difference between restricting and non-restricting modifiers. However, when a modifier returns a non-proper subset of the input set, its truth-conditional contribution is vacuous. Instead, a non-restricting modifier gives rise to a projecting inference that all members of the set it modifies satisfy its description, as is the case in (7a). The fact that such inferences arise at all is likely due to the fact that otherwise the modifier would be completely vacuous, making no meaningful contribution whatsoever.

Some relevant observations regarding projection of the inferences contributed by non-restricting modifiers were made in Leffel 2014. Here I want to make a more refined point that these inferences project very strongly. For example, the infelicitousness of (7c) shows that the inference that all Stephanie's dogs are large cannot be interpreted locally, under *if*, even under pressure. The fact that *her large dog* is a definite and thus triggers a presupposition that there exists a large dog belonging to Stephanie cannot explain the infelicitousness of (7c) on its own. If the inference contributed by the non-restricting *large* could be interpreted immediately under *if*, it should be able to satisfy this presupposition locally (as is the case in the intended meaning paraphrase in (7c)), but that doesn't happen.

Moreover, these inferences cannot be interpreted locally even when the non-restricting modifier is not within a definite. Thus, in (8) (inspired by some examples in Leffel 2014) the adjectives are within quantifiers, but can only have restricting interpretations.

- (8) a. I don't know if all chemicals are harmful, but will every harmful chemical be eliminated by this product?  
 Unavailable interpretation: 'Is it the case that (all chemicals are harmful and every harmful chemical will be eliminated by this product)?'
- b. I don't know for a fact if all chemicals are harmful, but I doubt that every harmful chemical will be eliminated by this product.  
 Unavailable interpretation: 'I doubt that (all chemicals are harmful and every harmful chemical will be eliminated by this product).'

Inferences contributed by non-restricting modifiers are thus different from presuppositions of so-called "weak" triggers, which can be interpreted locally under semantic operators, given some pragmatic pressure. For example, neither of the examples in (9) gives rise to a global inference that Jackie used to smoke; instead the presupposition of *stop* is interpreted locally.

- (9) a. *Context: The speaker doesn't know if Jackie ever smoked, but they noticed that she has recently started chewing on her pencil.*  
 Did Jackie recently stop smoking?  
 ↗ Jackie used to smoke.  
 ≈ Is it the case that (Jackie used to smoke and recently stopped)?

- b. *Context: Jackie works for a company that requires that its employees file a report whenever they change their smoking habits. The speaker just learned that Jackie had filed such a report, but they don't know for sure whether Jackie ever smoked. I don't know for a fact what Jackie's report says, but I doubt that Jackie **stopped** smoking. (It's more likely that she **started** smoking.)*  
 $\nrightarrow$  Jackie used to smoke.  
 $\approx$  'I doubt that (Jackie used to smoke and stopped).'

The standard way to handle local interpretation of presuppositions is via the process of *local accommodation* (see, e.g., Heim 1983; Schlenker 2009), which can be operationalized differently, but at the end of the day yields the result where the presupposition is interpreted as a conjunct at some local level.

Thus, we need a mechanism to generate inferences contributed by non-restricting modifiers and assure their projection. Moreover, this mechanism should either make local accommodation of such inferences impossible altogether, or ensure that local accommodation does not yield unattested interpretations. In section 5 I will propose that *cosuppositions* developed in Schlenker 2018a for inferences contributed by co-speech gestures can be re-purposed as such a general mechanism for generating projecting inferences of non-restricting modifiers.

Before I move on to the supplement strategy, let me add a quick note about (7c). It has been observed before that focus on an adjective forces a restricting interpretation thereof (the observation was originally made in Umbach 2006 for German and extended to English in Leffel 2014). For example, (10a) is a reasonable utterance that doesn't commit one to the existence of harmless carcinogens, but (10b) is weird because focus on *harmful* signals that the speaker believes harmless carcinogens exist, which is at odds with our world knowledge.

- (10) a. Cigarettes contain harmful carcinogens. (Leffel 2014, (3.10))  
b. #Cigarettes contain [**harmful**]<sub>F</sub> carcinogens. (Leffel 2014, (5.66))

Whatever the explanation for the contrast in (10) is (Leffel (2014) offers one), this property of focused modifiers alone could explain the infelicitousness of (7c): focus on *large* forces a restricting interpretation, but the context only allows for a non-restricting one. Now, it is unclear to me whether focus on adjectives indeed always forces restricting interpretations, and I will briefly come back to this issue in section 8.2. That said, this is a concern to keep in mind, which is why examples like (8) are crucial, as they show that adjectives can't have non-projecting non-restricting interpretations even when they are not focused.

### 3.2. Anchored supplements as exemplified by appositives

The composition strategy used by appositives is different from that of modifiers. Appositives associate with anchors (individuals in the case of adnominal appositives) and contribute some propositional content about those anchors. This content then typically has to project from under semantic operators. Most analyses of appositives assume they adjoin to their anchors in narrow syntax (e.g., Potts 2005; AnderBois et al. 2013; Koev 2013, etc.). For adnominal appositives, whose anchors are individuals, this means that they adjoin to DPs (Determiner Phrases), as opposed to adjectives, which adjoin to NPs (Noun Phrases). Further differences among specific analyses of appositives are immaterial for the purposes of this paper, and

for the rest of the paper I will mostly focus on the modifier strategy, but I will assume the majority view that adnominal appositives adjoin to DPs.

Whichever specific account of appositives one assumes, the general outcome is the same: appositives can never be restricting, because they are not restrictive to begin with. This explains the unacceptability of examples like (11b).<sup>7</sup> The pressure for appositives to project—however it is accounted for—then explains the unacceptability of non-projecting non-restricting interpretations of appositives as in (11c).

- (11) a. **Projecting non-restricting**  
 I don't know which one of Stephanie's pets is coming with us, but if she's bringing her [**dog**]<sub>F</sub>, {a large animal, who is large}, we should get a bigger van.  
 → Stephanie's dog is large.
- b. **Restricting**  
 #I don't know which one of Stephanie's dogs is coming with us, but if she's bringing her dog, {a [**large**]<sub>F</sub> animal, who is [**large**]<sub>F</sub>}, we should get a bigger van.
- c. **Non-projecting non-restricting**  
 #I don't know how big Stephanie's dog is, but if she's bringing her dog, {a [**large**]<sub>F</sub> animal, who is [**large**]<sub>F</sub>}, we should get a bigger van.  
 Intended: '...if (Stephanie's dog is large and she is bringing her dog)...

I will refer to the composition strategy used by appositives—whatever the details thereof—as *the (anchored) supplement strategy*. The term *supplement* is used, in particular, in Potts 2005 and some subsequent work to describe a class of expressions and can be used theory-neutrally. Appositives aren't the only type of supplements; at the very least parentheticals are supplements, too. The main difference is that parentheticals don't have to associate with anchors while appositives do (see Potts 2005; Esipova 2017 for further details).

Now let me add two notes regarding some apparently exceptional behavior of appositives.

First, Schlenker (2013) and Jasinskaja & Poschmann (2018) discuss apparent exceptions to the projection requirement on appositives, such as (12); the examples discussed in this paper don't ever exhibit such exceptional behavior, so I will not discuss this issue further.

- (12) If tomorrow I call the Chair, who in turn calls the Dean, we will be in deep trouble.  
 ↗ If tomorrow I call the Chair, they will call the Dean.  
 ≈ If (tomorrow I call the Chair and they call the Dean)...

Second, Wang et al. 2005 give examples like (13), claiming that *one*-appositives are, in fact, restricting (and, thus, restrictive).

- (13) If a professor, a famous one, publishes a book, they will make a lot of money.  
 ↗ If a professor publishes a book, they are famous.  
 ≈ If a famous professor publishes a book...

I agree with AnderBois et al. (2013) that such *one*-appositives are more like corrections, or second thought clarifications, rather than bona fide restrictive modifiers. Contrastive ex-

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<sup>7</sup>I repeat the paradigm from (3) in (11), but without the extralinguistic contexts.

amples like (14c) show that such *one*-appositives can't be used as planned restrictors—as opposed, for example, to adjectives, as in (14a), or restrictive relative clauses, as in (14b). Therefore, I will ignore *one*-appositives in this paper, too.

- (14) a. If a [**famous**]<sub>F</sub> professor publishes a book, they will make a lot of money, but if an [**unknown**]<sub>F</sub> professor does so, they will make nothing.  
 b. If a professor that's [**famous**]<sub>F</sub> publishes a book, they will make a lot of money, but if a professor that's [**unknown**]<sub>F</sub> does so, they will make nothing.  
 c. #If a professor, a [**famous**]<sub>F</sub> one, publishes a book, they will make a lot of money, but if a professor, an [**unknown**]<sub>F</sub> one, does so, they will make nothing.

## 4. Gestures

Now that the modifier and the supplement strategies have been properly laid out, let us discuss which strategy or strategies co-nominal gestures use. First, I adduce experimental data as evidence for the judgement patterns reported in section 2 for co-nominal gestures, as compared to adjectives and appositives. I then discuss the issues these data raise for the two analyses of co-speech gestures currently on the market, by Ebert (& Ebert) (2014; 2017), who argue that co-speech gestures are supplements, and Schlenker (2018a), who claims that co-speech gestures trigger assertion-dependent presuppositions, *cosuppositions*. I further propose a view whereby compositionally integrated gestures can use either the modifier or the supplement strategy, but there are additional pragmatic and possibly prosodic considerations that make modifier gestures preferably non-restricting, which assures that content contributed by co-nominal gestures tends to project. Finally, I re-purpose cosuppositions as a modality-neutral mechanism to yield projecting inferences of non-restricting modifiers.

### 4.1. (Un)available interpretations of co-nominal gestures: experimental evidence

To find out which interpretations are available for co-nominal gestures and which aren't, I conducted an acceptability judgement study.

#### 4.1.1. Design

Participants were recruited on Amazon Mechanical Turk and paid \$1 each for completing the task. They were asked to read context paragraphs, watch videos of sentences uttered in those contexts, and assess these sentences by dragging a slider to the desired position on a pseudo-continuous scale from 'Totally unnatural' to 'Totally natural' (mapped to 0–100).

The items differed across two factors: content type (adjective, appositive, gesture) and interpretation (projecting non-restricting (PNR), restricting (R), non-projecting non-restricting (NPNR)), resulting in 9 conditions. The target interpretation was enforced within each video by setting up the QUD and explicitly contrasting two alternatives;<sup>8</sup> the written contexts were meant to maximally support this interpretation. 4 complete test paradigms (for 4 different scenario types) were constructed; a sample paradigm is given in (15).

<sup>8</sup>The alternatives were made explicit after a pilot study revealed that some participants might be “rescuing” some of the items with appositives by interpreting the latter as describing a kind, not an instance thereof. For example, applying this strategy to *If Stephanie's bringing her dog, a large animal, we should get a bigger van* yields an inference that dogs are in general large.

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

- a. **PNR:** ..., 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**<sup>SMALL</sup>



, we'll be fine, but if she's bringing (i) her large **dog** / (ii) her **dog**,

a **large** animal / (iii) her **dog**<sup>LARGE</sup>, we should get a bigger van.



