The semantic impact of co-speech gestures

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Gesture Traditions

- 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)

Why Gestures?

Received wisdom: gesture facilitates speech/language

- Production:
    - relieves working memory (de Ruiter 2000)
    - serves as helping device for retrieval of lexical items
      (Krauss 1998)
    - serves as a means to convey certain aspects of meaning
      (McNeill 1992, Kita 2000)

- Perception:
    - highlights new and important information (McNeill 1992; Ebert et al. 2011)
    - facilitates foreign language word learning (Macedonia et al. 2011)

- Onto- and phylogenesis:
    - is a precursor for speech during acquisition
      (Özçaliskan & Goldin-Meadow 2005)
    - initiates evolution of language (Tomasello 1999)

Gestures and Communication

- Some of these theories argue:
  gestures serve communicative function and are intended as such (McNeill 1992, Kita 2000)
  ('Gesture and speech work together to convey one thought')

- One explanation (Hostetter & Alibali 2008):
  (co-speech) gestures are the result of simulated action and perception

- Such simulations are executed as gestures if:
  - activation of the simulated action is sufficiently high
  - the *gesture threshold* is low enough
  - the motor system is simultaneously engaged in speaking

Gestures and Communication

This elucidates...

- why gestures not only transmit emotions and feelings, but also semantic contentful information

- that speech-accompanying gestures can be co-expressive (double information already given by speech) and complementary (add information not expressed in speech)

- that recipients are sensitive to gestures and integrate their meanings (verified e.g. by retellings of multimodally presented stories, cf. Cassell et al. 1999)

Gesture and Speech

Division of labor: gesture vs. speech

- Often made claim:

  certain aspects are better to be realized gesturally

  (e.g. shape), others verbally (e.g. abstract properties)

Gesture and Speech

- But there are other constraints that seem to be triggered by the utterance situation

- Gesture-speech allocation and the form of the gesture is influenced by...

  - common ground (Holler & Stevens 2007; Gerwing & Bavelas 2004) and information structure (McNeill 1992)

  - narrative and discourse structure (McNeill 1992, Parill 2010, Stec 2012)

  - the concrete communicative goals of the speaker

Communicative Potential

What is usally not addressed in gesture research is...

- how gesture-speech allocation is influenced by the concrete communicative goals of the speaker

- what co-speech gestures reveal to the hearer about the speaker's communicative plan

- what co-occurring linguistic material does to the communicative potential of gestures

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

Main Questions

- Questions for this talk:

  – How does gesture meaning combine with verbal meaning?

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

  – 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
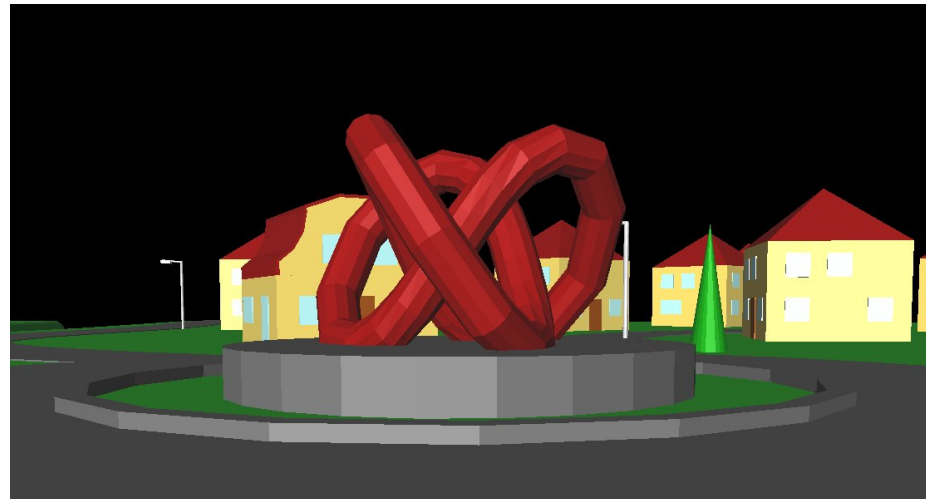
Some Background

on gesture theory

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)

A Corpus Example

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]$^{+ic-g}$.

