Gestures, appositives and truth value judgements – an experimental series

Cornelia Ebert & Qingfeng Schwaderer
Institut für Linguistik/Germanistik
Universität Stuttgart
Gestures have a long tradition in neurosciences, evolution theory, communication theory, semiotics, robotics, and in particular psychology.

But – except for pointing gestures – they are generally ignored in (formal) semantics or pragmatics.

(recent exceptions: Lascarides & Stone 2009; Giorgolo 2012)
Gestures

- Gesture:
  communicative movements of hands and arms
  transporting emotions, intentions, and thoughts

- Types of Gestures:
  - Iconic gestures
  - Pointing gestures
  - Emblematic gestures
  - Metaphoric gestures
  - Regulators
  - Beats
A Corpus Example

- Speech-accompanying iconic gesture
- From the Bielefeld Speech-and-Gesture-Alignment (SaGA) corpus of project B1 *Speech-gesture-alignment* of the SFB 673 *Alignment in Communication* (Lücking et. al 2013)
Interloc. right: The sculpture, [what is there represented]^{reg-g}?
Interloc. left: It is on a [grey base made of concrete]^{ic-g}.
Three meters high. And on it, there are [red tubes]^{ic-g}.
Semantic Contribution

- Gesture information adds semantic content to the utterance
- Here: information about the shape of the base and the arrangement of the tubes
Main Claim

- When accompanying speech, gesture contribution is not at issue by nature
- Gesture contribution is not what the speaker intends to push conversion to
- Unless gestures...
  - stand alone (without co-occurring speech), or
  - accompany demonstratives
Question for this talk:

*How does gesture meaning combine with verbal meaning?*

→ claim: co-speech gestures are non-at-issue by default

Recent research *(Ebert 2014)* (not in this talk):

*What exactly is the (formal-semantic) meaning contribution of the gesture?*

→ claims: - (iconic and pointing) gestures denote (rigid designators to) the gesture referent
  - there are additional meaning contributions due to alignment with verbal phrases
Experiments

- **On gestures:**
  - In what way do gestures contribute meaning?
    - result: they do not contribute to truth conditions in the same way as speech material (as they are not at-issue)

- **On appositives:**
  - Do they contribute in the same way as gestures?
    - result Exp. 1: no, they seem to contribute to truth conditions just like at-issue information; result in conflict with often made claims on appositives (but see Koev & Syrett 2014)
    - design Exp. 2: check whether results of Exp. 1 are due to experiment design
Main Claim

gestures systematically contribute non-at-issue meaning
Two Dimensions

- ‘Multidimensional meanings’: at-issue vs. non-at-issue material (e.g. Potts 2012)

- Words, phrases, and entire sentences contribute meanings in different ‘dimensions’ (cf. Grice 1975)

- Formal frameworks: Potts 2005, 2007; Gutzmann 2012; Koev 2013; AnderBois et al. t.a. among others
Two Dimensions within Speech

- Core phenomena:
  1. expressives like *damn* (or 'mixed items' like *cur*)
     Ex.: *The damn dog howled all night.*
  2. supplements like appositive relative clauses or appositive NPs
     Ex.: *Paul, the best horse riding instructor in the world, moved to Stuttgart recently.*

- bring in information that is not at issue at the time of utterance, but sneaked in as ‘secondary’ information
- information is not for disposition, non-negotiable
- Gestures naturally contribute information in a different 'dimension' (mode)
Expressives and Emblems

- Expressives ≈ (co-speech) emblematic gestures

- Transmit attitudes and feelings, often negative ones, often offensive in an immediate fashion (what Nouwen 2014 characterizes as 'toxic')

- Potts (2012, p. 2532): expressives create ‘a window into [the speaker’s] underlying emotional state at the time of utterance’

- Recurring metaphor for gestures: a ‘window to the mind’ (cf. the title of McNeill 2000, see also: McNeill 1992, 2005)
Supplements and Iconics