- b. **R:** ..., 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**<sup>SMALL</sup>, we'll be fine, but if she's bringing (i) her **large** dog / (ii) her dog, a **large** animal / (iii) her **dog**<sup>LARGE</sup>, we should get a bigger van.

- c. **NPNR:** ...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**<sup>SMALL</sup>, we'll be fine, but if she's bringing (i) her **large** dog / (ii) her dog, a **large** animal / (iii) her **dog**<sup>LARGE</sup>, we should get a bigger van.

Each participant saw 1 randomly selected item per condition and 2 additional items, presented in random order. One of the additional items was an attention check where the participant was instructed to drag the slider all the way to the left or to the right. The other item had a mismatch between the written context and the video sentence; it was always a non-projecting non-restricting context and a restricting sentence with adjectives (randomly selected from the four scenario types). This item was added to assess whether participants were paying attention to the written contexts and as an informal baseline for degradedness.

Participants who failed the attention check or reported being non-native speakers of English were excluded. The final number of participants was 122 (33 female, 89 male).

#### 4.1.2. Results

All statistical tests and plots were done using R (2018). A mixed effects linear regression model was run for each content type with interpretation as a fixed effect, and participant and scenario type as random effects. Once the significant effect of interpretation was established, pairwise comparisons between different interpretations were performed via similar models.

The results are visualized in Figure 1, and the statistics are summarized in Table 2. The mean % acceptability for mismatch items was 39, which is not significantly different from that of non-projecting non-restricting items with adjectives (Beta = -.041,  $t = -.858$ ,  $p = .393$ ), but no meaningful comparisons can be made with the other content types.

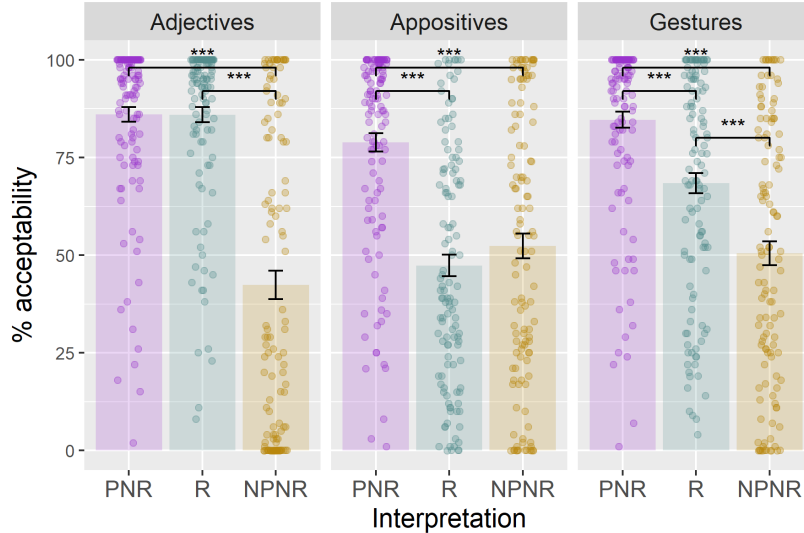


Figure 1: % acceptability of different interpretations for each content type. Error bars show standard error. Dots represent individual responses (jitter was added for better visualization).

As one can see, restricting interpretations of co-nominal gestures aren’t as bad as non-projecting non-restricting interpretations thereof, in contrast to appositives, but they also aren’t as good as projecting non-restricting interpretations thereof, in contrast to adjectives. A comprehensive analysis of co-nominal gestures needs to account for these contrasts. It also needs to capture the gradient and variable nature of judgements for restricting gestures. The design of the experiment above doesn’t allow to assess inter-speaker variability in a meaningful way, but in Esipova To appear I show that speakers vary in an internally consistent way in how acceptable they find non-projecting interpretations of co-nominal gestures.

#### 4.2. Supplemental analysis of co-speech gestures

In what to my knowledge is the first attempt to account for the projection behavior of co-speech gestures, Ebert & Ebert (2014) claim that such gestures are supplements, akin to appositives. They propose to analyze such gestures within Potts’ (2005) bidimensional semantics, although, once again, for our purposes the specific analysis doesn’t matter.

More recently, Ebert (2017) proposed a more refined analysis. She claims that co-speech gestures are usually supplements, but there also exist NP-level co-speech gestures with “exemplification” semantics. Under this view, *her dog*<sup>LARGE</sup>, for example, typically has the same semantics as *her dog, which is large*, in which case the gesture adjoins to the DP *her dog*. But—if my understanding of her claims is correct—the gesture LARGE can also sometimes be interpreted as adjoining to the NP *dog* and exemplifying a typical entity in its denotation.

If co-speech gestures are supplements, it is unsurprising that they allow for projecting, but not non-projecting non-restricting interpretations; the explanation would be the same as for appositives. Yet, neither the supplement nor the exemplification strategy can yield restricting interpretations of co-speech gestures, which we have seen are marginally available. Thus, while it is possible that co-speech gestures are sometimes supplements (and maybe sometimes exemplifiers), this doesn’t give us the full range of available interpretations.

Table 2: % acceptability of different interpretations for each content type: statistics.

Content	Mean % acceptability				Comparisons	
	PNR	R	NPNR	PNR/R	PNR/NPNR	R/NPNR
Adjectives	86.0	85.9	42.4	NS	***	***
				Beta = .001	Beta = .565	Beta = .568
				$t = .03$	$t = 10.71$	$t = 10.842$
				$p = .976$	$p < 2e-16$	$p < 2e-16$
Appositives	78.9	47.4	52.4	***	***	NS
				Beta = .49	Beta = .398	Beta = $-.077$
				$t = 10.35$	$t = 8.057$	$t = -1.628$
				$p < 2e-16$	$p = 6.28e-13$	$p = .106$
Gestures	84.6	68.4	50.5	***	***	***
				Beta = .301	Beta = .513	Beta = .277
				$t = 6.298$	$t = 10.95$	$t = 5.459$
				$p = 5.43e-09$	$p < 2e-16$	$p = 2.59e-07$

#### 4.3. Cosuppositional analysis of co-speech gestures

Schlenker (2018a) argues against the supplemental analysis and proposes instead that co-speech gestures trigger assertion-dependent presuppositions he calls *cosuppositions*.

One of Schlenker’s original arguments against the supplemental analysis is that co-speech gestures don’t seem to be subject to the same anaphoric constraints as appositives. More specifically, as shown in (16), while appositives need a discourse referent to serve as an anchor for them, similarly to ordinary pronouns requiring discourse referents as antecedents for cross-sentential anaphora, co-speech gestures don’t seem to require that. I’d like to note that in my experience the judgements on anchorless co-speech gestures are gradient and variable, and most people do find them somewhat degraded (which is what I report in (16)), but there is still a contrast between co-speech gestures and appositives to be explained.

- (16) a. %?Stephanie didn’t bring a dog<sup>LARGE</sup>.  
b. %?Stephanie brought no dog<sup>LARGE</sup>.  
c. \*Stephanie didn’t bring a dog, {which was large, a large animal}.  
d. \*Stephanie brought no dog, {which was large, a large animal}.  
e. Stephanie didn’t bring a dog. \*It was large.  
f. Stephanie brought no dog. \*It was large.

Some further experimental work (Tieu et al. 2017, 2018) has provided experimental evidence that co-speech gestures don’t always project like appositives either.

Neither piece of evidence (anaphoric constraints and projection patterns) excludes the possibility that co-speech gestures can sometimes be interpreted as supplements, only that they aren’t always interpreted as such. In this respect, Schlenker and Tieu et al.’s data point in the same direction as mine: even if gestures are sometimes interpreted as supplements, the supplement strategy doesn’t yield the entire range of possible interpretations for gestures.

At this point we need to see if the cosupposition mechanism as formulated by Schlenker is sufficient to generate all the attested interpretations of co-speech gestures discussed in this paper without generating any unattested ones. In what follows I show that, the cosupposition mechanism yields good results for NP-level gestures (given the right assumptions), but predicts unattested interpretations for DP-level gestures.

#### 4.3.1. What are cosuppositions

A cosupposition of the configuration  $[[S]^G]$  has the form  $S \Rightarrow G$ , where  $S$  is the spoken expression the gesture adjoins to,  $G$  is the gesture, and  $\Rightarrow$  is generalized entailment. When this cosupposition projects, the local context  $c'$  of  $[[S]^G]$  has to entail it:  $c' \Rightarrow (S \Rightarrow G)$ . Schlenker also makes a standard assumption that presuppositions can in principle be locally accommodated under some (possibly minor) pressure. He further specifies that when a gestural cosupposition is locally accommodated, it is conjoined to  $S$ :  $S \& (S \Rightarrow G)$ , which is equivalent to  $S \& G$ , where  $\&$  is generalized conjunction. Local accommodation of presuppositions is typically taken to incur some cost,<sup>9</sup> the amount of which can vary across triggers (weak/soft vs. strong/hard triggers) and—potentially—across speakers.

Note that for Schlenker’s cosupposition mechanism to apply, it is crucial that  $S$ ,  $G$ , and  $c'$  are all of the same semantic type, otherwise neither generalized entailment nor generalized conjunction are possible. Thus, the type of the constituent to which the gesture adjoins matters. With this in mind, let’s see what results the mechanism above yields for co-nominal gestures adjoining to NPs and DPs, respectively.<sup>10</sup>

#### 4.3.2. Cosuppositions of NP-level gestures

In (17) I provide a step-by-step derivation<sup>11</sup> of a projected and a locally accommodated cosupposition in *Stephanie brings her dog<sup>LARGE</sup>* with the gesture adjoining to the NP *dog*. The assumptions about the denotations of *dog* and an NP-level *LARGE* are standard: I assume both denote *et*-type predicates (so does Schlenker).<sup>12</sup> A more liberal assumption is made about the local context  $c'$  of *dog<sup>LARGE</sup>*, which also has to be of type *et*. The literature on local contexts doesn’t talk much about non-propositional local contexts except predicative local contexts in examples with quantifiers. Schlenker (2018a) assumes pragmatic local contexts from Schlenker 2009, defined as the strongest possible restriction one can make before processing the presupposition trigger (the  $[[S]^G]$  configuration for gestural cosuppositions). Under the assumption that when computing a local context we can take into account at least all the content linearly preceding the trigger, we can assume that the local context  $c'$

<sup>9</sup>The psycholinguistic nature of this cost isn’t usually discussed in the relevant literature; I am using this term simply to refer to whatever results in lower acceptability. However, see Chemla & Bott 2013 for experimental data on response times as a measure of processing cost incurred by local accommodation.

<sup>10</sup>Note that the exact temporal alignment of a gesture is unlikely to be a reliable indicator of its adjunction level. For example, the preparatory phase of a co-speech gesture often starts way before the spoken constituent it “associates with”. Thus, I will assume that whenever a gesture roughly aligns with and associates with a nominal, the gesture in principle might be adjoining either to the entire DP or to an NP within it.

<sup>11</sup>Throughout this paper I am omitting world variables in derivations for the sake of simplicity.

<sup>12</sup>Of course, the predicate description in the gesture’s denotation is simplified; size gestures indicate size iconically, so a more accurate description would be along the lines of ‘roughly of this size’ (this is not to say that the mapping is always accurate), but for my purposes this simplified denotation will suffice.



of  $\underline{dog}^{\text{LARGE}}$  in the target example is the set of individuals  $x$  such that Stephanie brings  $x$  and  $x$  belongs to her. In this paper I will not explore whether this assumption is justified and harmless, nor whether even more liberal assumptions are needed for other cases of NP-level gestures, but this assumption is necessary to make cosuppositions work in this case.