Gesture Phases

Gesture phrase divides up into three phases
(Kendon 1980; McNeill 1992):

- **Preparation phase**
  (preparation, pre-hold)

- **Stroke**

- **Retraction phase**
  (post-hold, retraction)

Temporal Alignment

Gesture and speech are temporally aligned:

- **stroke and main accent**

  (e.g. Pittenger, Hockett, & Danehey 1960; Loehr 2004)

  stroke occurs just before or at the same time as
  (but not later than) the nuclear accent

- gesture phrases and 'tone groups' (Kendon 1972)
  (i.e. 'the smallest grouping of syllables over which a completed intonation
  tune occurs')

  gesture phrases and 'information units' (Kendon 1988, cf. Halliday 1985)

  gesture phrases and 'intermediate phrases' (Loehr 2004)

  gesture phrases and focus phrases (Ebert, Evert & Wilmes 2011)

Semantic Contribution

- Gesture information adds semantic content to the utterance

- Here: information about the shape of the base and the arrangement of the tubes

Objective 1

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

(1) Cornelia: *"Ich habe [eine Flasche Wasser] zum Talk mitgebracht." /*

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

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

- Gesture information adds semantic content to the utterance (cf. McNeill 1992, Kendon 1980)

- Questions:

  - How does gesture meaning combine with verbal meaning?

  - What exactly is the meaning contribution of the gesture?

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

Appositive Meaning is Non-at-issue

The direct denial test

protest to appositive

(5) *Ludger Beerbaum, <u>an out-</u>*
<u>standing show jumper</u>, was
accused of poling.

Direct denial response:

(6) *#That's not true! He is actually a*
lousy show jumper.

Discourse interrupting protest:

(7) *Hey, wait a minute! Actually, he*
is not an outstanding show
jumper, but pretty lousy.

protest to main clause

(5) *Ludger Beerbaum, an out-*
standing show jumper, <u>was</u>
<u>accused of poling.</u>

Direct denial response:

(8) *That's not true! He was actually*
accused of doping.

Appositive Meaning is Non-at-issue

The negation test

negating the appositive

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

Negation elaboration:

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

negating the main clause

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

Negation elaboration:

(11) *He was actually accused of doping.*

Gesture Meaning is Non-at-issue

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 <u>big</u> 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 <u>big</u> bottle of water to the talk.*

Negation elaboration:

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

Gesture Meaning is Non-at-issue

(1) *"Ich habe [eine Flasche Wasser] zum Talk mitgebracht." /*

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

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

Gesture Meaning is Non-at-issue

- 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)

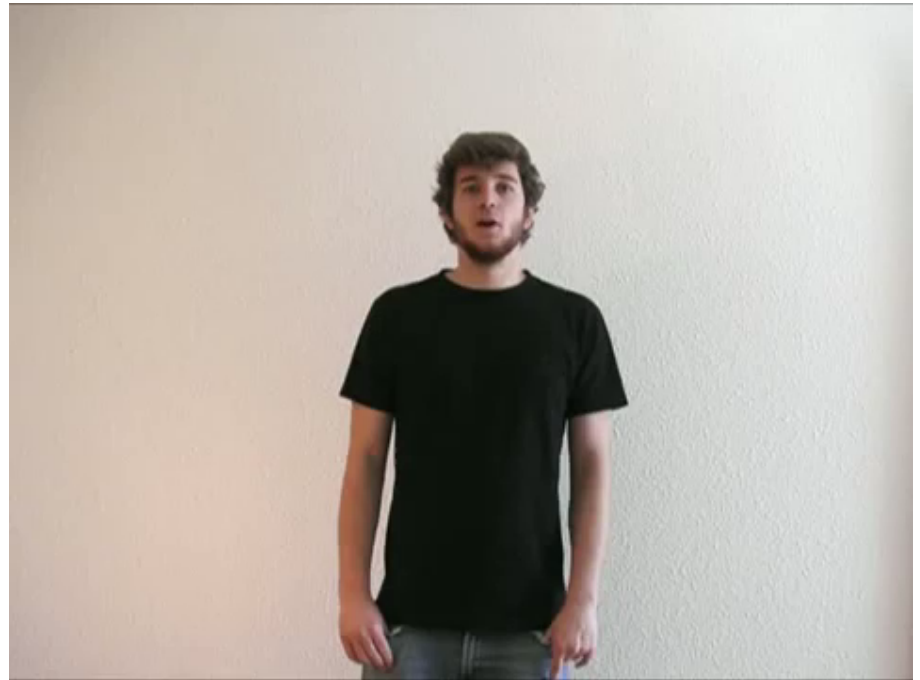- Rating experiment to test for these predictions

