Temporal sequence and the alignment of gesture and speech

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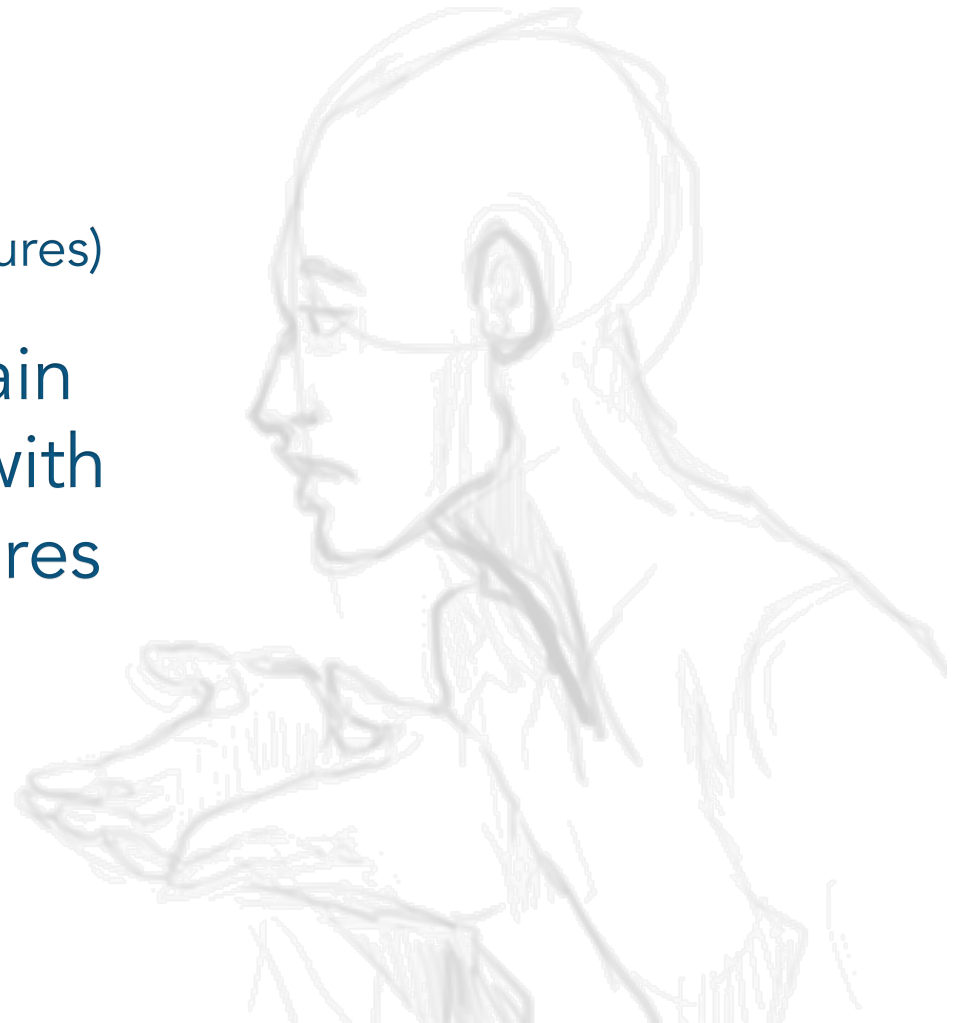Allgemeine Sprachwissenschaft, Berlin

Z A S

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goals of this talk

- a closer look at post-speech gestures
  (compared to co-speech gestures)

- a comparison of certain kinds of appositives with certain kinds of gestures

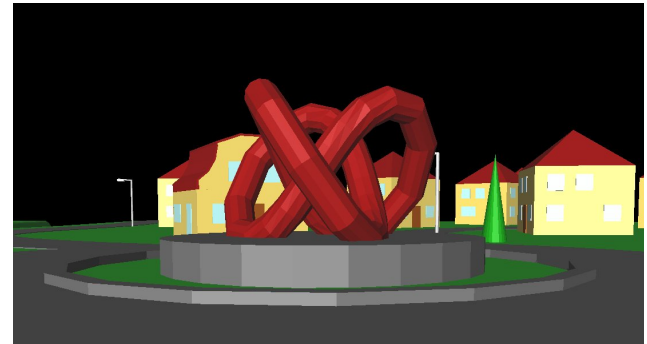- a new suggestion: 'gradual at-issueness'

corpus example: co-speech

It is on a [grey base made of concrete]$^{+ic\text{-}g}$. Three meters high.
And on it, there are [red tubes]$^{+ic\text{-}g}$.