With all these assumptions in place, we get desirable results for the target sentence. If the cosupposition projects, we end up with a projecting inference that if Stephanie brings a dog of hers, that dog is large. Since size is typically an individual-level predicate, it is natural to conclude from that that all Stephanie's dogs are large, which gives us the projecting non-restricting interpretation. If we locally accommodate the cosupposition, the predicate denoted by the gesture ends up acting as an ordinary restrictive modifier without any additional inferences, which allows for a restricting interpretation, as desired.

- (17) Stephanie brings her  $[[_{\text{NP}} \text{dog}]^{\text{LARGE}}]$ .
- a. spoken expression  $S$ :  
 $\llbracket \text{dog} \rrbracket = \lambda x. \text{dog}(x)$
  - b. gesture  $G$ :  
 $\llbracket \text{LARGE}_{\text{NP}} \rrbracket = \lambda x. \text{large}(x)$
  - c. cosupposition  $S \Rightarrow G$ :  
 $(\lambda x. \text{dog}(x)) \Rightarrow (\lambda x. \text{large}(x))$   
 $\lambda x. \text{dog}(x) \rightarrow \text{large}(x)$
  - d. local context  $c'$ :  
 $\lambda x. \text{bring}(s, x) \wedge \text{poss}(s, x)$
  - e. projection  $(c' \Rightarrow (S \Rightarrow G))$ :  
 $(\lambda x. \text{bring}(s, x) \wedge \text{poss}(s, x)) \Rightarrow (\lambda x. \text{dog}(x) \rightarrow \text{large}(x))$   
 $\forall x. (\text{bring}(s, x) \wedge \text{poss}(s, x)) \rightarrow (\text{dog}(x) \rightarrow \text{large}(x))$   
 'For all individuals  $x$ : if Stephanie brings  $x$  and  $x$  belongs to her, then if  $x$  is a dog,  $x$  is large.'
  - f. local accommodation  $(S \& (S \Rightarrow G))$ :  
 $(\lambda x. \text{dog}(x)) \& (\lambda x. \text{dog}(x) \rightarrow \text{large}(x))$   
 $\lambda x. \text{dog}(x) \wedge \text{large}(x)$

Note that in Schlenker's system there is no difference between locally accommodating the cosupposition of an NP-level gesture and not generating any cosupposition to begin with but treating the gesture as an ordinary restrictive modifier intersecting with the NP it adjoins to. I will come back to this property of cosuppositions later in section 5.

#### 4.3.3. Cosuppositions of DP-level gestures

Things aren't as smooth if we apply the cosupposition mechanism to DP-level gestures. Let us look at *Stephanie brings her dog*<sup>LARGE</sup> again, but with LARGE adjoining to the DP *her dog*.

First, we need to figure out what DP-level gestures denote. Once again, for the cosupposition mechanism to apply, they should be of the same type as the DPs they adjoin to. It is unclear what it would mean for generalized entailment to hold between two individuals, so let us assume that both are generalized quantifiers of type  $\langle et, t \rangle$ . But what exactly would an  $\langle et, t \rangle$ -type gesture denote? As a first pass, let us try treating such gestures as existential quantifiers. So, a DP-level LARGE would mean roughly 'a large object'.

Next, we need to figure out what the local context of *her dog*<sup>LARGE</sup> is; it needs to be of type  $\langle et, t \rangle$ , as well. Based on the linearly preceding material, it is not unreasonable to stipulate a local context along the lines of ‘something that Stephanie brings’. (Again, how justified this stipulation is is a separate issue that I am not planning to discuss here.)

The derivations of a projected and a locally accommodated cosupposition for the target example are given in (18) (from now on I will be omitting intermediate steps).

- (18) Stephanie brings  $[[_{\text{DP}} \text{ her dog}]^{\text{LARGE}}]$ . (Attempt 1.)
- a. spoken expression  $S$ :  
 $[[\text{her dog}]] = \lambda P.P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x))$
  - b. gesture  $G$ :  
 $[[\text{LARGE}_{\text{DP}}]] = \lambda P.\exists x[\text{large}(x) \wedge P(x)]$
  - c. local context  $c'$ :  
 $\lambda P.\exists x[\text{bring}(s, x) \wedge P(x)]$
  - d. cosupposition  $S \Rightarrow G$ :  
 $\lambda P.P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \rightarrow \exists x[P(x) \wedge \text{large}(x)]$
  - e. projection ( $c' \Rightarrow (S \Rightarrow G)$ ):  
 $\forall P.\exists x[\text{bring}(s, x) \wedge P(x)] \rightarrow (P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \rightarrow \exists x[P(x) \wedge \text{large}(x)])$   
‘For all properties  $P$ : if Stephanie brings an object that has  $P$ , then if there is a dog that has  $P$ , there is a large object that has  $P$ .’
  - f. local accommodation ( $S \& (S \Rightarrow G)$ ):  
 $\lambda P.P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \wedge \exists x[P(x) \wedge \text{large}(x)]$   
We proceed with the derivation as usual and get:  
 $\text{bring}(s, \iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \wedge \exists x[\text{large}(x) \wedge \text{bring}(s, x)]$   
‘Stephanie brings a dog and a large object.’

Are these results good? If the purported cosupposition projects, we get a convoluted inference, which, at the end of the day, assures that all Stephanie’s dogs are large. That’s so, because one of the properties the resulting formula can be checked against is the property of being any specific dog. Let’s say, Stephanie has one dog, named Fang. The result above assures that if Stephanie brings an object that has the property of being Fang, then if Stephanie’s dog has the property of being Fang, there is a large object that has the property of being Fang. Or, much simpler, if Stephanie brings Fang, Fang is large. Once again, given that size is an individual-level predicate, we can conclude that Fang is large tout court.

However, the predicted local accommodation interpretation is not attested. And of course, if gestural cosuppositions can in principle be locally accommodated, they should be able to be locally accommodated regardless of whether the gesture adjoins to an NP or a DP.

Moreover, given the assumptions above, nothing prevents gestures from adjoining to negative quantifiers like *no dog*, with some devastating results, as shown in (19).<sup>13</sup>

<sup>13</sup>As for gestures adjoining to NPs within DPs like *no dog*, Schlenker’s empirical claim is that such examples are acceptable and give rise to the same projecting inference as with gestures adjoining to NPs within indefinite DPs like *a dog*. For the target example the inference would be ‘If Stephanie brings a dog, it is large’. As far as I can tell, to get this inference via the cosupposition mechanism, the local context in both cases would need to be the property of being brought by Stephanie—regardless of whether the determiner is *a* or *no*. Once again, the issue of whether this assumption is justified is beyond the scope of this paper.

- (19) Stephanie brings  $\llbracket_{\text{DP}} \text{no dog} \rrbracket^{\text{LARGE}}$ .
- a. spoken expression  $S$ :  
 $\llbracket \text{no dog} \rrbracket = \lambda P. \neg \exists x [\text{dog}(x) \wedge P(x)]$
  - b. gesture  $G$ :  
 $\llbracket \text{LARGE}_{\text{DP}} \rrbracket = \lambda P. \exists x [\text{large}(x) \wedge P(x)]$
  - c. local context  $c'$ :  
 $\lambda P. \exists x [\text{bring}(s, x) \wedge P(x)]$
  - d. cosupposition  $S \Rightarrow G$ :  
 $\lambda P. \neg \exists x [\text{dog}(x) \wedge P(x)] \rightarrow \exists x [P(x) \wedge \text{large}(x)]$
  - e. projection ( $c' \Rightarrow (S \Rightarrow G)$ ):  
 $\forall P. \exists x [\text{bring}(s, x) \wedge P(x)] \rightarrow (\neg \exists x [\text{dog}(x) \wedge P(x)] \rightarrow \exists x [P(x) \wedge \text{large}(x)])$   
 ‘For all properties  $P$ : if Stephanie brings an object that has  $P$ , then if there is no dog that has  $P$ , there is a large object that has  $P$ .’
  - f. local accommodation ( $S \& (S \Rightarrow G)$ ):  
 $\lambda P. \neg \exists x [\text{dog}(x) \wedge P(x)] \wedge \exists x [P(x) \wedge \text{large}(x)]$   
 We proceed with the derivation as usual and get:  
 $\neg \exists x [\text{dog}(x) \wedge \text{bring}(s, x)] \wedge \exists x [\text{bring}(s, x) \wedge \text{large}(x)]$   
 ‘Stephanie brings no dog, and she brings a large object.’

The issue can be replicated with some other quantifiers. At this point one could say that the assumption that DP-level gestures denote existential quantifiers is incorrect. After all, under this assumption, there is no link between the spoken expression and the gesture. To introduce such a link and to avoid the issue with quantifiers, we could assume that DP-level gestures are anaphorically linked to the DPs they adjoin to, so that a DP-level  $\text{LARGE}_i$  would mean something like ‘that <sub>$i$</sub>  large object’. Thus, when we have a gesture that’s trying to adjoin to a DP that doesn’t introduce a discourse referent, we get a failure. In a way, this would be an attempt to give DP-level gestures a semantics that is very similar to that of appositives while still making use of the cosupposition mechanism.

How would this tweak affect our results? I will skip some unsuccessful attempts to implement it without adjusting the local context of *her dog*<sup>LARGE</sup> and will immediately suggest that local contexts can also come with anaphoric elements, including to something that is yet to come. This assumption is extremely controversial, but at this point we are trying to see if we can in principle get reasonable results for DP-level gestures via the cosupposition mechanism, so let’s allow this. In (20) I provide the derivations for *Stephanie brings her dog*<sup>LARGE</sup> with the gesture adjoining to *her dog*, with these new assumptions in place. Now *her dog* bears an index  $i$ , which gets picked up both by  $\text{LARGE}$  and by the local context of *her dog*<sup>LARGE</sup>.

- (20) Stephanie brings  $\llbracket_{\text{DP}} \text{her dog} \rrbracket_i^{\text{LARGE}_i}$ . (Attempt 2.)
- a. spoken expression  $S$ :  
 $\llbracket [\text{her dog}]_i \rrbracket^g = \lambda P. P(\iota x. \text{dog}(x) \wedge \text{poss}(s, x))$
  - b. gesture  $G$ :  
 $\llbracket \text{LARGE}_i \rrbracket^g = \lambda P. P(g(i)) \wedge \text{large}(g(i))$
  - c. cosupposition  $S \Rightarrow G$ :  
 $\lambda P. P(\iota x. \text{dog}(x) \wedge \text{poss}(s, x)) \rightarrow (P(g(i)) \wedge \text{large}(g(i)))$
  - d. local context  $c'$ :

- e.  $\lambda P.\text{bring}(s, g(i)) \wedge P(g(i))$   
 projection ( $C' \Rightarrow (S \Rightarrow G)$ ):  
 $\forall P.(\text{bring}(s, g(i)) \wedge P(g(i))) \rightarrow (P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \rightarrow$   
 $(P(g(i)) \wedge \text{large}(g(i))))$   
 $\forall P.(\text{bring}(s, \iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \wedge P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x))) \rightarrow$   
 $\text{large}(\iota x.\text{dog}(x) \wedge \text{poss}(s, x))$   
 ‘For all properties  $P$ : if Stephanie brings her dog and her dog has  $P$ , then her dog is large.’
- f. local accommodation ( $S \& (S \Rightarrow G)$ ):  
 $\lambda P.P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \wedge P(g(i)) \wedge \text{large}(g(i))$   
 $\lambda P.P(\iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \wedge \text{large}(\iota x.\text{dog}(x) \wedge \text{poss}(s, x))$   
 We proceed with the derivation as usual and get:  
 $\text{bring}(\iota x.\text{dog}(x) \wedge \text{poss}(s, x)) \wedge \text{large}(\iota x.\text{dog}(x) \wedge \text{poss}(s, x))$   
 ‘Stephanie brings her dog, and her dog is large.’