Appositives ≈ (co-speech) iconic gestures


Conveys roughly the same meaning as:

(2) Cornelia: "Ich habe eine große Flasche Wasser zum Talk mitgebracht." / "I brought a big bottle of water to the talk."
Gestures' Semantic Contribution


- Question:
  - How does gesture meaning combine with verbal meaning?
Gesture Meaning is Non-at-issue

- Gestures contribute non-at-issue meaning (in the sense of Potts 2005)
- Speech-accompanying (iconic and pointing) gestures roughly behave like appositives
- Appositives (cf. Potts 2005):
  
  (3) Ludger Beerbaum, an outstanding show jumper, was accused of poling.

  (4) Ludger Beerbaum, who is an outstanding show jumper, was accused of poling.
Tests for Non-at-issueness

- Appositives are argued to be non-at-issue (Potts 2005)
- Among other things, appositives have these properties:
  - they cannot be denied directly in discourse
  - they project, e.g. they cannot be the target of negation
Ludger Beerbaum, an outstanding show jumper, was accused of poling.

Direct denial response:

#That's not true! He is actually a lousy show jumper.

Discourse interrupting protest:

Hey, wait a minute! Actually, he is not an outstanding show jumper, but pretty lousy.
Appositive Meaning is Non-at-issue

The negation test

negating the appositive

(9) *It is not true that Ludger Beerbaum, an outstanding show jumper, was accused of poling.*

Negation elaboration:

(10) **#He is actually a lousy show jumper.**

negating the main clause

(9) *It is not true that Ludger Beerbaum, an outstanding show jumper, was accused of poling.*

Negation elaboration:

(11) **He was actually accused of doping.**
The direct denial test

**speech & gesture**

(12) I brought [a bottle of water].

Direct denial response:

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

Discourse interrupting protest:

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

**speech only**

(15) I brought a **big** bottle of water.

Direct denial response:

(16) That's not true! You actually brought a small bottle.
Gesture Meaning is Non-at-issue

The negation test

speech & gesture

(17) *I did not bring [a bottle of water] to the talk.*

Negation elaboration:

(18) #A small one is enough for me.

speech only

(19) *I did not bring a big bottle of water to the talk.*

Negation elaboration:

(20) *A small one is enough for me.*
How does gesture meaning combine with verbal meaning?

At-issue: semantic content of the speech signal

The speaker brought a bottle of water to the talk

Non-at-issue: 'semantic content' of the gesture (roughly):

The bottle is big
In parentheses

demonstratives are 'dimension shifters'
German *so* as Dimension Shifter

The negation test

**speech & gesture**

(B1) *Ich bringe niemals [eine Flasche Wasser] mit zu Vorträgen.*

*I never bring [a bottle of water] to talks.*

Negation elaboration:

(B2) *Eine kleine reicht mir nämlich.*

*(A small one is enough for me.)*

**speech + *so* & gesture**

(B3) *Ich bringe niemals [SO eine Flasche Wasser] mit zu Vorträgen.*

*I never bring [a bottle of water like that] to talks.*

Negation elaboration:

(B4) *Eine kleine reicht mir nämlich.*

*(A small one is enough for me.)*
German so as Dimension Shifter

What happened here?

(B5) Ich bringe niemals [SO eine Flasche Wasser] mit zu Vorträgen.  
(I never bring [a bottle of water like that] to talks.)

is synonymous to

(B6) Ich bringe niemals eine große Flasche Wasser mit zu Vorträgen.  
(I never bring a big bottle of water to talks.)

so shifted gesture meaning contribution (i.e. similarity) from the non-at-issue level to the at-issue level
German so as Dimension Shifter

The direct denial test

speech & gesture

(B7) *Ich habe [eine Flasche Wasser]* mitgebracht.

*I brought [a bottle of water].*

Direct denial response:

(B8) #*Das stimmt nicht. Du hast doch eine kleine mitgebracht* *(That's not true! You actually brought a small bottle.)*

speech + so & gesture

(B9) *Ich habe [SO eine Flasche Wasser].* mitgebracht.

