Composition determines projection across modalities

Overview  The current consensus in the literature is that the content contributed by gestures co-occurring with speech, *co-speech gestures*, as in (1), tends to project from under semantic operators (e.g., Ebert & Ebert 2014; Tieu et al. 2017, 2018; Schlenker 2018).

(1) If Stephanie’s bringing *[dog]*$_{\text{LARGE}}$, we should get a bigger van.$^1$

→ Stephanie’s dog is large.

But there is no consensus on what assures said projection. Ebert & Ebert (2014) claim that co-speech gestures are akin to appositives and project as such. Schlenker (2018) argues that co-speech gestures trigger special presuppositions, *cosuppositions*. I show that neither analysis can on its own account for all (un)available interpretations of co-nominal gestures and propose an alternative, whereby how gestures project is determined by how they compose.

Interpretations of adnominal adjuncts: experiment  Design MTurkers ($N = 122$) watched videos of sentences uttered in various contexts and rated them on a scale from ‘Totally unnatural’ to ‘Totally natural’ (mapped to 0–100). The items differed across content type (adjective, appositive, gesture) and interpretation (projecting non-restricting (PNR), restricting (R), non-projecting non-restricting (NPNR)). A sample paradigm is given in (2).

(2) *Context: We are going on a group tour. A. and M. are responsible for renting a van. M. just told A. that...*

a. **PNR:** ...Stephanie, who has two pets, a small cat and a large dog, is planning to bring along one of her pets. A., 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*$_{\text{SMALL}}$, we’ll be fine, but
if she’s bringing (i) her large *dog* / (ii) her *dog*, a large *animal* / (iii) her *dog*$_{\text{LARGE}}$, we
should get a bigger van.

b. **R:** ...Stephanie, who has two dogs, a small Pug and a large Great Dane, is planning to bring along one of her dogs. A., 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*$_{\text{SMALL}}$, we’ll be fine, but
if she’s bringing (i) her large *dog* / (ii) her dog, a large *animal* / (iii) her *dog*$_{\text{LARGE}}$, we
should get a bigger van.

c. **NPNR:** ...Stephanie is planning to bring along her dog. A. knows that Stephanie only has one dog, but has never seen it. She says:
Do you know how big Stephanie’s dog is? ‘Cause if she’s bringing (i) her small *dog* / (ii) her dog, a small *animal* / (iii) her *dog*$_{\text{SMALL}}$, we’ll be fine, but if she’s bringing (i) her large *dog* / (ii) her dog, a large *animal* / (iii) her *dog*$_{\text{LARGE}}$, we should get a bigger van. [Intended: ‘...if (Stephanie’s dog is large and she’s bringing her dog)...’]

Results and discussion  The results are given in Fig. 1. The contrast between appositives and gestures wrt restricting interpretations suggests that the appositive-like strategy cannot be the only interpretation strategy available to co-speech gestures, contra Ebert & Ebert 2014.

Cosuppositions of NP- and DP-level gestures  Schlenker’s (2018) cosupposition strategy, given in (3), isn’t sufficient either. Given the right assumptions, the mechanism yields good results for NP-level (type *et*) gestures, as shown in (4). Local accommodation of such gestures makes the desirable restricting interpretation possible. But, allowing local accom-

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1 In ‘word’ gesture co-occurs with word. Bold indicates prosodic contrastive focus marking.
modation for DP-level (type \{et, t\}) gestures yields unattested interpretations, no matter the assumptions. For example, if in \textit{Stephanie brings \{dp \ her dog\}_{LARGE}} the gesture denotes something like ‘a large object’, conjoining it to the DP \textit{her dog} will result in a completely unattested interpretation ‘Stephanie brings her dog and a large object’. Introducing an anaphoric link between \textit{her dog} and the gesture yields the non-projecting non-restricting interpretation (see (5)), shown to be unavailable by the experiment above. Thus, if we wanted to maintain that the cosupposition strategy is the only one available to co-speech gestures, we would either have to say that local accommodation can apply to NP-, but not DP-level gestures, or that co-nominal gestures can’t adjoin to DPs. Neither option seems motivated.

\begin{enumerate}
\item Cosupposition of \([\{S\}]^G\)
\begin{enumerate}
\item \([S]\): spoken expression
\item \([G]\): gesture
\item \([c']\): pragmatic local context (Schlenker 2009)
\item \([S \& (S \Rightarrow G)]\) \(\Rightarrow\) is generalized entailment
\item \((S \& G)\) \((\&\) is generalized conjunction\)
\end{enumerate}
\end{enumerate}

\begin{enumerate}
\item Stephanie brings her \([\{np \ dog\}]_{LARGE}\).
\begin{enumerate}
\item \([S]\) = \(\lambda x.\text{dog}(x)\)
\item \([G]\) = \(\lambda x.\text{large}(x)\)
\item \([c']\) = \(\lambda x.\text{bring}(s, x) \land \text{poss}(s, x)\)
\item \(\forall x. (\text{bring}(s, x) \land \text{poss}(s, x)) \Rightarrow (\text{dog}(x) \Rightarrow \text{large}(x))\)
\item \(\lambda x.\text{dog}(x) \land \text{large}(x)\)
\end{enumerate}
\end{enumerate}

\begin{enumerate}
\item Stephanie brings \([\{dp \ her dog\}]_{LARGE}\).
\begin{enumerate}
\item \([S]\) = \(\lambda P.\ P((x.\text{dog}(x) \land \text{poss}(s, x))\) \(\Rightarrow\)
\item \([G]\) = \(\lambda P.\ P(g(i)) \land \text{large}(g(i))\)
\item \(\lambda P.\ P((x.\text{dog}(x) \land \text{poss}(s, x)) \land \text{large}(x))\)
\end{enumerate}
\end{enumerate}

\textbf{Proposal: composition determines projection} But how do gestures compose? No gesture-specific composition I propose that syntax and semantics proper are modality-blind, i.e., when gestures compositionally integrate into utterances, they do so just like spoken content. Any modality-specific effects arise in pragmatics or phonology and its interfaces. Two composition strategies exist in the nominal domain; both are available to gestures. \textit{Modifiers}, such as adjectives, adjoin to NPs in the syntax. Semantically, they compose with sets of entities and return subsets thereof, i.e., modifiers are \textit{restrictive}, but not necessarily proper subsets, i.e., modifiers aren’t always \textit{restricting}. Non-restricting modifiers are truth-conditionally vacuous, but give rise to strongly projecting inferences about all the elements of the input set. I re-purpose Schlenker’s cosuppositions as a modality-neutral mechanism yielding such inferences. \textit{Supplements}, such as appositives, adjoin to DPs and contribute obligatorily projecting propositional content about them; they aren’t restrictive and thus can’t be restricting. Any existing implementation will do (e.g., Potts 2005; Koev 2013).

\begin{figure}
\centering
\includegraphics[width=\textwidth]{fig1}
\caption{Acceptability ratings of different interpretations for different content types.}
\end{figure}