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.
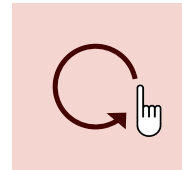*(In this picture, you see a wall with a window.)*

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 <u>runden</u> Fenster zu sehen...

gesture vs. adjective

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

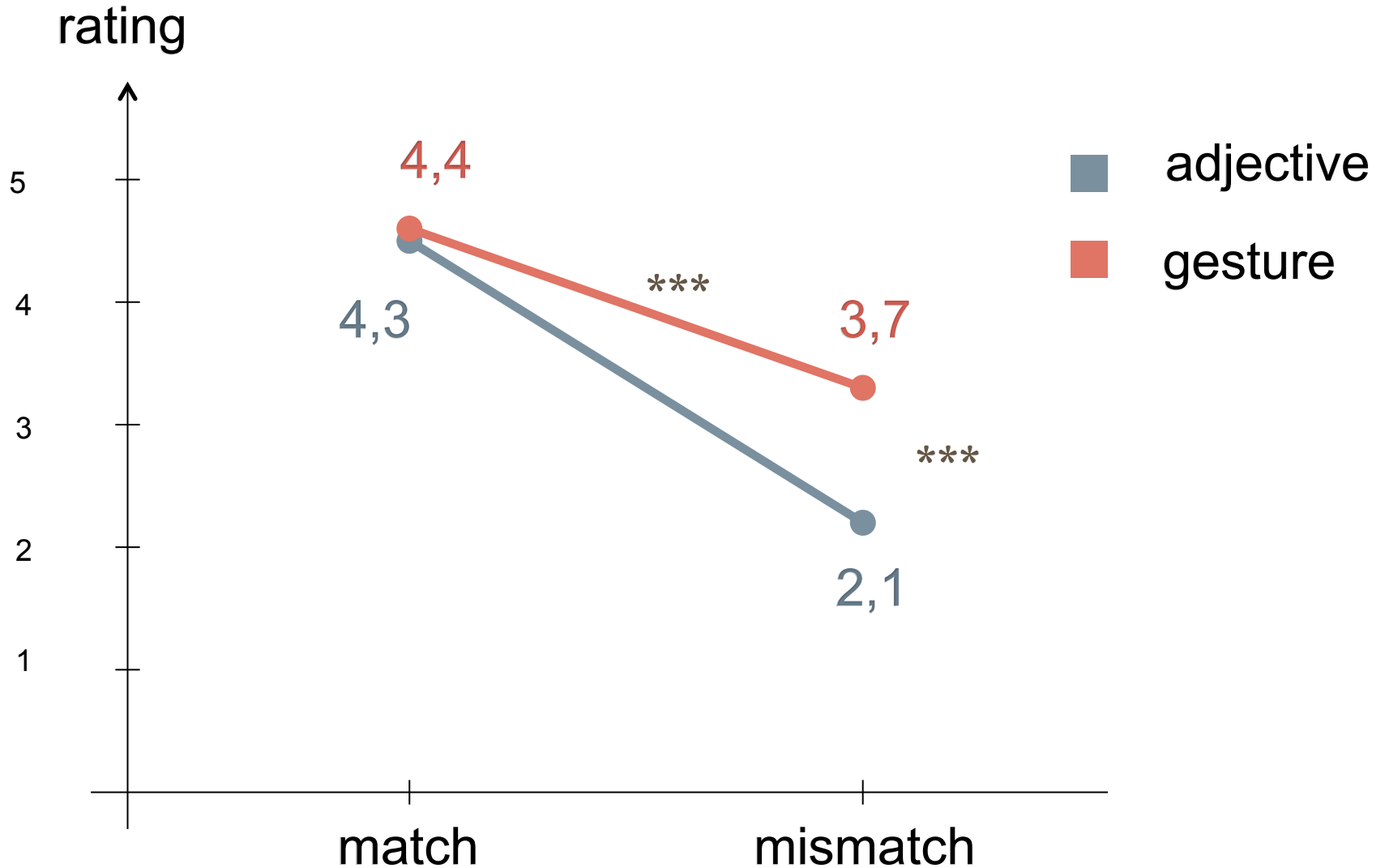 MODE: gesture vs. adjective

- participants:

  40 students of the University of Stuttgart
  native speakers of German

  expectation: gesture mismatch   >>   adjective mismatch

Gesture Meaning is Non-at-issue

rating

- adjective
- gesture

4,4

4,3

*** 3,7

*** 2,1

match   mismatch

Gesture Meaning is Non-at-issue

- **Predictions confirmed**:

  - clear interaction effect: negative influence of mismatches much lower for gestures than for adjectives

  - gesture meaning does not enter truth conditions straightforwardly → not treated like asserted material

- Gesture meaning is non-at-issue

- Future work: run exact same experiment with appositives instead of gestures

Objective 2

gestures contribute lexical and constructional meaning

Gesture Meaning Contributions

What exactly is the meaning contribution of the gesture?

(1) Cornelia: *"Ich habe [eine Flasche Wasser] zum Talk mitgebracht." /*

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

Conveys roughly the same meaning as:

(2) Cornelia: *"Ich habe eine <u>große</u> Flasche Wasser zum Talk mitgebracht." /*

                 "I brought a <u>big</u> bottle of water to the talk."

Gesture Meaning Contributions

What exactly is the meaning contribution of the gesture?

- No difference between iconic and pointing gestures:

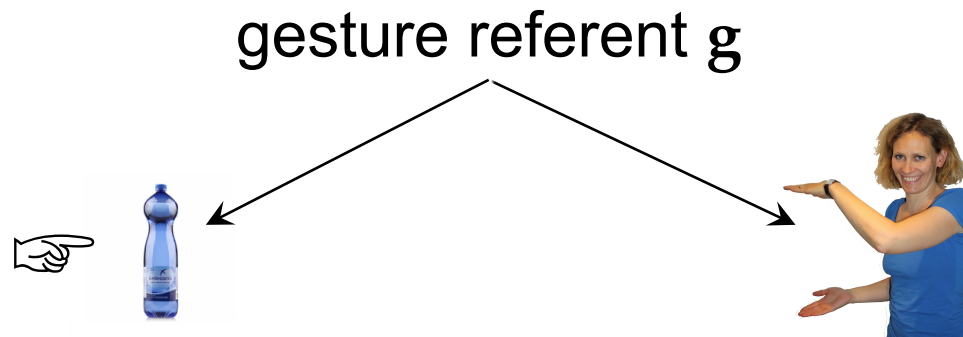 (21) *Daniel also brought [a bottle of water].*
  ☞ 🍶

     But actually a big one.

- Continuation indicates:
  pointing gesture conveys *The bottle is small*

- pointing gesture makes non-at-issue contribution in the same way as a corresponding iconic gesture

Gesture Meaning Contributions

'Lexical' meaning

- iconic and pointing gestures function alike
  — both refer to an individual

- For iconic gestures: represented individual is abstract and carries at least the features crucial for comparison
  (cf. Umbach & Gust to appear)

gesture referent **g**

Gesture Meaning Contributions

'Constructional' meaning

- Gesture and speech are temporally aligned
  (e.g. Pittenger, Hockett, & Danehey 1960; Loehr 2004)

- Proposal:

indefinite article
+ ☞ **g**

$\left.\right\}$ **g** is similar to verbal referent

(cf. Umbach & Gust to appear for
such an analysis of similarity demonstratives)

name/definite article
+ ☞ **g**

$\left.\right\}$ **g** is identical to verbal referent

noun phrase
+ ☞ **g**

$\left.\right\}$ **g** exemplifies verbal concept

(cf. Fricke 2012, Lücking 2013)

Gesture Meaning Contributions

Illustrations via gesture mismatch:

- name + gesture → identity

  (22) *[Daniel Hole] is one of the organizers of this workshop.*

  ☞

- definite article + gesture → identity

  (23) *[The big bottle of water] is blue.*

  ☞

- noun phrase + gesture → exemplification

  (24) *Most [bottles] are made of plastic nowadays.*

  ☞

A Formal Analysis

Combined meaning contributions of speech and gesture:

indefinite article + gesture	name/definite article + gesture	noun phrase + gesture
a	*the*	*bottle*