*I brought [a bottle of water like that].*

Direct denial response:

(B10) *Das stimmt nicht. Du hast doch eine kleine mitgebracht* *(That's not true! You actually brought a small bottle.)*
Demonstratives make speech-accompanying gesture meaning at-issue

Comes close to Tomasello's (1999) claim (in the spirit of Bühler 1934) that demonstratives are attention shifters and serve to create 'joint attention' (cf. Diessel 2006)

Cf. Fricke 2012, Umbach & Ebert 2009, Streeck 2002 for placeholder-function of so (see also König 2012)

Demonstratives function as dimension shifters from non-at-issue to at-issue (pace Potts 2005, 2007 and Gutzmann 2012)
Demonstratives as Dimension Shifters

- *diese/this* is the demonstrative version of the shifted definite article *die/the*, i.e.

  \[
  \text{diese} = \text{so} + \text{die} \quad \quad \text{this} = \text{so} + \text{the}
  \]

### At-issue:

- **eine**
  - \( a \)
  - \( \exists x \)

- **SO eine**
  - \( \exists x \)

- **die**
  - \( \exists x \)

- **diese**
  - \( \exists x \)

### Non-at-issue:

- **SIM\( p^* (x, z) \)**

- **SIM\( p (x, z) \)**

- **\( x = p^* z \)**

- **\( x = p z \)**
A Formal Example
(so + indefinite article)

Combined meaning contributions of speech and gesture:

\[ \exists x \land \text{bottle}_p(x) \]

\[ \exists z \land z = \text{SIM}_p(x, z) \]

\[ \exists z \land z = \text{SIM}_p(x, z) \land \exists x \land \text{bottle}_p(x) \land \text{SIM}_p(x, z) \land \text{bottle}_p(z) \]

(Cf. Umbach & Gust to appear)
A Formal Example
(\textit{so + indefinite article})

\begin{align*}
\exists z \wedge z = \text{\textit{SO}} & \Downarrow \text{g} \wedge \exists x \wedge \text{bottle}_p(x) \wedge \text{SIM}_p(x, z) \wedge \text{bottle}_p^*(z) \\
& \wedge \text{bring}_p(\text{cornelia}, x)
\end{align*}

At-issue: there is a bottle \textbf{which is similar to the gesture referent} that Cornelia brought

Non-at-issue: the gesture referent is itself a bottle
End of parentheses

demonstratives are 'dimension shifters'
Intermediate conclusion: Gesture meaning is non-at-issue

Predictions:
- gesture meaning is processed like other non-at-issue material (e.g. appositives)
- gesture meaning is not treated like asserted material and does not enter truth conditions straightforwardly (but see Syrett & Koev 2014 and their results for the truth-conditional contribution of appositives)

Rating experiment to test for these predictions
Experiment on gestures

how do gestures contribute meaning?
Gesture Meaning is Non-at-issue

rating study: influence of iconic gestures on truth-value judgements

Auf diesem Bild ist eine Mauer mit [einem Fenster] zu sehen. (In this picture, you see a wall with a window.)

Does the description in the video fit the picture? □ 1 □ 2 □ 3 □ 4 □ 5
1 = not at all; 5 = perfectly
Gesture Meaning is Non-at-issue

rating study: influence of iconic gestures on truth-value judgements

Auf diesem Bild ist eine Mauer mit [einem Fenster] zu sehen...