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results of gesture research

- **gestures contribute semantic content** (cf. McNeill 1992, Kendon 1980)
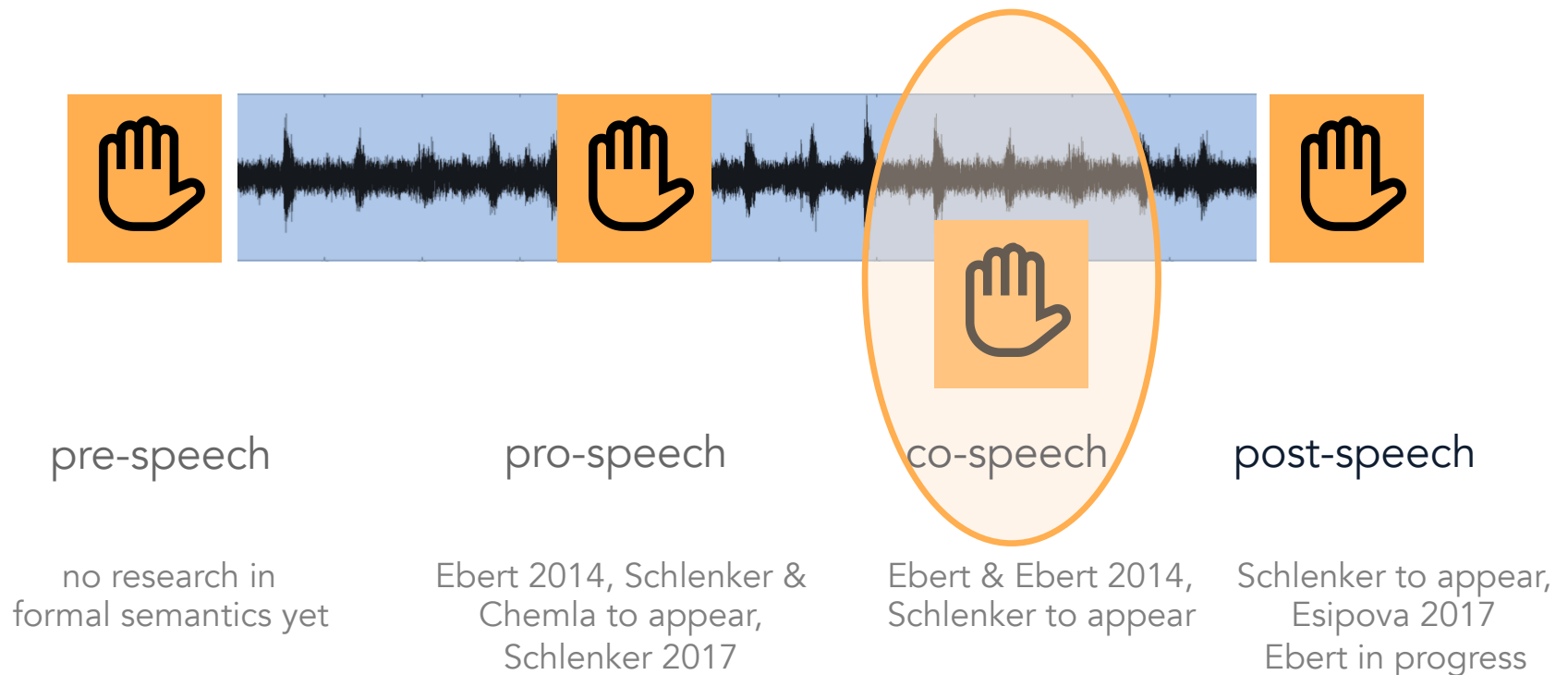
  Here: about the form of the base and the shape of the tubes

- **gesture and speech are temporally aligned** (Pittenger, Hockett, & Danehey 1960; Loehr 2004; Ebert, Evert & Wilmes 2011 and many more)

  Here: 'round' gesture with *base* and 'tube-shape' gesture with *tubes*

temporal alignment

gesture types according to temporal alignment with speech
(terminology along the lines of Schlenker 2017)

pre-speech	pro-speech	co-speech	post-speech
no research in formal semantics yet	Ebert 2014, Schlenker & Chemla to appear, Schlenker 2017	Ebert & Ebert 2014, Schlenker to appear	Schlenker to appear, Esipova 2017 Ebert in progress

co-speech gestures
semantic interpretation

Ebert & Ebert

(1) *I brought [a bottle of water] to the talk.*

at-issue:	semantic content of the speech signal:
	speaker brought a bottle of water to the talk
nicht at-issue:	semantic content of the gesture (roughly):
	The bottle is big

Ebert & Ebert

gesture meaning is not at-issue

- 'multidimensional meaning' (z.B. Potts 2005):

    - at-issue: information that is for disposition

    - not at-issue: further side information

- words, phrases, and sentences can contribute meanings on different dimensions (vgl. Grice 1975)

- formal approaches: Potts 2005; Gutzmann 2012; Koev 2013; AnderBois et al. 2015, ...