$\exists x$

similarity

☞

$\mathrm{SIM}_{p^\star}(x, z)$

$\exists x$

identity

☞

$x =_{p^\star} z$

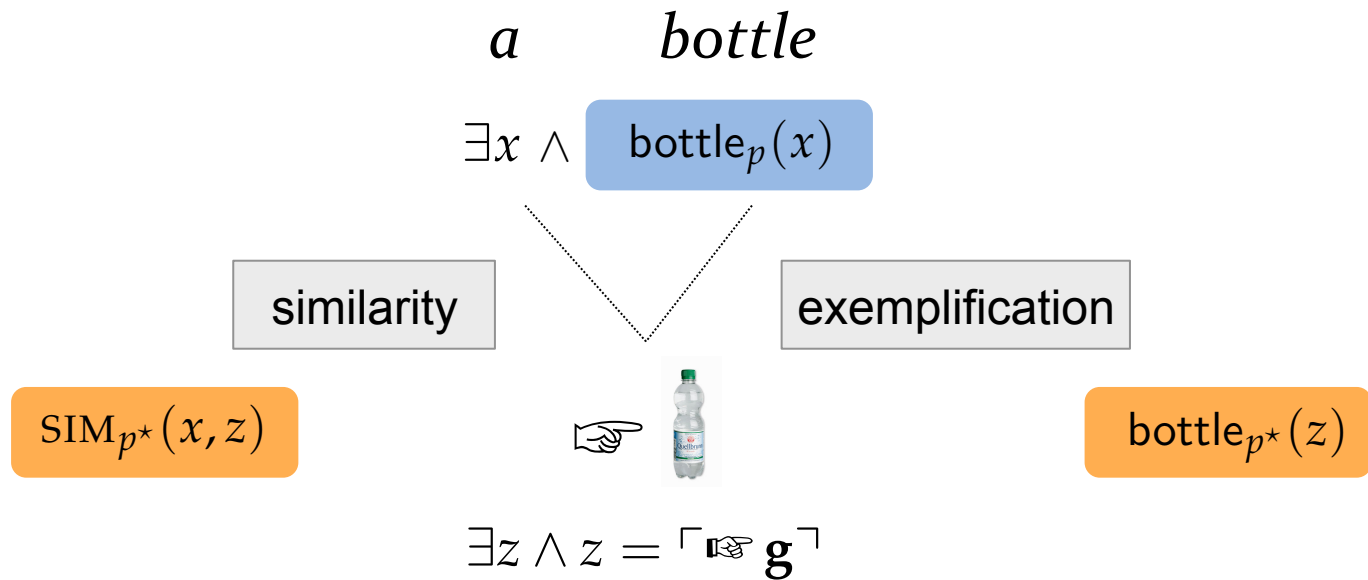$\mathrm{bottle}_p(x)$

exemplification

☞

$\mathrm{bottle}_{p^\star}(z)$

+ presuppositions
(existence & uniqueness)

A Formal Example
(indefinite article + NP)

Combined meaning contributions of speech and gesture:

$$a \qquad bottle$$

$$\exists x \wedge \boxed{\mathrm{bottle}_p(x)}$$

| similarity | | exemplification |

$$\mathrm{SIM}_{p^\star}(x,z) \qquad \text{☞} \qquad \mathrm{bottle}_{p^\star}(z)$$

$$\exists z \wedge z = \ulcorner \text{☞} \, \mathbf{g} \urcorner$$

$$\exists z \wedge z = \ulcorner \text{☞} \, \mathbf{g} \urcorner \wedge \exists x \wedge \boxed{\mathrm{bottle}_p(x)} \wedge \boxed{\mathrm{SIM}_{p^\star}(x,z)} \wedge \boxed{\mathrm{bottle}_{p^\star}(z)}$$

A Formal Example
(indefinite article + NP)

(25) *Cornelia brought [a bottle].*

☞ 🍾

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

$$\wedge \boxed{\text{bring}_p(\text{cornelia}, x)}$$

At-issue: there is a bottle that Cornelia brought

Non-at-issue: the gesture referent is similar to this bottle

the gesture referent is itself a bottle

Objective 3

demonstratives are 'dimension shifters'

German *so* as Dimension Shifter

The negation test

speech & gesture

(26) *Ich bringe niemals*
  [eine Flasche Wasser] mit zu

                    Vorträgen.