The result for projection is quite good; once again, one of the properties we could consider is the property of being Stephanie’s dog, so this result assures that all Stephanie’s dogs are large. The result for local accommodation, however, is exactly the non-projecting non-restricting interpretation the experiment in 4.1 showed to be unavailable—or at least significantly more degraded than the restricting interpretation, which is unexpected if both obtain via local accommodation of a gestural cosupposition.

I’d like to take a moment to appreciate the importance of this result. If this attempt to give DP-level gestures a cosuppositional semantics with an anaphoric twist had been successful, we could have given cosuppositional semantics to appositives, too. However, we would have run into the same problem: it would be entirely puzzling why cosuppositions triggered by appositives can’t be locally accommodated in the vast majority of cases. Furthermore, the failure of this attempt also shows that the suggestion made independently by Rob Pasternak and Manfred Krifka and discussed in Schlenker 2018a to treat gestural appositives<sup>14</sup> as triggering cosuppositions with anaphoric elements is unlikely to work. Just like most spoken appositives, gestural appositives can’t be interpreted locally even under pressure, as shown in (21) (the gesture **LARGE** has its own time slot and follows the spoken expression *her dog* that it associates with), which would be entirely puzzling if they triggered cosuppositions.<sup>15</sup>

(21) ***Non-projecting non-restricting***

#I don’t know how big Stephanie’s dog is, but if she’s bringing her dog, **LARGE**, we should get a bigger van.

Intended: ‘...if (Stephanie is bringing her dog and her dog is large)...’

<sup>14</sup>Schlenker (2018a) calls such gestures *post-speech gestures*; I have my reservations about using this term, discussed in Esipova 2018c.

<sup>15</sup>However, I believe gestural appositives can be used as clarifications, similar to *one*-appositives previously exemplified in (13), for example:

- (i) a. Bring me a beer, a small one.

- b. Bring me a beer, **SMALL**



We could try positing other  $\langle et, t \rangle$ -type denotations for DP-level gestures in the hope of making the cosupposition mechanism yield reasonable results, but we would keep running into the problem of unattested local accommodation interpretations.

We could also stipulate a ban on DP-level co-speech gestures altogether, but it is unclear how one would motivate such a constraint. First, this constraint would have to distinguish between gestural and non-gestural content in narrow syntax; in the next section I will talk about why this might be undesirable. Second, this narrow syntax constraint would have to be sensitive to linearization, which happens after narrow syntax, so we would be running into a look-ahead problem. The reason why this constraint would have to be sensitive to linearization is that, as Schlenker (2018a) argues, gestural appositives do exist. We have already seen an infelicitous example with one in (21); (22) is a felicitous version thereof.

- (22) If Stephanie’s bringing her dog, LARGE, we should get a bigger van.  
 → Stephanie’s dog is large.

Schlenker’s main argument for gestures such as in (22) being akin to appositives rather than presuppositions is that they seem to require discourse referents (see (16) for the relevant examples with appositives), as shown in (23) (in my experience, the judgements are somewhat gradient and variable, but in general, people do find such examples substantially degraded).

- (23) ??Stephanie didn’t bring a dog, LARGE.

Thus, we would have to say that gestures can in principle adjoin to DPs, but when they do, they must be linearized as having their own time slot. Perhaps, one could come up with a principled reason why that would happen, but let me suggest that we don’t even need to try.

#### 4.4. *Proposal: no gesture-specific compositionality*

In a series of recent presentations (Esipova 2017, 2018b,c) I have been promoting the idea that narrow syntax and semantics proper are modality-blind, i.e., when gestures integrate into a compositional structure, they do so in the same way as spoken content. In particular, gestural constituents can bear all and only syntactic labels spoken constituents can bear (i.e., no mysterious GestPs exist); they can merge at all and only sites where spoken constituents bearing the same syntactic labels can merge; they can semantically compose with other constituents in all and only ways available to spoken constituents, etc. Any modality-specific effects arise in phonology and its interfaces and in pragmatics and, due to their gradient and variable nature, are best captured via violable weighted constraints.

Here I will not rehash how a lot of empirical generalizations about gestures, including the ones made in Ebert & Ebert 2014; Schlenker 2018a, can be explained under this view (see my work cited at the beginning of this subsection for that). I will just point out that this view is very appealing conceptually. An alternative would be to allow for gesture-specific compositionality strategies, and it is unclear how they would emerge or be acquired, given that most children acquiring a spoken language likely don’t get a lot of gestural input. Instead, my view relies on the intuition that, when faced with iconic content-bearing gestures, speakers of a spoken language apply the general linguistic rules they have internalized mostly from spoken input to said gestures in a way that best fits their iconic content and what little morphosyntactic information they carry. Oftentimes, several possibilities for compositional

integration will be open for a given gesture, especially when it comes to co-speech gestures, whose level of adjunction in the syntax isn't always obvious from their temporal alignment.

Furthermore, a view that allows for gesture-specific compositionality would be hard to reconcile with any framework that relies on late lexical insertion, such as distributed morphology (Halle & Marantz 1993 et seq.), since one would need to know in advance if they are going to insert a spoken item from the lexicon or a gestural item, possibly created on the spot, into a given slot. My view is perfectly compatible with—and, in fact, favoring—late lexical insertion, the idea being that the output of narrow syntax is just a labeled hierarchical structure, the generation of which is not sensitive to whether the content that will be inserted at spell-out is spoken or gestural.

Now, the view I propose does not imply that no gesture-specific interpretation strategies exist at all, only that compositional integration of gestures happens in the same way as that of spoken content. It is quite possible that in many cases gestures co-occurring with some spoken content don't integrate with this content compositionally. It is also entirely plausible that humans are capable of simultaneously producing two compositionally independent utterances, in the spoken and in the gestural modality. The two can still interact at the level of prosody,<sup>16</sup> and we might still be able to establish some meaning correspondences between the two non-compositionally. However, one can't maintain that gestures never integrate compositionally into otherwise spoken utterances; compositional integration of gestures is required at the very least for restricting interpretations of co-speech gestures as well as for many cases of gestures with their own time slot (for the latter, I specifically have in mind what Schlenker (2018a) calls *pro-speech gestures*; see his paper for details).

Now, how does this general view apply to the gestural data at hand? Gestural adnominal content, just like spoken one, comes in two varieties: modifiers and supplements. This goes in line with the intuition that, being non-lexicalized and carrying little morphosyntactic information, the gesture LARGE, for example, can be taken to iconically represent either the property of being large (and, thus, being akin to the adjective *large*) or a large object (and, thus, being akin to the nominal appositive *a large animal*). Thus, in contexts supporting the projecting non-restricting interpretation, an adnominal gesture can be either a non-restricting modifier or a supplement. In contexts supporting the restricting interpretation, a gesture can only be a modifier. Neither strategy can yield a non-projecting non-restricting interpretation, because both supplements and non-restricting modifiers have to project.

At this point we predict gestures to pattern exactly like adjectives across the three interpretation types, which is not what we observed in section 4.1, nor in Esipova To appear. We still need to explain why restricting interpretations of gestures are degraded for many people. Under the view I propose this would not be due to any constraints in narrow syntax or semantics; the compositional mechanism allows for restricting interpretations of co-speech gestures. Instead, the degradedness will have to be due to some bias against restricting interpretations of gestures due to pragmatic or phonological considerations or both.

One potential explanation is following the intuition in Schlenker 2018a that there is a general pragmatic preference for co-speech gestures to be truth-conditionally vacuous, the idea being that when you have an expression in the primary (i.e., spoken) modality co-occurring with an expression in the secondary (i.e., gestural) modality, the latter should not be encod-

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<sup>16</sup>See, e.g., Loehr (2004) on alignment of spoken content and gestures, including non-content bearing ones.

ing anything affecting the truth conditions of the utterance. Restricting interpretations are truth conditionally non-vacuous, so such interpretations of gestures would be dispreferred.

A more involved explanation, relevant specifically for the data discussed here and in Esipova To appear, is that it's hard for vocal prosodic prominence to associate with co-speech gestures, once again the idea being that there is some competition between co-occurring spoken and gestural content in which the former has the priority. If it's hard to mark co-speech gestures as prosodically prominent, it will be hard to semantically focus them, which is necessary for the restricting interpretation in examples like (4b). The two explanations are not mutually exclusive, and both allow for gradience and variability, so both can be at play.

Note that both explanations suggest that there is a bias against restricting interpretations of co-speech gestures, but they don't apply to gestures that have their own time slot. I discuss why it might still be hard to get restricting interpretations of the latter in Esipova 2017, 2018c, and I won't rehash the discussion here.

## 5. Re-purposing cosuppositions

In the previous section I argued that co-nominal gestures can be either supplements or modifiers, but when they are modifiers, they are preferably non-restricting. As shown before, non-restricting modifiers contribute strongly projecting inferences about all the members of the input set. I will now talk about how Schlenker's cosuppositions can be re-purposed as a general, modality-neutral mechanism of generating these inferences.

Schlenker's original motivation for introducing cosuppositions as a mechanism of generating projecting inferences contributed by co-speech gestures was, in a way, very close to the one I pursued in the previous section. The idea was to start with conjunctive semantics for co-speech gestures, i.e., essentially, treat gestures as intersective modifiers. However, due to their secondary modality nature, co-speech gestures preferably shouldn't affect the truth conditions of the utterance. Cosuppositions were meant to capture that.<sup>17</sup>

The intuition I develop in the previous section is more fine-grained, however. I agree that there is a pressure for co-nominal gestures to be truth-conditionally vacuous, but how exactly it is assured is determined by the composition strategy selected for this specific occurrence of the gesture, which, in turn, is determined by whether this gesture is meant/interpreted to represent a property or an object that has this property. If the gesture represents an object, it is treated as a nominal, and the supplement strategy is used, which automatically assures that it does not affect the truth conditions. If the gesture represents a property, the modifier strategy is used, but then there is a preference for the gesture to be non-restricting (which can be overridden, to a varied extent). As a non-restricting modifier, a gesture contributes a projecting inference about all the members of the set denoted by the NP it adjoins to.