Ebert & Ebert

co-speech gestures behave like appositives

appositives contribute non-at-issue information

(2) *Ludger Beerbaum,* *an outstanding show jumper,* *was accused of doping.*

(NA)

(3) *Ludger Beerbaum,* *who is an outstanding show jumper,* *was accused of doping.*

(ARC)

- transmit information that is not the goal of the utterance

- this information is not for disposition

Ebert & Ebert

appivesives are not at-issue (Potts 2005)

- direct denial

   appositives cannot be directly denied in discourse

- projection

   appositives project, i.e. they cannot be interpreted in the scope of a modal or a negation

- Non-at-issue material can be ignored in ellipsis
   (Potts et al. 2009)

direct denial

to appositive

(4) *Lance Armstrong, a world class cyclist, started his career at the age of 12.*

Direct denial response:

(5) *#That's not true! He wasn't a world class cyclist, he was a world class trumpeter.*

Discourse interrupting protest:

(6) *Hey, wait a minute! He actually he was a world class trumpeter, not a cyclist.*

to main clause VP

(7) *Lance Armstrong, a world class cyclist, started his career at the age of 12.*

Direct denial response:

(8) *That's not true! He started his career at the age of 16.*

projection

with appositive	with main clause VP
(9) *It is not true that Lance Armstrong, a world class cyclist, started his career at the age of 12.*	(11) *It is not true that Lance Armstrong, a world class cyclist, started his career at the age of 12.*
Negation elaboration:	Negation elaboration:
(10) *#He was a world class trumpeter.*	(12) *He started with about 16.*

ellipsis

- Expressive content can be ignored under ellipsis
  (Potts et al. 2009)

  (13)

  A: *I saw your f***ing dog in the park.*

  B: *No, you didn't — you couldn't have. The poor thing passed away last week.*

- Holds also for appositive content:

  (14)

  A: *I met Peter, the best trumpeter in town, for lunch.*

  B: *Last week, I did, too. — But I don't think, he is such a great trumpeter.*

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Ebert & Ebert

direct denial

speech and gesture

(15) *I brought [a bottle of water] to the talk.*

direct denial:

(16) *#That's not true! You actually brought a small bottle.*

discourse interrupting protest:

(17) *Hey, wait a minute! Actually, the bottle is not as big.*

only speech

(18) *I brought a big bottle of water to the talk.*

direct denial:

(19) *That's not true! You actually brought a small bottle.*

Ebert & Ebert

projection

speech and gesture

(20) *On train journeys, I never take [a bottle of water] with me.*

Elaboration:

(21) *#There, I need a big one.*

only speech

(22) *On train journeys, I never take a small bottle of water with me.*

Elaboration:

(23) *There, I need a big one.*

gesture content projects (like appositive content) and cannot be interpreted as restricting the NP.

Ebert & Ebert

ellipsis

co-speech gesture

(24) *This helicopter will soon [take off],*

and this plain, too.

pro-speech gesture

(25) *#This helicopter will*

soon

and this plain, too.

(from Schlenker & Chemla 2016)

Ebert & Ebert

- Make use of ideas of Koev (2013) and AnderBois et. al. (2015) to account for at-issue/non-at-issue distinction

- uni-dimensional and dynamic system
  → accounts for anaphora/binding between different levels

- Keep track of at-issue/non-at-issue content via propositional variables p, $p^\star$:

At-issue proposal:	p
Non-at-issue imposition:	$p^\star$

- rough approximation of pragmatic use (cf. Farkas & Bruce, 2010):
  is on the table for discussion
  is not for discussion and silently imposed

Ebert & Ebert

I brought [a bottle of water] to the talk.

$$[x] \; \wedge \; \boxed{\text{bottle}_p(x)} \quad \wedge \quad \boxed{\text{bring}_p(\text{speaker}, x)}$$

'lexical' gesture semantics: temporal alignment:

$$[z] \; \wedge z = \ulcorner \text{☞} \, \mathbf{g} \urcorner \quad \wedge \quad \boxed{\text{SIM}_{p^\star}(x, z)}$$

$$[x] \wedge \boxed{\text{bottle}_p(x)} \; \wedge [z] \wedge z = \ulcorner \text{☞} \, \mathbf{g} \urcorner \wedge \boxed{\text{bring}_p(\text{speaker}, x)} \; \wedge \boxed{\text{SIM}_{p^\star}(x, z)}$$

co- vs. post-speech gestures

2 views

temporal alignment

gesture types according to temporal alignment with speech
(terminology along the lines of Schlenker 2017)

pre-speech   pro-speech   co-speech   post-speech

corpus example: post-speech

"With one round tower. [ ]+ic-g With one round..."