Auf diesem Bild ist eine Mauer mit einem runden Fenster zu sehen...

match vs. mismatch
Gesture Meaning is Non-at-issue

Prestudy to decide on the gesture/adjective to be taken

- Pretest to test for the typicality of the gestures for the NP concept

- Worry: some gestures might be considered typical for the NP ('interpretantenbezogene Gesten' (concept related gestures), cf. Fricke 2012)

- Picture/gesture match might then be considered high, because gesture matches NP concept, not the concrete DP object

- Solution: choose gestures that are untypical for the NP concept
Gesture Meaning is Non-at-issue

- materials:
  24 experimental items (48 fillers)

- independent variables:
  MATCH: match vs. mismatch
  MODE: gesture vs. adjective

- participants:
  40 students of the University of Stuttgart
  native speakers of German

expectation: gesture mismatch >> adjective mismatch
Gesture Meaning is Non-at-issue

rating

match  mismatch

4,4  3,7
4,3  2,1

***  ***

adjective  gesture
Predictions confirmed:
- clear interaction effect: negative influence of mismatches much lower for gestures than for adjectives
- gesture meaning does not enter truth conditions straightforwardly $\rightarrow$ not treated like asserted material

Gesture meaning is non-at-issue

Next experiment: run exact same experiment with appositives instead of gestures
Experiments on appositives

How do appositives contribute meaning?
Appositives are Non-at-issue?

Assumption:

Appositives are non-at-issue (following Potts 2005)

Rating study I & II:

influence of appositives on truth-value judgements:

Do they contribute meaning in a similar way as gestures do? 
Recall that gesture meaning does not enter truth conditions straightforwardly → not treated like asserted material
Appositives are Non-at-issue?

Rating study I: influence of appositives on truth-value judgements

1. Does the description in the audio match the picture?

□ 1 □ 2 □ 3 □ 4 □ 5
1 = not at all
5 = perfectly

(In this picture, there is a statue standing on a base, [pause] a circular [pause] (one).)
Appositives are Non-at-issue?

Rating study I: influence of appositives on truth-value judgements

Auf diesem Bild sieht man einen Sockel, [pause] einen runden [pause], mit einer Statue darauf.

Auf diesem Bild sieht man einen runden Sockel mit einer Statue darauf.

match vs. mismatch
Appositives are Non-at-issue?

Rating study I: influence of appositives on truth-value judgements

*Auf diesem Bild sieht man einen Sockel, [pause] einen runden [pause], mit einer Statue darauf.*

**Prediction / expectation:**

- appositive-picture mismatch rating
- adjective-picture mismatch rating

*Auf diesem Bild sieht man einen *runden* Sockel mit einer Statue darauf.*

mismatch
Appositives are Non-at-issue?

Rating study I: influence of appositives on truth-value judgements

**independent variables:**

**MATCH:** match vs. mismatch (with pictures)

**MODE:** appositive vs. adjective (with audio records)

**materials:**

24 experiment items + 48 fillers

**participants:**

40 German native speakers
(students of the University of Stuttgart)
Appositives are Non-at-issue?

rating results

4,53
4,46
2,30
2,23

match
mismatch

adjective
appositive
Appositives are Non-at-issue?

Prediction/expectation unfulfilled:

There was no difference between appositive-picture mismatch rating and adjective-picture mismatch rating

Conclusion:

Appositives seem to contribute to truth conditions the same way at-issue information does (in line with Koev & Syrett 2014)

Appositives differ from gestures in this respect
Appositives are Non-at-issue?

Discussion:

Too little information was provided
Consequently, participants’ attention focused on every bit of it
There was no context to rely upon to tell ‘secondary’ information apart from at-issue information

Rating study II (ongoing):

redesign the previous study, providing sufficient context und clear cases of non-at-issueness of appositives
Appositives are Non-at-issue?

Rating study II (ongoing): influence of appositives on truth-value judgements

1 Establishing the examiner – examinee setting:

During an interview, the examiner is asking the examinee to remember details about a picture showed to him a few weeks ago.

Prüfer: Erinnern Sie sich noch, was auf dem Bild war?
(Examiner: Do you still remember what was in that picture?)
Appositives are Non-at-issue?

Rating study II (ongoing): influence of appositives on truth-value judgements

③ Case I: the color of the triangle is introduced as an appositive, i.e. non-at-issue content

(Examinee: Building blocks. A triangle, [pause] blue [pause], was at the very top.)