This projecting inference is generated by the same mechanism that generates such inferences for other non-restricting modifiers. Let me suggest that Schlenker's cosuppositions are a good candidate for such a mechanism, but an adjustment is needed for them to work properly in all cases. The cosupposition for *her dog*<sup>LARGE</sup> in (17) could also be the inference contributed by a non-restricting adjective *large* in *her large dog*. Note, however, that it is quite easy to assume that an iconic gesture LARGE denotes a set of individuals (namely, individuals roughly of the size indicated by the gesture) and combines with the NP it adjoins

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<sup>17</sup>I thank Philippe Schlenker (p.c.) for explaining this reasoning to me.

to via set intersection. It is much harder to argue that the adjective *large* denotes a set of individuals, since *large* is often sensitive to the NP it adjoins to. One standard way to handle this is to say that adnominal adjectives like *large* take the NP they adjoin to as an argument and return a set of individuals that measure in a certain way relative to the standard for the comparison set denoted by the NP. Similarly, non-intersective substantive adjectives like *skillful* are also often assumed to be functions from sets of individuals to sets of individuals.

Now, imagine we have a configuration where an  $\langle et, et \rangle$ -type adjective combines with an *et*-type NP, and we want the adjective to be non-restricting. The cosupposition mechanism can't apply in its present form, since the NP can't entail the adjective due to type mismatch. The issue might not arise for gestures, since due to their iconic nature and restricted space of possible meanings, it is easier to maintain that they always denote sets of individuals. However, if we want to re-purpose cosuppositions as a general mechanism generating projecting inferences of non-restricting modifiers, we need to deal with this issue.

I propose the following fix. Schlenker's cosuppositions of an  $[NP_2 [ModP] [NP_1]]$  configuration (where ModP is any modifier) have the form  $NP_1 \Rightarrow ModP$ . I suggest that they should instead have the form  $NP_1 \Rightarrow NP_2$ . In other words, when we have a non-restricting modifier, the constituent being modified should entail the result of modification, not the modifier. Assuming, as is standard, that both the NP being modified and the resulting NP are of type *et*, the type mismatch issue doesn't arise, regardless of the modifier's type. (24) exemplifies how this works for the NP *skillful cellist*, yielding the intuitively correct result that if *skillful* is non-restricting, we get an inference that in the local context of the whole NP, being a cellist entails being a skillful cellist. The exact lexical semantics of *skillful* doesn't matter here, I am just treating it as a relation between properties and individuals.

- (24) a.
- $$\begin{array}{c}
 NP_2 \\
 \lambda x.\text{skillful}(\text{cellist}, x) \\
 \swarrow \quad \searrow \\
 \begin{array}{cc}
 \text{AdjP} & NP_1 \\
 \text{skillful} & \text{cellist} \\
 \lambda P \lambda x.\text{skillful}(P, x) & \lambda x.\text{cellist}(x)
 \end{array}
 \end{array}$$
- b. cosupposition  $NP_1 \Rightarrow NP_2$ :  
 $\lambda x.\text{cellist}(x) \rightarrow \text{skillful}(\text{cellist}, x)$

If one wants to keep the semantics of some modifiers intersective, the resulting cosuppositions won't be affected by the change. For example, for *her dog*<sup>LARGE</sup> with the gesture intersectively composing with the NP *dog*, the cosupposition would be  $\lambda x.\text{dog}(x) \rightarrow (\text{dog}(x) \wedge \text{large}(x))$ , which is equivalent to  $\lambda x.\text{dog}(x) \rightarrow \text{large}(x)$ , which is what we had before.

More generally, this adjustment has the welcome consequence that the inner workings of the modifier and how it combines with the constituent it modifies don't matter, as long as the constituent being modified is of the same type as the result of modification. Furthermore, this formulation of cosuppositions matches the definition of non-restricting modifiers as modifiers whose compositional contribution is vacuous in a more intuitive way.

Note that the reformulation I propose is partially in line with the modality-neutral view of cosuppositions proposed by Schlenker himself in a later manuscript (2018b), although



the motivations, the specifics, and the ultimate outcomes are different. Schlenker (2018b: (67)) proposes that cosuppositions arise when an expression  $pp'$  has  $p'$  as an “unimportant entailment” and thus should be equivalent to  $p$  in its local context, i.e.,  $pp'$  and  $p$  should entail each other (from which it follows that  $p$  should entail  $p'$ , which is the original formulation of cosuppositions). However, this entailment-based view of cosuppositions still doesn’t extend to cases where  $pp'$  and  $p'$  don’t match in type. I instead link cosuppositions to a specific compositional configuration and don’t require any entailment relations between the modifier and either the modified constituent or the result of modification. Extending my view of cosuppositions to the cases discussed in Schlenker 2018b could be a matter of future research.

Now, how do cosuppositions relate to ordinary presuppositions? The term *presupposition* is often used broadly to describe any content that projects in a certain way or even any projective content that doesn’t obviously fall into any other category. The class of inferences referred to as presuppositions is not necessarily homogeneous in how these inferences arise, however. Under the view developed here, the question of how cosuppositions of non-restricting modifiers arise is trivial: they are simply a formalization of what it means to be non-restricting. The crucial question is why and how they project. As for why, cosuppositions of non-restricting modifiers project because otherwise these modifiers make no meaningful contribution. As for how, for now I am assuming Schlenker’s view that they need to be entailed by the local context of the modified constituent—which is a standard assumption about how presuppositions project. Of course, we still need to develop a principled algorithm for computing local contexts of non-restricting modifiers (this needs to be done regardless of the specific view on how cosuppositions arise). Work in this direction might reveal that we need to refine our understanding of how cosuppositions project.

What about local accommodation? For Schlenker local accommodation is a mechanism available to gestural cosuppositions as a subtype of presuppositions, by stipulation. The way it is operationalized is by conjoining the cosupposition to the spoken expression the gesture adjoins to. Remember that under this formulation, locally accommodating a cosupposition of an NP-level gesture simply yields an intersective interpretation:  $S \& (S \Rightarrow G)$ , which is equivalent to  $S \& G$ . The original reason to apply local accommodation was to get a restricting interpretation of the gesture, but under my analysis, NP-level gestures start out as restrictive modifiers, so they have the potential to be restricting to begin with. When they are restricting, the cosupposition won’t be generated in the first place, since it’s a property of non-restricting modifiers. Even if we were to apply local accommodation, which under the revised formulation of cosuppositions would correspond to conjoining the cosupposition to the result of modification,<sup>18</sup> it would not have any effect. For example, if we were to conjoin the cosupposition of *skillful cellist* to *skillful cellist*, we would get  $\lambda x.\text{skillful}(\text{cellist}, x) \wedge (\text{cellist}(x) \rightarrow \text{skillful}(\text{cellist}, x))$ , which is equivalent to  $\lambda x.\text{skillful}(\text{cellist}, x)$ .

But now that we have disposed of local accommodation as a meaningful notion for cosuppositions, could we try to revive the reductionist idea at the end of section 4.3.3 and apply the cosupposition mechanism to DP-level adjuncts? The answer is no, since it wasn’t local accommodation per se that was causing problems in (20), but rather conjoining DP-level gestures with the DPs they are adjoining to. If we were to extend the reasoning above to

<sup>18</sup>We don’t want to conjoin it to the NP being modified, because for  $\langle et, et \rangle$ -type modifiers we would end up with a configuration in which a modifier takes an argument that contains this modifier.

DP-level adjuncts, we would have to posit restrictive modifier semantics for them, which simply doesn't seem to be a licit composition strategy for DP-level adjuncts.

## 6. *Phi*-features on pronouns

Let us now talk about *phi*-features on pronouns. In section 2 I made an empirical observation, illustrated in (5) and repeated in (25) without the extralinguistic contexts, that inferences contributed by *phi*-features on pronouns project in a way similar to inferences contributed by non-restricting adnominal modifiers (adjectives and co-nominal gestures).

- (25) a. ***Projecting non-restricting***  
 I don't know if it was Lucius or Bellatrix<sub>*i*</sub> who cast the curse, but if **she<sub>*i*</sub>** cast it, the victim is unlikely to recover.  
 → Bellatrix is female.
- b. ***Non-projecting non-restricting***  
 #I don't know the gender of [the person who cast the curse]<sub>*i*</sub>, but if **she<sub>*i*</sub>** cast it, the victim is unlikely to recover.  
 Intended: '...if (*x<sub>i</sub>* is female and *x<sub>i</sub>* cast it)...

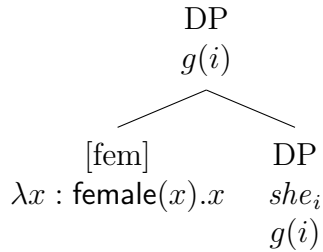
In this section I am going to argue that this similarity obtains because *phi*-features on pronouns are in fact non-restricting modifiers, but the non-restricting interpretation is obligatory for them due to how denotations of pronouns are built. A welcome consequence of this analysis is that we no longer have to stipulate that *phi*-features on pronouns trigger presuppositions, nor explain why those purported presuppositions are strong. Also, we don't have to assume any new, non-standard composition strategies for *phi*-features on pronouns. Finally, the analysis I propose is more morphosyntactically plausible than the existing alternatives.

### 6.1. Presuppositional analyses of *phi*-features

Projecting inferences of *phi*-features on pronouns have been traditionally analyzed as presuppositions. Below I review two representative analyses within the presuppositional approach.

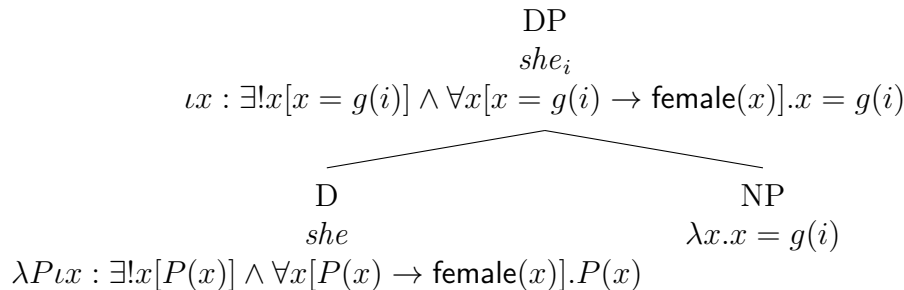
In Heim & Kratzer 1998 (also, e.g., Cooper 1983; Sudo 2012), the pronoun starts out as an index variable of type *e* whose value is supplied by the assignment function. *Phi*-features then merge one by one and check their respective presuppositions about the value of this variable. If its presupposition is satisfied, the feature passes this value on; if it isn't, the feature returns a failure. In (26) I provide Heim & Kratzer's structure for *she* (for simplicity, I only include the gender feature; their treatment of number and person is analogous).

- (26) Pronouns in Heim & Kratzer 1998



Elbourne (2005) treats pronouns as definite descriptions, which have an *et*-type NP layer. Not all pronouns bear indices in Elbourne’s analysis, but in those that do, the NP denotes the property of being the value of the pronoun’s index.<sup>19</sup> This NP combines with a determiner that is similar to the definite article, but comes with additional presuppositions contributed by the *phi*-features. Elbourne further assumes that in English pronouns, the NP doesn’t have an overt exponent, and morphemes like *she* spell out the determiner. Elbourne’s structure for an indexed *she* is given in (27) (again, I only include gender).

(27) Indexed pronouns in Elbourne 2005



There are several issues with the two analyses of *phi*-features on pronouns above.