corpus example: post-speech

"Such a curve. [   ]$^{+ic\text{-}g}$ *[I went along there]*$^{+ic\text{-}g}$*."*

co- & post-speech gestures

temporal alignment and interpretation of the gesture

co-speech   post-speech

Ebert & Ebert (2014),
Ebert (in progress)

like appositives

Schlenker (to appear)   cosuppositional   like appositives

co-speech: Schlenker

- co-speech gestures do not behave like supplements, but rather like a special kind of presupposition, i.e. like *cosuppositions*

- An expression *p* with a co-occuring gesture with content *g* comes with the requirement that it holds that *p entails g*

a. *John [helped] his son.*

entails:
John helped his son by lifting him.

b. *John didn't [help] his son.*

c. *Did John [help] his son?*

entail:
If John (had) helped his son,
he would have done so by lifting him.

co vs. post: Schlenker

interpretational difference between co- und post-speech gestures

- co-speech gestures are co-suppositional, they behave like presuppositions

  co-speech:

  (26) *One student brought a bottle of water to the meeting.*

  ↪ *cosupposition: If a student brings a bottle of water to the meeting,*
  it will be a big one

  → One student brought a big bottle of water to the meeting

co vs. post: Schlenker

- **post-speech gestures** behave **like appositives**

post-speech:

(27) *One student brought a bottle of water to the meeting.*

↪ appositive: *One student brought a bottle of water to the meeting, which was big (by the way).*

predictions

- presuppositions are unproblematic in downward entailing contexts, appositives are not licensed (cf. Potts 2005)

(28) *#No student brought a bottle of water, which was big by the way.*

(29) *No student brought a bottle of water.*

    + cosupposition:

    If a student brings a bottle of water, it will be a big one.

predictions

- Schlenker (2016): in negative environments, co-speech gestures also receive a presuppositional interpretation.

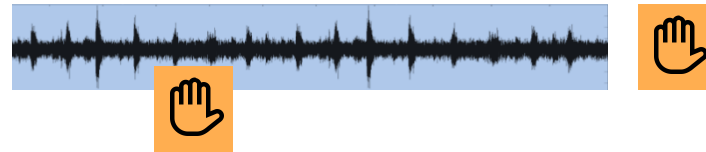*I did not bring [a bottle of water].*

Asserted:	the speaker did not bring a bottle of beer
Presupposed:	If the speaker had brought a bottle it would have been a big bottle

- Ebert & Ebert (2014): odd or interpreted as the gesture associating with the NP (concept-related reading): the speaker takes beer bottles to be that big by default.

predictions

temporal alignment and interpretation of the gesture

	co-speech	post-speech
Ebert & Ebert (2014), Ebert (in progress)	*No* — like appositives — *No*	
Schlenker (to appear)	cosuppositional	like appositives
	No	*No*

experimental study

- predictions can be experimentally tested (see also Tieu et al. 2016, 2017)

- Here: pilot study as part of

  PSIMS (Ebert, Fuchs, Krifka 08/2017-07/2020):

  The Pragmatic Status of Iconic Meaning in Spoken Communication: Gestures, Ideophones, Prosodic Modulations

experimental study

context:

In kindergarden, the children had to cut out different forms.

a. **One** *child managed to cut out a geometrical form.*

b. **No** *child managed to cut out a geometrical form.*

c. **One** *child managed to cut out a geometrical form.*

d. **No** *child managed to cut out a geometrical form.*

experimental study

context:

Im Kindergarten sollten die Kinder verschiedene Formen ausschneiden.
'In kindergarden, the children had to cut out different forms.'

Ein Kind hat es geschafft, 'ne geometrische Form auszuschneiden.

'One child managed to cut out a geometrical form.'

co   post

experimental study

context:

Im Kindergarten sollten die Kinder verschiedene Formen ausschneiden.
'In kindergarden, the children had to cut out different forms.'

Aber kein Kind hat es geschafft, 'ne geometrische Form auszuschneiden.

'But no child managed to cut out a geometrical form.'

co   post

experimental study

FILLER items:

- lexically ambiguous items with matching, non-matching co- and post-speech gestures

- example: non-matching co-speech gesture

  context: *Auf dem Bauernhof sind viele Tiere sehr früh munter.*

  item: *Der Hahn zum Beispiel ist ein solcher Frühaufsteher.*

  context: *On a farm, many animals wake up early in the morning .*

  item: *The rooster is such an early riser.*

experimental study

Context:

Auf dem Bauernhof sind viele Tiere sehr früh munter.
On a farm, many animals wake up early in the morning.

non-matching co-speech

Der Hahn zum Beispiel ist ein solcher Frühaufsteher.

'The rooster is such an early riser.'

(German *Hahn* also: tap)

experimental study

- **materials**

  16 experimental items (16 fillers)

- **independent variables**

  DETERMINER: *one* vs. *no*

  POSITION: co-speech vs. post-speech

- **participants**

  32 native speakers of German

experimental study

On a scale from 1 to 10:

How natural do you consider the utterance in the video in the given context?