Case II: the color of the triangle is introduced as an adjective, integrated into the DP, i.e. at-issue content

(Examinee: Building blocks. A blue triangle was at the very top.)
Appositives are Non-at-issue?

Rating study II (ongoing): influence of appositives on truth-value judgements

4 Prüfer: Ja, genau, das stimmt. Da war ein Dreieck ganz oben.

(Examiner: Yes, exactly, that‘s right. There was a triangle at the very top.)

! exclusion the color from the truth condition

5 Ist die Reaktion des Prüfers der Situation sprachlich angemessen?
(Is the examiner‘s reaction linguistically appropriate to the situation?)

□ 1 □ 2 □ 3 □ 4 □ 5

1 = not at all 5 = perfectly
Appositives are Non-at-issue?

Rating study II (ongoing): influence of appositives on truth-value judgements


Prüfling: Bauklötze. Ein blaues Dreieck war ganz oben.

match vs. match

appositive vs. adjective

color not-at-issue color at-issue
Appositives are Non-at-issue?

Rating study II (ongoing): influence of appositives on truth-value judgements


Prediction / expectation:

appositive-picture mismatch rating

adjective-picture mismatch rating

Prüfling: Bauklötze. Ein blaues Dreieck war ganz oben.

mismatch
Appositives are Non-at-issue?

Rating study II (ongoing): influence of appositives on truth-value judgements

**independent variables:**

MATCH: match vs. mismatch (with pictures)
MODE: appositive vs. adjective (with audio records)

**materials:**

24 experiment items + 48 fillers

**participants:**

40 German native speakers
(students of the University of Stuttgart)
Conclusion

- Gesture meaning:
  
is non-at-issue,
  
  and does not enter truth conditions straightforwardly

- Appostive meaning:
  
despite being considered largely non-at-issue and often argued not to contribute to truth conditions straightforwardly, seem to contribute to truth conditions the same way at-issue information does (rating study I), which remains to be verified by further investigation (rating study II)
Thank you

also to:

**Christian Ebert** for collaboration on the formal modelling of gestures and the constructional rules of gesture-speech interaction,

**Florian Hahn, Insa Lawler, and Hannes Rieser** for giving us access to the SAGA corpus and for their constant support and cooperation,

**Ellen Fricke, Klaus von Heusinger, Stefan Hinterwimmer, Hans Kamp, Manfred Krifka, Philippe Schlenker, Peter Staudacher, Carla Umbach, Ede Zimmermann, and the linguistics group in Stuttgart** for various discussions on semantic issues around gestures,

**Barbara Herold** for information and discussion about iconicity in sign languages,

**David Bausch, Robin Hörnig, Carolin Krämer, Fabian Schlotterbeck, and Britta Stolterfoht** for help with and discussion on experiment designs, setups, execution, and evaluation.
Appendix E
rating study on gesture meaning contribution
Gesture Meaning is Non-at-issue

**Prestudy** to decide on the gesture/adjective to be taken

- **Solution:** choose gestures that are untypical for the NP concept

- Two groups of 15 native speakers each were played silent videos and asked to rate the typicality of the gestures for the corresponding NP

- E.g. Is the gesture typical for a window? Scale: 1 (not typical at all) to 5 (very typical)

- Example: mean rating for 'window':

  - square = 3,9
  - round = 1,3
Gesture Meaning is Non-at-issue

Fillers (48)

- A: 24 with gesture (polysems),
  B: 24 without gesture
  (background check)

- A: 12 gesture picture matches,
  12 gesture picture mismatches;

- Example A (match):
  Auf diesem Bild ist eine Fliege zu sehen.
  'In this picture you can see a fly/bow tie.'
Gesture Meaning is Non-at-issue

Fillers (48)

- B: 12 speech picture match, 12 speech picture mismatches
- Examples B (mismatch):
  
  *Auf diesem Bild sind im Hintergrund Wolken zu sehen.*
  *In this picture you can see clouds in the background.*
References


References


References


References