First, if *phi*-features are presupposition triggers, they have to be “strong”, in the sense that the inferences they trigger cannot be locally accommodated, even under maximal pressure, as shown in (25b). Much of the presupposition literature explicitly or implicitly assumes that why some expressions trigger presuppositions in the first place, as well as how strong those presuppositions are, is determined lexically. The literature that does try to come up with a principled triggering algorithm (see Abrusán 2011 for an overview as well as one of the proposals) typically targets weak triggers (usually by design). Strong triggers thus remain a mystery. Either one needs to explain why a given triggering algorithm cannot be undone for such triggers or we should just give up on non-lexical triggering algorithms for strong triggers and assume that their presuppositions are purely lexical. The latter option is particularly vexing in the case of *phi*-features, since it is entirely unclear then why languages systematically divide the lexical content of pronouns into at-issue and presuppositional in the same way, i.e., with the index being at-issue but the featural content being presupposed.

Second, the composition strategy used by the feature in (26) is an unusual one. Do we have adnominal content other than *phi*-features that only checks presuppositions? If we don’t, then, all other things being equal, an analysis that doesn’t have to posit a new composition strategy to handle *phi*-features will have an edge over an analysis that does.

Elbourne’s analysis doesn’t run into this issue, but only because he doesn’t put *phi*-features into separate projections in the syntax in the first place, instead lumping them all in D. This is incompatible with any framework that builds words in the syntax, such as Distributed Morphology (Halle & Marantz 1993 et seq.), given that in many languages pronouns are morphologically complex. Heim & Kratzer’s analysis does posit separate projections for *phi*-features, but it is morphosyntactically implausible for a different reason.<sup>20</sup> There have

<sup>19</sup>I am simplifying Elbourne’s treatment of indices in a way that is not crucial for anything here.

<sup>20</sup>It’s also unlikely that *phi*-features are DP-level adjuncts, which is also why I am not proposing to treat them as supplements. But the labels in (26) are not a crucial part of Heim & Kratzer’s analysis.

been arguments in the literature that pronouns do need an *et*-type layer going back as early as Postal 1966. Some recent striking evidence of this kind comes from Lee’s 2019 work on Khoekhoe pronouns, which can be modified by *et*-type properties, including compositionally complex ones, wedging between the morpheme realizing person and those realizing gender and number, as shown in (28). Note also that the data like in (28) would be hard to reconcile with an Elbourne-style view whereby all featural content of a pronoun is in D.

- (28)     $s\acute{a}\ddot{a}\text{-}\#^h\acute{u}p\acute{\imath}\chi\ddot{a}\text{-}n\grave{a}m\acute{a}\text{-}t\text{-}\acute{o}$   
           2-loud-Nama-MIX-PL  
           ‘you loud Namas (men and women, more than 2)’ (Khoekhoe)

To sum up, a morphosyntactically plausible structure for pronouns is one where (i) pronouns have an *et*-type layer, and (ii) *phi*-features have their own projections within this layer.

## 6.2. Proposal: *phi*-features as obligatorily non-restricting modifiers

I propose that we can avoid all the issues above and have a conceptually appealing and morphosyntactically plausible analysis of *phi*-features on pronouns by treating them as obligatorily non-restricting modifiers. The reason why *phi*-features are always non-restricting is that they always modify the Elbourne-style property of being the value of the pronoun’s index, whose extension is a singleton set (containing one individual, atomic or plural). After all the *phi*-features have merged, a determiner applies to the resulting set and returns the individual in it, which is the value of the index. Thus, the internal composition of pronouns resembles that of other nominals much more closely: they start out as *et*-type properties, can be modified as such,<sup>21</sup> and finally combine with a determiner yielding an individual.

This composition is exemplified in (29) for the English pronoun *she* (once again, for now I am only showing how things work for gender). I am assuming intersective composition of the feature and the property it merges with for simplicity. I’m also agnostic about the labels and the morphosemantic mapping within a pronoun, i.e., which morpheme spells out which part of meaning; as long as the types work out, any specific analysis works for my purposes.

- (29)
- $$\begin{array}{c}
 she_i \\
 \iota x.\text{female}(x) \wedge x = g(i) \\
 \swarrow \quad \searrow \\
 \lambda P.\iota x.P(x) \quad \lambda x.\text{female}(x) \wedge x = g(i) \\
 \quad \quad \quad \swarrow \quad \searrow \\
 \quad \quad \quad [fem] \quad \lambda x.x = g(i) \\
 \quad \quad \quad \lambda x.\text{female}(x)
 \end{array}$$

Now, if the value of *i* isn’t female, the input of the determiner will be the empty set, and the iota operator will fail to produce an output. Thus, the feature has to be non-restricting.

<sup>21</sup>Language-specific restrictions on how pronouns can be modified could come from which lexical items a given language has to spell out which chunks of structure. For example, if English *she* can only spell out an uninterrupted structure consisting of the property of being the index value and all the relevant *phi*-features, no additional modifiers will be allowed, since there will be no way to spell out the resulting structure.

As any other non-restricting modifier, it then contributes a projecting inference about all the individuals in the input set. Cosuppositions yield a decent result here, too; in (29), the cosupposition would be  $\lambda x.x = g(i) \rightarrow (\text{female}(x) \wedge x = g(i))$ , which is equivalent to  $\lambda x.x = g(i) \rightarrow \text{female}(x)$ . As things stand, this inference will project like other cosuppositions, i.e., it will need to be entailed by its local context. It is unclear, though, how sensitive gender inferences actually are to local contexts. Yet, this question arises for the presuppositional analysis, too. Sudo (2012) has a relevant discussion; I won't add anything to it here.

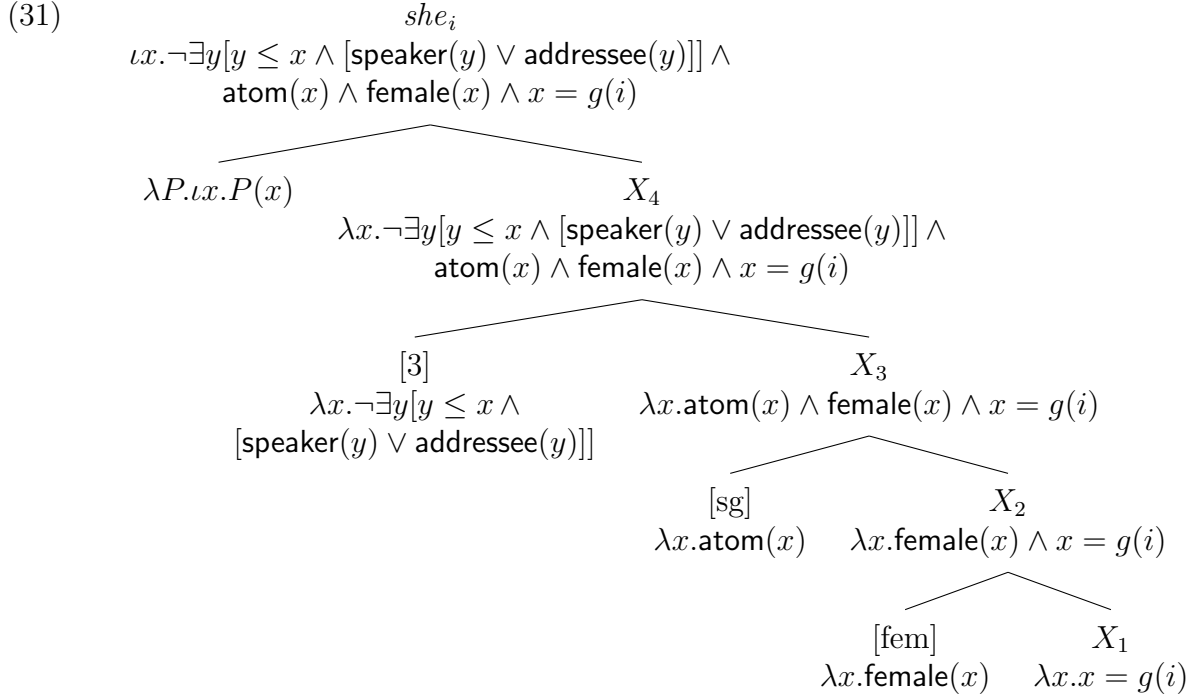
Note that there is an additional difference between my analysis and Elbourne's. Elbourne adds presuppositions of existence and uniqueness to the denotation of the pronoun determiner. He does that, because for him not all pronouns bear indices, and the property the determiner combines with can be some contextually salient property, thus, the pronoun determiner should maximally resemble the definite article. I do not make this assumption, and, thus, I don't need to add existence or uniqueness presuppositions to the denotation of the determiner in (29). A separate uniqueness requirement isn't needed, since the uniqueness of the output individual is assured by it being identical to the value of the index. One might think that the existence presupposition would be helpful in assuring the projection of the inferences contributed by the *phi*-features. For example, in (29), it would require that a female individual identical to the index value exists, and this inference would project, since it's a presupposition. However, I don't need that; that the individual in question exists is assured by the mechanics of the iota operator, and the projection of the gender inference is assured because the gender feature is a non-restricting modifier.

In fact, making the projection of featural inferences of pronouns an epiphenomenon of the projection of a definite-like existence inference would be empirically problematic. Existence inferences of definites are not as strong as gender inferences of pronouns, as shown in (30). As things stand, the failure of the iota operator to return an output in (29) is irredeemable. Adding an existence presupposition should allow for local accommodation thereof, as seems to be the case in (30a), but this option doesn't seem to be available in (30b).

- (30) a. The queen of Hungary didn't come to the party, because there is no queen of Hungary.  
 $\approx$  'It's not the case that (there exists a queen of Hungary and the queen of Hungary came to the party)...'
- b. A: What about Skyler<sub>i</sub>? Did she<sub>i</sub> come to the party?  
 B: #She<sub>i</sub> didn't come to the party, because he<sub>i</sub> is not a woman.<sup>22</sup>  
 Intended: 'It's not the case that (there exists a female  $x_i$  and the female  $x_i$  came to the party)...'

Now, let me add a quick note on number and person. They are meant to work in the same way as gender, as shown in (31) ( $\leq$  stands for 'is a mereological part of'); the cosuppositions are computed for each modifier:  $X_1 \Rightarrow X_2$ ,  $X_2 \Rightarrow X_3$ , and  $X_3 \Rightarrow X_4$ . The details might need to be refined (for example, one might want to split person into  $[\pm\text{speaker}]$  and  $[\pm\text{addressee}]$  or alter the lexical entries for some features), but I believe (31) to be a viable rough sketch.

<sup>22</sup>I come back to the issue of metalinguistic focus improving such examples in section 8. Note, however, that focus on *the* in (30a) is not necessary for local accommodation of the existence presupposition to obtain; in fact, metalinguistic focus on *the* can only target the uniqueness inference.



## 7. Height specifications on co-verbal gestures

The last type of content left to discuss is height specifications on co-verbal gestures. I am repeating (6) illustrating the crucial relevant contrast in (32).