(instruction beforehand: pay good attention to picture and sound)
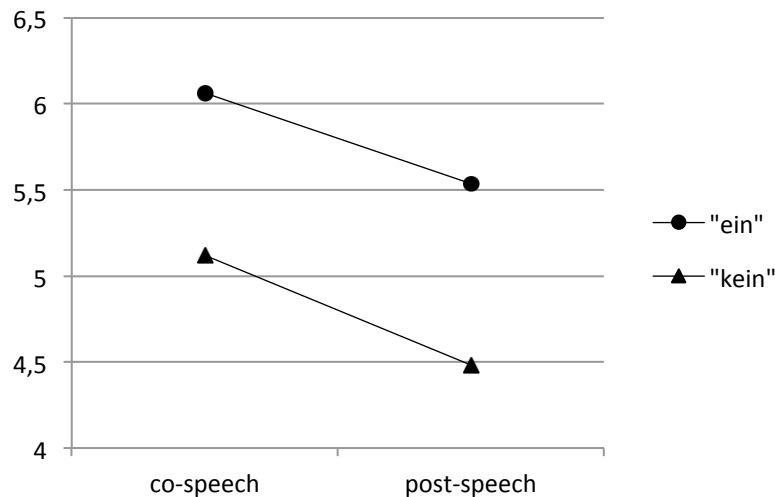
experimental study

predictions

    a. **One** *child managed to cut out a geometrical form.*

    b. [*E&E]**No** *child managed to cut out a geometrical form.*

    c. **One** *child managed to cut out a geometrical form.*

    d. [*S/E&E]**No** *child managed to cut out a geometrical form.*

- Ebert & Ebert: no interaction effect
- Schlenker: interaction of DETERMINER and POSITION

experimental study

results

main effect DETERMINER
in *F*1- und *F*2-Analyse:
$F1(1,31) = 23.9$, $p < .001$;
$F2(1,15) = 11.1$, $p < .01$
main effect POSITION in *F*1-analysis:
$F1(1,31) = 7.0$, $p = .01$;
$F2(1,15) = 3.0$, $p = .10$
no interaction effect: $F1/F2 < 1$

- NO generally worse than ONE

- post-speech tends to be worse than co-speech
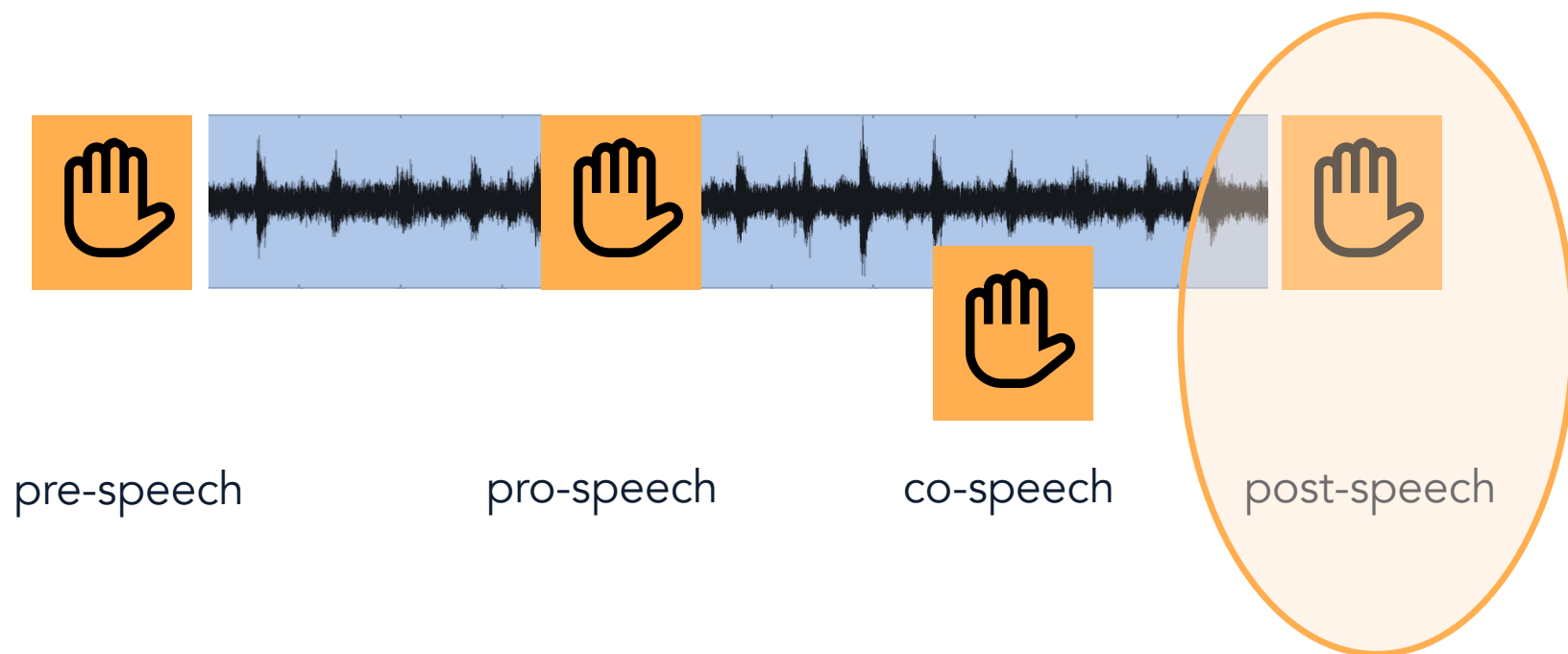
- no interaction → evidence for Ebert & Ebert

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post-speech gestures

a closer look

temporal alignment

gesture types according to temporal alignment with speech
(terminology along the lines of Schlenker 2017)

pre-speech   pro-speech   co-speech   post-speech

at-issue appositives

- Some appositives *can* apparently be at-issue (AnderBois et al. 2015; Koev 2013; Syrett & Koev 2014)

- Direct denial is possible with sentence-final ARCs

(30) A: *Peter bought a trumpet, which was extremely expensive by the way.*

      B: *No, it wasn't that expensive.*

(31) A: *A trumpet, which was extremely expensive by the way, is one of the instruments that Peter baught the other day.*

      B: *??No, it wasn't that expensive.*

at-issue appositives

Question: why are appositives at-issue in these cases?

- AnderBois et al. 2015:

  appositives enjoy a "*broader range of possible interpretations, behaving in many respects as though they were conjunctions rather than true appositives*"

- Syrett & Koev 2014:

  "*we propose to account for the shifting status of ARCs [...] by assuming that ARCs can* compete *with main clauses for at-issue status (that is, either is in principle a candidate for at-issue status), and by relating the ordering of the appositive assertion and the main clause assertion to the overall flow of discourse*" (my emphasis)

at-issue appositives

- Syrett & Koev (2014):

  - all appositives (both NAs and ARCs) and main clauses introduce independent assertions

  - in principle, either can be at issue – they compete

  - the proposition that is processed last is at issue

  - ARCs can be attached to either the anchor or the root node

  - recency of assertion has an effect on its at-issue status

    the symphony hired my friend [$_{DP}$ Sophie [$_{CP}$ who is a classical violinist]]

    [$_{CP1}$ the symphony hired my friend Sophie] [$_{CP2}$ who is a classical violinist]

at-issue appositives

- Also: some appositives seem to be interpretable in the scope of modal operators, i.e. they do not seem to project (Wang et al. 2006; Nouwen 2014)

- Appositive *one*-modifiers (a subtype of NAs) often do not project:

  If a professor, a famous one, publishes a book, he will make a lot of money.

  Mary wants to marry an Italian, a rich one.

at-issue appositives

- Koev (2013) hypothesizes that *one*-"appositives" are in fact not appositive constructions but a special kind of restricting modifier (cf. Nouwen 2014).

gradual at-issueness

- pieces of information compete for at-issue status

- slogan 'gradual at-issueness':

  *"The more stand-alone a piece of information is,
  the more at-issue it is."*

- stand-alone:

  - temporally independent or seperated

  - other "stand alone" features like finiteness

- predicts inter- and intra-subjective variability

gradual at-issueness

Denial Examples (response: *No, THAT was LOUIS Armstrong!*)

- completely out:

  Lance Armstrong, <u>the virtuosic trumpeter,</u> survived a severe cancer desease .

- slightly better (?):

  Lance Armstrong, <u>who was a virtuosic trumpeter,</u> survived a severe cancer desease.

- better:

  Among the peope who survived a severe cancer desease we also find Lance Armstrong, <u>the virtuosic trumpeter</u>.

- even better:

  Among the peope who survived a severe cancer desease we also find Lance Armstrong, <u>who was a virtuosic trumpeter</u>.

gradual at-issueness

Showing the same with gestures instead of appositives

gradual at-issueness

Denial Examples (response: *No, THAT was LOUIS Armstrong!*)

- completely out: *[Lance Armstrong] survived a severe cancer desease.*

- slightly better (?):

   Among the peope who survived a severe cancer desease we also find [Lance Armstrong].

- better:

   Among the peope who survived a severe cancer desease we also find

   Lance Armstrong.

- even better:

   Among the peope who survived a severe cancer desease we also find

   Lance Armstrong.   [...pause...]

gradual at-issueness

- priciple of 'gradual at-issueness' is supposed to also include information from different channels, i.e. speech, gesture, mimics, ...