- (32) *Context: Zoe is a stuntwoman. The crew just filmed a scene in which Zoe was punching an extra while the director of the movie Uma was away.*
- a. **Projecting non-restricting or restricting:** *Uma knows who the extra was and that he is much taller than Zoe. Uma originally wanted Zoe to punch him in the face, not in the sternum. Uma says:*  
 If Zoe punched him<sup>PUNCH-[HIGH]<sub>F</sub></sup>, that's OK, but if she punched him<sup>PUNCH-[LOW]<sub>F</sub></sup>, we'll have to reshoot the scene.  
 → The extra's face is higher than Zoe's face; his sternum is at Zoe's face level.
- b. **Non-projecting non-restricting:** *Uma doesn't know who the extra was, but she knows that he was punched in the face, and she originally wanted the extra to be much taller than Zoe. Uma says:*  
 %??If Zoe punched him<sup>PUNCH-[HIGH]<sub>F</sub></sup>, that's OK, but if she punched him<sup>PUNCH-[LOW]<sub>F</sub></sup>, we'll have to reshoot the scene.  
 Intended: '...if (his face is ⟨higher than Zoe's face, at Zoe's face level⟩ and Zoe punched him)...

Schlenker & Chemla (2018) draw parallels between height specifications on verbal gestures that have their own time slot and *phi*-features on pronouns (as well as height specifications on ASL signs). The contrast in (6) is in line with this comparison (once again, I believe there is no difference between co-verbal gestures and verbal gestures with their own time

slot in this respect), however, Schlenker & Chemla assume a presuppositional analysis for both. Naturally, treating height specifications on gestures as presupposition triggers raises the same question of how these presuppositions are triggered and why they resist local accommodation (although some people find (32b) marginally acceptable, which I come back to at the end of this section). Instead, I suggest extending the modifier analysis to height specifications on gestures by assimilating them to *phi*-features on pronouns or to adjectives.

The most straightforward way to do so is to say that the gestures in (32) contain incorporated nominal arguments specifying the area of contact of the punching movement (akin to *in the face* and *in the sternum*, but without the assumption that there is a PP layer in the syntax). The height specifications on the gestures then modify these arguments. The rest depends on what exactly the nature of these arguments is.

We could say that the incorporated arguments in (32) are essentially pronouns, standing for the extra's face ( $x_i$ ) and sternum ( $x_j$ ). Then the analysis of height specifications would be the same as for *phi*-features on pronouns. For example, the denotation of the "face" argument in (32a) would be  $\iota x.\text{high}(x) \wedge x = g(i)$ , and we would get a projecting inference that the extra's face is located high(er than Zoe's face). In (32b) the inferences of the height specifications on the gestures can't project, given the context, so a failure obtains.

Alternatively, we could argue that the incorporated arguments in (32) are more like ordinary definite descriptions, with a vague-ish, contextually determined descriptor (e.g.,  $\iota x.\text{high}(x) \wedge \text{body-part}(x)$ ). The height specifications in (32a) would then be restricting modifiers, just like the adjective *large* in (2b) or the gesture *LARGE* in (4b). Height specifications in (32b) would be non-restricting modifiers (as there is only one relevant body part), but since they can't project in the context, (32b) would fail for the same reason as (7c).

Can we distinguish between these two options? A possible direction would be to compare the behavior of height specifications on co-verbal gestures under ellipsis and *only* to that of *phi*-features on pronouns and ordinary non-restricting modifiers, spoken and gestural. Schlenker & Chemla (2018) claim that both height specifications on gestures and *phi*-features on pronouns can be ignored in these environments. For example, under the sloppy readings of the examples in (33), the inferences that arise for Zoe don't arise for Skyler.

- (33) *Context: Zoe and Skyler are practicing face punches with sparring partners.*
- a. Zoe<sub>i</sub> punched<sup>PUNCH-HIGH</sup> her<sub>i</sub> sparring partner, but Skyler didn't.
  - b. Only Zoe<sub>i</sub> punched<sup>PUNCH-HIGH</sup> her<sub>i</sub> sparring partner.
- For (a,b):  $\nrightarrow$  Skyler's sparring partner's face is higher than Skyler's.  
For (a,b):  $\nrightarrow$  Skyler is female.

It seems that non-restricting modifiers, both spoken and gestural, can at least sometimes be ignored under ellipsis and *only*, too, as shown in (34). However, these judgements are often more gradient and variable, and ultimately, we would want to obtain quantitative data on all the four types of content to see if height specifications on co-verbal gestures pattern more with *phi*-features on pronouns or with ordinary non-restricting modifiers.

- (34) *Context: Stephanie and Lucy went to the same party yesterday.*
- a. Stephanie brought her ginormous dog to the party, but Lucy didn't.
  - b. Only Stephanie brought her ginormous dog to the party.

- c. Stephanie brought her dog<sup>LARGE</sup> to the party, but Lucy didn't.
- d. Only Stephanie brought her dog<sup>LARGE</sup> to the party.  
 For (a-d): → Lucy has a dog.<sup>23</sup>  
 For (a-d): ?% ↯ Lucy's dog is large.

Now, why is (32b) marginally acceptable for some people? The construal under which the gestures in (32) contain incorporated nominal arguments doesn't have to be the only one available. It might be possible, at least for some people, to construe the gestures in (32) as containing no nominal arguments whatsoever with the height specifications being adverbials specifying the direction of motion (akin to *upwards* and *forwards*). Under this construal, the height specifications in both examples in (32) would be restricting adverbial modifiers and should be acceptable. Because the contrast in (32) still obtains, either this construal is dispreferred for some reason, or there is an independent reason why (32b) is still degraded under this construal. I leave this issue for future research.

## 8. Some open questions

Before I wrap up, let me briefly raise two questions that should be addressed in more detail in future research. One question is whether the composition-driven reductionist approach to projection I have been arguing for in the nominal domain can be extended to the verbal domain. The other question has to do with how some types of focus interact with projection.

### 8.1. Composition and projection in the verbal domain

Throughout this paper I have argued that projection of adnominal content is either projection of supplements (for DP-level adjuncts) or projection of non-restricting modifiers (for content merging with *et*-type constituents). Is something similar happening in the verbal domain? This question is first and foremost motivated by the observation in Schlenker 2018a that co-verbal gestures also give rise to projecting inferences, as in (35).

- (35) *Context: Zoe is taking part in a shooting competition.*

If Zoe hits the bullseye every time she shoots<sup>Longbow</sup>, I'll give you \$10.  
 → Zoe will be shooting a longbow.



Schlenker claims co-verbal gestures trigger cosuppositions, just like co-nominal gestures, but doesn't say much about how that relates to their compositional integration. Under the analysis developed in this paper, co-nominal gestures tend to contribute projecting inferences because they are either supplements or preferably non-restricting modifiers. To maintain a

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<sup>23</sup>I include this inference to show that some lexical presuppositions cannot be ignored under ellipsis and *only*. Schlenker & Chemla (2018) note this, too. Here is another example of that (modulo local accommodation, in which case the presupposition isn't ignored, but rather is interpreted locally):

- (ii) a. Jackie stopped smoking, but Daisy didn't.  
 → Daisy used to smoke.
- b. Out of these five women, only Jackie stopped smoking.  
 → Each of these five women used to smoke.



unified theory of co-speech gestures, I would have to show how this story extends to co-verbal gestures. Here I will not develop a full account, but will outline a direction for such.

First, a similar empirical observation can be made for co-verbal gestures as for co-nominal gestures: co-verbal gestures can (marginally) be restricting, but when they are non-restricting, their contributions have to project, as shown in (36).

- (36) *Context: Zoe is taking part in an athletic competition.*
- a. **Projecting non-restricting:** *Participants first shoot a longbow and then swim a mile.*  
 If Zoe hits the bullseye every time she [shoots]<sub>F</sub><sup>LONGBOW</sup>, I'll give you \$10. I won't be betting on her [swimming]<sub>F</sub>, though.  
 → Every time Zoe shoots, she will be shooting a longbow.
  - b. **Restricting:** *Participants first shoot a longbow and then a gun.*  
 %If Zoe hits the bullseye every time she shoots<sup>[LONGBOW]<sub>F</sub></sup>, I'll give you \$10. I won't be betting on her [gun]<sub>F</sub> shooting, though.  
 ↗ Every time Zoe shoots, she will be shooting a longbow.
  - c. **Non-projecting non-restricting:** *Participants choose if they are going to shoot a longbow or a gun.*  
 #If Zoe hits the bullseye every time she shoots<sup>[LONGBOW]<sub>F</sub></sup>, I'll give you \$10. I won't be betting if she chooses to shoot a [gun]<sub>F</sub>, though.  
 Intended: 'If (every time Zoe shoots, she will be shooting a longbow, and she hits the bullseye every time she shoots a longbow)...'

It stands to reason that at least in (36b) the gesture LONGBOW is modifying a property of events (type *vt*). That is, it takes a set of shooting events and gives back a set of shooting events whose theme is a longbow. The exact syntax of this configuration doesn't matter that much, especially under the Neo-Davidsonian assumption that verbal arguments (which are obligatory) and adjuncts (which are optional) both denote sets of events combining with other sets of events. For example, LONGBOW can be construed as a direct object argument akin to *a longbow* or as a VP-level adjunct akin to *by shooting a longbow*; compositionally speaking, there will be no difference within the Neo-Davidsonian framework.

If the modifier composition strategy is available to co-verbal gestures, the same reasoning can apply to them as to co-nominal modifiers: they prefer to be non-restricting, and when they are, their contributions have to project, which can be operationalized via the cosupposition mechanism. For example, if the gesture LONGBOW is a modifier in (36a), its cosupposition would eventually be something like  $\lambda e.\text{shoot}(e) \rightarrow \text{longbow}(\text{theme}(e))$ , which would need to be satisfied in the local context (the set of events whose agent is Zoe).

Now, is there anything akin to the supplement strategy in the verbal domain? Appositive relative clauses can certainly have verbal projections of seemingly different sizes as anchors. For example, it looks like in (37a) the appositive's anchor is the event of the roof collapsing while in (37b) it is a property of events, namely, the set of marathon running events.

- (37) a. The roof collapsed, which injured several people.  
 b. Zoe ran a marathon, which is not an easy thing to do.

Schlenker 2018a argues that gestural appositives exist in the verbal domain as well. For

example, (38) seems to be degraded, arguably because the gestural appositive fails to find an event anchor (in my experience, the judgements are somewhat gradient and variable, but in general, people do find such examples degraded).

- (38) a. Zoe shot the target, Longbow.  
 b. ??Zoe didn't shoot the target, Longbow.

Thus, it looks like both the modifier and the supplement strategies exist in the verbal domain, and both spoken and gestural content makes use of them. However, further research is needed on the precise syntax-semantics mapping for modifiers and supplements in the verbal domain.

## 8.2. Complications caused by focus

When studying projection, one must be wary of potential effects of different types of focus.

One case of interest is so-called *metalinguistic*, or *corrective focus*. Most types of content I have discussed in this paper (with the exception of, perhaps, appositives) can be targeted by metalinguistic focus resulting in what on the surface looks like non-projecting non-restricting interpretations of this content, as exemplified in B's responses in (39).

- (39) a. A: Stephanie brought her ginormous dog to the party.  
 B: Stephanie didn't bring her **ginormous** dog—her dog is **average**-sized!  
 b. A: Stephanie brought her dog<sup>LARGE</sup> to the party.  
 B: Stephanie didn't bring her **dog**<sup>LARGE</sup>—her dog is of **this**<sup>SMALL</sup> size!  
 c. A: What about Skyler<sub>i</sub>? Did she<sub>i</sub> come to the party?  
 B: **She**<sub>i</sub> didn't come to the party, because **he**<sub>i</sub> is not a woman.  
 d. A: Zoe punched<sup>PUNCH-HIGH</sup> the extra.  
 B: Zoe didn't **punch** him<sup>PUNCH-HIGH</sup>—the guy is shorter than her!