- Emphasizes aspects of temporal occurence
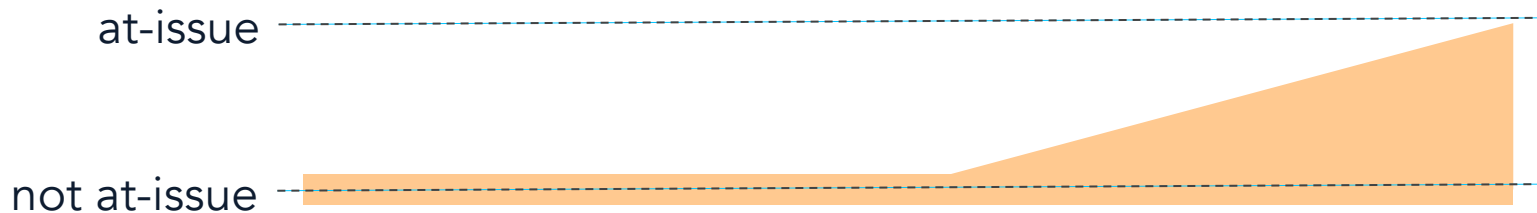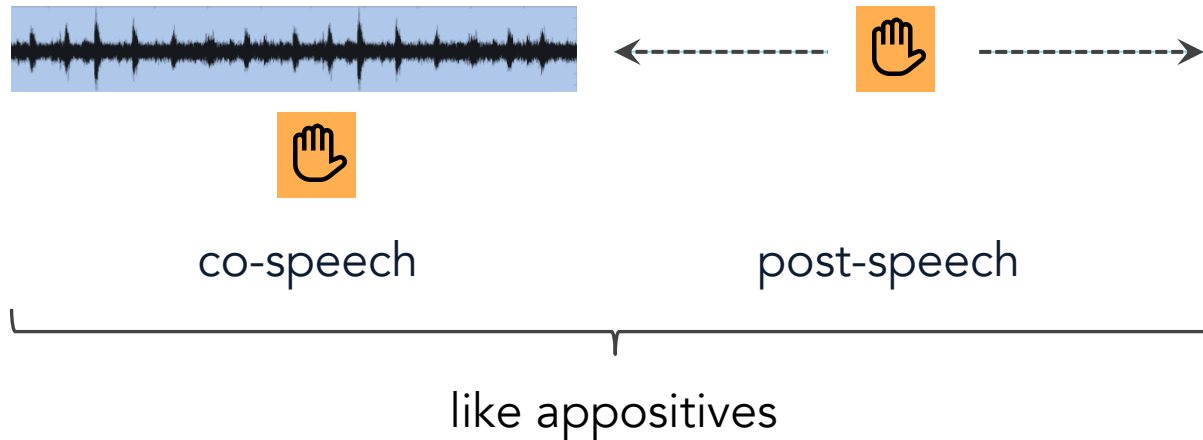
    Temporal coincidence

    → strong competition

    → clear at-issue/non-at-issue distribution

    Temporal proximity → facultative competition

- comma intonation of appositives ↔ temporal coincidence

gradual at-issueness

temporal alignment crucial for interpretation of the gesture

gradual at-issueness

in the spirit of gradual at-issueness, post-speech gestures can be

- <u>integrated:</u> behave like ordinary appositives, i.e. receive a supplemental interpretation like co-speech gestures

    ➜ not at-issue

    ➜ function like run-of-the-mill appositives

- <u>isolated:</u> behave like one-'appositives', i.e. they are assertive like stand-alone pro-speech gestures

    ➜ at-issue

    ➜ serve to clarify/specify a property of the speech DR; like *one*-modifiers (cf. Averitseva-Klisch's view on afterthoughts: clarify reference)

gradual at-issueness

post-speech:

Some philosopher brought a bottle of beer.

    ↪ supplement: *Some philosopher brought a bottle of beer,*
                                       which was big.

    ↪ assertion: *Some philosopher brought a bottle of beer, a big one.*

empirical evidence

- co-speech gesture not-at-issue:

  A: *Maria bought Paula [extremely expensive jewelry] for her birthday.*

  B: *#No, that's not true! She bought her a necklace!*

- isolated post-speech gesture at-issue:

  A: *Maria bought Paula [extremely expensive jewelry] for her*

  birthday.

  B: *No, that's not true! She bought her a necklace!*

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empirical evidence

co-speech gesture content projects:

Maria spends a lot of time in trains. She often said that she needs something so she can do her work on the trains.

A: *Maria bought herself* ⌐ *a tablet* ¬ *to be more flexible with her work.*
   🖐 *big*

B: *Why such a big one??*

A: *She is an illustrator. They use these huge tablets.*

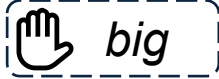A: *#Maria wants to/should buy herself* ⌐ *a tablet* ¬ *to be more flexible with her work.*
B: *What? Tablet???*   🖐 *big*
A: *#She is an illustrator. They use these huge tablets.*

empirical evidence

isolated post-speech gesture content does not project:

Maria spends a lot of time in trains. She often said that she needs something so she can do her work on the trains.

A: *Maria bought herself a tablet* 🖐 *big* *to be more flexible with her work.*

[B: *Why such a big one??*

A: *She is an illustrator. They use these huge tablets.*]

A: *Maria wants to/should buy herself a tablet* 🖐 *big* *to be more flexible with her work.*

[B: *Why such a big one??*

A: *She is an illustrator. They use these huge tablets.*]

empirical evidence

co-speech gestures pattern with 'real' appositives:

Maria bought herself a tablet – oversized by the way – to be more flexible
   with her work.

#Maria wants to/should buy a tablet – oversized by the way – to be more flexible
   with her work.

isolated post-speech gestures pattern with *one*-'appositives':

Maria bought herself a tablet, an oversized one, to be more flexible with her work.

Maria wants to/should buy herself a tablet, an oversized one, to be more flexible
   with her work.

empirical evidence

co-speech gesture content projects:

If you buy [a dog] you cannot stay in this flat.

✋ *big*

#A Chihuahua/a small dog would be ok, of course.

→ A dog of whatever size means leaving the flat (and the speaker's prototypical concept of a dog is that it is that big)

post-speech gesture content does not project:

If you buy a dog ✋ *big* *you cannot stay in this flat.*

A Chihuahua would be ok, of course.

→ A "serious"/big dog means leaving the flat

empirical evidence

co-speech gestures pattern with 'real' appositives:

#If you buy a dog – big by the way – you cannot stay in this flat.

#A Chihuahua would be ok, of course.

isolated post-speech gestures pattern with *one*-'appositives':

If you buy a dog, a big one, you cannot stay in this flat.

A Chihuahua would be ok, of course.

empirical evidence

- Post-speech gestures are not possible in all configurations

  I love I-Pads. #But I would never buy a tablet. 🖐 *big*

- However, they are excluded whenever *one*-'appositives'
  would be excluded:

  I love I-Pads. #But I would never buy a tablet, a huge one.

- Contribution must involve a monotonic update.
  It has to be a specification and must not involve any revision.

outlook

pre-speech gestures & shifting

temporal alignment

pre-speech	**pro-speech**	**co-speech**	**post-speech**
at issue (?)	at-issue	not at-issue	more distant → "more at-issue"

integrated:
    not at issue

isolated: at issue

Schlenker (2017) defends a different view: he argues that the relevant distinction is between external and internal (syntactically (in)eliminable) enrichments. The former are not at-issue – even if they have a separate time slot –, the latter can be at issue or not.

corpus example: pre-speech

More specifically, [on the righthandside, there will be (such) a pillar]$^{+ic\text{-}g}$. It doesn't fit the townscape at all.

dimension shifters

- whenever there are pieces of information from different dimensions or channels, they compete for the at-issue status

- there are certain defaults, but these can be overridden

- temporal sequence (within speech) and temporal alignment (of gesture and speech) has an effect on the default interpretation of the involved pieces

- dimension shifters shift information from one dimension to the other

dimension shifters

Mimics as dimension shifter:

- Schlenker (2016): At-issue readings are derivable via local accommodation, because they are weak triggers, but in particular in contrastive contexts (cf. Esipova 2017)

  I did not bring [a bottle] , I brought [a bottle].

  small

dimension shifters

Mimics as dimension-shifter:

- Ebert & Ebert (2014): at-issue readings are generally not possible (cf. projection with negation)…

- … EXCEPT with certain mimics (raising eyebrows, …) and an eye-catching gesture (see also Esipova 2017)

I did not bring [a bottle] , I brought [a bottle].

small

dimension shifters

Dimension shifters

- Examples not-at-issue → at-issue:

  - mimics – raising eyebrows (previous slide), …

  - demonstratives – *ein* vs. *so ein* and *the* vs. *this*
    (Ebert & Ebert 2014)

  - focus-marking/prosody/…
    (*He is not just an expert, he is THE expert*)

- Examples at-issue → non-at-issue:

  - 'comma' intonation

summary

- pieces of information from one or across different channels of communication compete for at-issueness

- a prime example is the interplay of gestural information and speech, where speech usually wins over gesture

- the status of gestures depends on their temporal alignment with speech (i.e. availability of a competitor)

  - stand-alone gesture → at-issue, cf. *one*-appositives

  - co-speech gesture → not-at-issue, cf. ordinary appositives

- there are means to switch and shift information between dimensions

Thank you
for your attention!

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