The cases above don't have to be viewed as counterexamples to the observation that inferences contributed by the content above have to project, since they can be analyzed under a general assumption that the focus in them is targeting the form, not the content of the expressions (see, e.g., Li 2017 for a recent version of such an analysis). That is not to say that the question of how such analyses extend to gestural content is not an interesting one. Furthermore, there is a methodological benefit in understanding what licenses metalinguistic focus, so as to be able to distinguish cases thereof from cases of bona fide non-projection.

Note that metalinguistic focus on modifiers in the examples above certainly doesn't force restricting interpretations of those modifiers either. While this might not be a particularly fair counterexample to the claim in Umbach 2006 and Leffel 2014 that focus does force restricting interpretations of modifiers, the following case might be more interesting:

- (40) *Context: The speaker believes that whenever a large and a small dog find themselves in the same room, they fight.*  
 If Stephanie brings her **ginormous** dog to the party, and Lucy brings her **miniscule** dog, they'll fight.

At least some people find the example in (40) acceptable in a context in which Stephanie and Lucy only have one dog each, and the inferences about their sizes project. If the two

adjectives operate on the sets of Stephanie’s dogs and Lucy’s dogs, respectively—which is an assumption I have been making throughout the paper—this is a bona fide counterexample to the claim that focus always forces restricting interpretations of modifiers. This is in line with the stance I took regarding examples like (40) in Esipova 2018a, where I claim that such focus only marks the contrast between two expressions, but doesn’t relate to any QUD.

An alternative is that in (40) the modifiers are combining with larger sets, for example, the set of all dogs, and are, thus, restricting. If that’s the case, however, it is entirely puzzling why the inferences about the sizes of Stephanie’s and Lucy’s dogs still project. Clearly, more research is needed to figure out what’s going on in examples like (40).

## 9. Conclusion

In this paper I have argued for a composition-driven reductionist approach to projection of adnominal content, both spoken and gestural. I have proposed that two composition strategies exist for such content, the modifier strategy and the supplement strategy, which also determine how a given piece of content projects.

The modifier strategy is used within NPs. Modifiers take *et*-type sets as input and return subsets thereof. When the set returned by a modifier is equivalent to the input set, the truth conditional contribution of the modifier is vacuous, and a general pragmatic mechanism generates a strongly projecting inference about all the members of the input set. I have suggested that Schlenker’s (2018a) cosuppositions, which he proposed to account for inferences of co-speech gestures, can be used as such a general, modality-neutral mechanism.

The supplement strategy is used by DP-level adjuncts, in particular, adnominal appositives. Supplements don’t operate on sets and thus can’t possibly restrict them. Instead, they contribute propositional content about the individual anchor they adjoin to. Furthermore, supplements have to project, which can be implemented in various ways. I have not proposed a new way to do so, but I have argued that extending the cosupposition mechanism to account for projection of supplements doesn’t seem to be plausible.

I have further proposed that adnominal adjectives, *phi*-features on pronouns, and height specifications on co-verbal gestures all use the modifier strategy. The crucial difference between adjectives and *phi*-features is that the former can be restricting while the latter are obligatorily non-restricting, for configurational reasons. This explains why *phi*-features project so strongly without stipulating that they trigger strong presuppositions lexically or assuming any non-standard composition strategies; this analysis is also consistent with morphosyntactic evidence about composition of pronouns. I have further suggested that height specifications on co-verbal gestures can be assimilated to either *phi*-features on pronouns or adjectives, but further work is needed to distinguish between these two possibilities.

I have also argued that both the modifier and the supplement strategies are available to co-nominal gestures, but when they are modifiers, they prefer to be non-restricting, which explains the tendency for co-nominal gestures to make projecting contributions. Thus, we don’t need any gesture-specific composition strategies or projection mechanisms.

One major direction for further research would be to extend this composition-driven reductionist approach to projection in the verbal domain.

## References

- Abrusán, Márta. 2011. Predicting the presuppositions of soft triggers. *Linguistics and Philosophy* 34(6). 491–535. doi:10.1007/s10988-012-9108-y.
- AnderBois, Scott, Adrian Brasoveanu & Robert Henderson. 2013. At-issue proposals and appositive impositions in discourse. *Journal of Semantics* 32(1). 93–138. doi:10.1093/jos/fft014.
- Carlson, Gregory N. 1984. Thematic roles and their role in semantic interpretation. *Linguistics* 22(3). 259–280. doi:10.1515/ling.1984.22.3.259.
- Chemla, Emmanuel & Lewis Bott. 2013. Processing presuppositions: Dynamic semantics vs pragmatic enrichment. *Language and Cognitive Processes* 28(3). 241–260. doi:10.1080/01690965.2011.615221.
- Cooper, Robin. 1983. *Quantification and syntactic theory*. Dordrecht: Reidel.
- Ebert, Cornelia. 2017. Co-speech vs. post-speech gestures. Talk given at *Language and cognition workshop in memory of Peter Bosch*, Osnabrück, February.
- Ebert, Cornelia & Christian Ebert. 2014. Gestures, demonstratives, and the attributive/referential distinction. Talk given at *Semantics and Philosophy in Europe (SPE 7)*, Berlin, June.
- Elbourne, Paul D. 2005. *Situations and individuals*. Cambridge, MA: MIT Press.
- Esipova, Maria. 2017. Co- and post-speech gestures: A prosody/syntax approach. Talk given at the workshop *Week of Signs and Gestures*, University of Stuttgart. [http://esipova.net/files/esipova-stuttgart2017\\_slides.pdf](http://esipova.net/files/esipova-stuttgart2017_slides.pdf).
- Esipova, Maria. 2018a. Focus on what’s not at issue: Gestures, presuppositions, supplements under contrastive focus. In Uli Sauerland & Stephanie Solt (eds.), *Proceedings of Sinn und Bedeutung 22*, 385–402. Berlin: Leibniz-Centre General Linguistics.
- Esipova, Maria. 2018b. Gestural adjuncts at the interfaces. Poster presented at the workshop *Linguistic Explorations Beyond Language*, University of Crete. [http://esipova.net/files/esipova-creteling2018\\_poster.pdf](http://esipova.net/files/esipova-creteling2018_poster.pdf).
- Esipova, Maria. 2018c. Gestures at the interfaces. Talk given at the workshop *Foundational Topics in Semantics*, New York University. [http://esipova.net/files/esipova-ftis2018\\_slides.pdf](http://esipova.net/files/esipova-ftis2018_slides.pdf).
- Esipova, Maria. To appear. Acceptability of at-issue co-speech gestures under contrastive focus. *Glossa: A Journal of General Linguistics*. <https://ling.auf.net/lingbuzz/004268>.
- Halle, Morris & Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In Kenneth Hale & S. Jay Keyser (eds.), *The view from building 20*, 111–176. Cambridge, MA: MIT Press.
- Heim, Irene. 1983. On the projection problem for presuppositions. In Michael Barlow, Daniel Flickinger & Michael Wescoat (eds.), *Proceedings of the Second West Coast Conference on Formal Linguistics*, 114–125.
- Heim, Irene & Angelika Kratzer. 1998. *Semantics in generative grammar*. Oxford: Blackwell.
- Jasinskaja, Katja & Claudia Poschmann. 2018. Attachment in syntax and discourse: towards an explanation for the variable scope of non-restrictive relative clauses. Poster presented at *Semantics and Linguistic Theory (SALT) 28*.
- Koev, Todor. 2013. *Apposition and the structure of discourse*: Rutgers University disserta-

- tion.
- Lee, Naomi. 2019. Khoekhoe pronominal morphosyntax: Gender on Root-attached little *n*. Talk given at *The 93rd Annual Meeting of the LSA*, New York City.
- Leffel, Timothy. 2014. *The semantics of modification: Adjectives, nouns, and order*. New York University dissertation.
- Li, Haoze. 2017. Semantics of metalinguistic focus. In Alexandre Cremers, Thom van Gessel & Floris Roelofsen (eds.), *21st Amsterdam Colloquium*, 345–354.
- Loehr, Daniel P. 2004. *Gesture and intonation*. Georgetown University dissertation.
- Parsons, Terence. 1990. *Events in the semantics of English*. Cambridge, MA: MIT Press.
- Postal, Paul. 1966. On so-called pronouns in English. In Francis P Dinneen (ed.), *Report on the 17th Annual Round Table Meeting of Language and Linguistics Studies*, 177–206. Washington, D.C.: Georgetown University Press.
- Potts, Christopher. 2005. *The logic of conventional implicatures*. Oxford University Press.
- R Core Team. 2018. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing Vienna, Austria. <https://www.R-project.org>.
- Roberts, Craige. 1996/2012. Information structure: Towards an integrated formal theory of pragmatics. *Semantics and Pragmatics* 5(6). 1–69. doi:10.3765/sp.5.6.
- Schlenker, Philippe. 2009. Local contexts. *Semantics and Pragmatics* 2(3). 1–78. doi:10.3765/sp.2.3.
- Schlenker, Philippe. 2013. Supplements without bidimensionalism. Ms., Institut Jean-Nicod and New York University. <http://www.semanticsarchive.net/Archive/jgwMjNmM/>.
- Schlenker, Philippe. 2018a. Gesture projection and cosuppositions. *Linguistics and Philosophy* 41(3). 295–365. doi:10.1007/s10988-017-9225-8.
- Schlenker, Philippe. 2018b. Iconic presuppositions. Ms., Institut Jean-Nicod and New York University. <https://ling.auf.net/lingbuzz/004116>.
- Schlenker, Philippe. To appear. The semantics and pragmatics of appositives. In Lisa Matthewson, Cécile Meier, Hotze Rullmann & Thomas Ede Zimmermann (eds.), *Blackwell companion to semantics*, Wiley. <http://ling.auf.net/lingbuzz/002538>.
- Schlenker, Philippe & Emmanuel Chemla. 2018. Gestural agreement. *Natural Language & Linguistic Theory* 36(2). 587–625. doi:10.1007/s1104.
- Sudo, Yasutada. 2012. *On the semantics of phi features on pronouns*. Massachusetts Institute of Technology dissertation.
- Tieu, Lyn, Robert Pasternak, Philippe Schlenker & Emmanuel Chemla. 2017. Co-speech gesture projection: Evidence from truth-value judgment and picture selection tasks. *Glossa: A Journal of General Linguistics* 2(1). 102. doi:10.5334/gjgl.334.
- Tieu, Lyn, Robert Pasternak, Philippe Schlenker & Emmanuel Chemla. 2018. Co-speech gesture projection: Evidence from inferential judgments. *Glossa: A Journal of General Linguistics* 3(1). 109. doi:10.5334/gjgl.580.
- Umbach, Carla. 2006. Non-restrictive modification and backgrounding. In Beáta Gyuris, Kálmán László, Cristoph Piñón & Károly Varasdi (eds.), *Proceedings of the Ninth Symposium on Logic and Language*, 152–159. Budapest: Hungarian Academy of Sciences.
- Wang, Linton, Brian Reese & Eric McCready. 2005. The projection problem of nominal appositives. *Snippets* 10(1). 13–14.