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

Negation elaboration:

(27) *#Eine kleine reicht mir nämlich.*
    (A small one is enough for me.)

speech + *so* & gesture

(28) *Ich bringe niemals*
  [SO eine Flasche Wasser] mit zu

                    Vorträgen.

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

Negation elaboration:

(29) *Eine kleine reicht mir nämlich.*
    (A small one is enough for me.)

German *so* as Dimension Shifter

- What happened here?

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

is synonymous to

(30) *Ich bringe niemals eine <u>große</u> Flasche Wasser mit zu Vorträgen.*
  (I never bring a <u>big</u> 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

(30) *Ich habe [eine Flasche Wasser]*

mitgebracht.

I brought [a bottle of water].

Direct denial response:

(31) *#Das stimmt nicht. Du hast doch eine kleine mitgebracht*

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

speech + *so* & gesture

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

mitgebracht.

I brought [a bottle of water like that].

Direct denial response:

(33) *Das stimmt nicht. Du hast doch eine kleine mitgebracht.*

(That's not true! You actually brought a small bottle.)
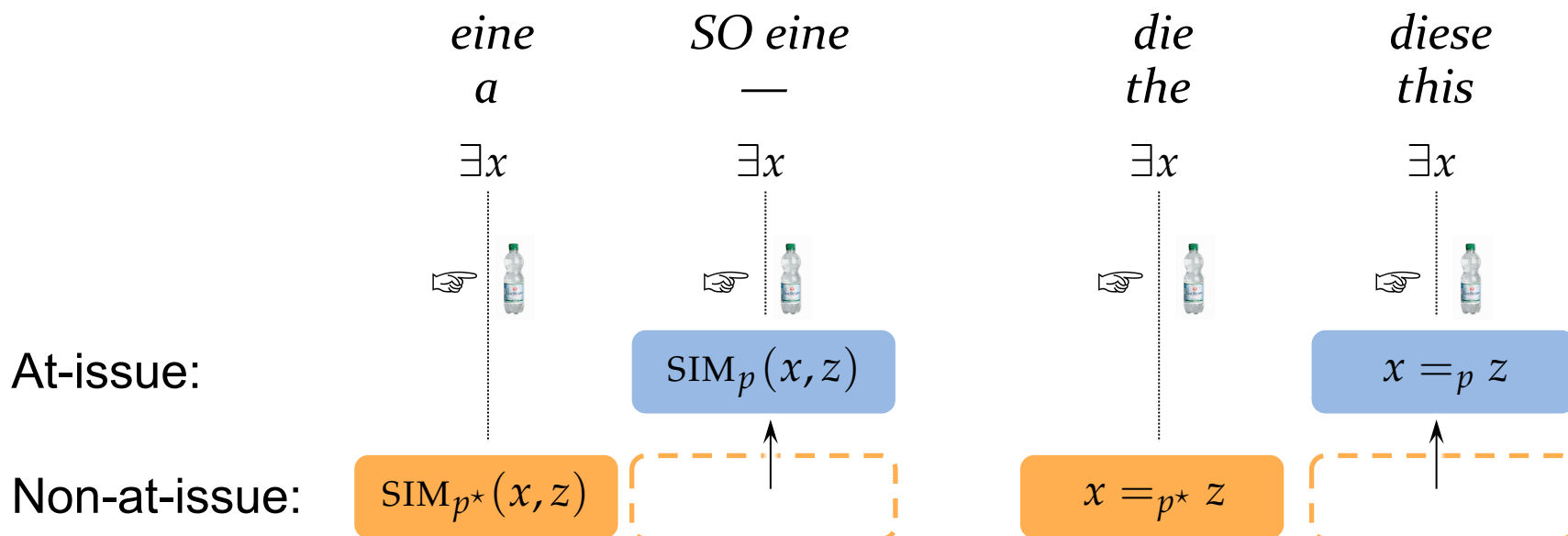
Demonstratives as Dimension Shifters

- 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.

$$diese = so + die \qquad\qquad this = so + the$$

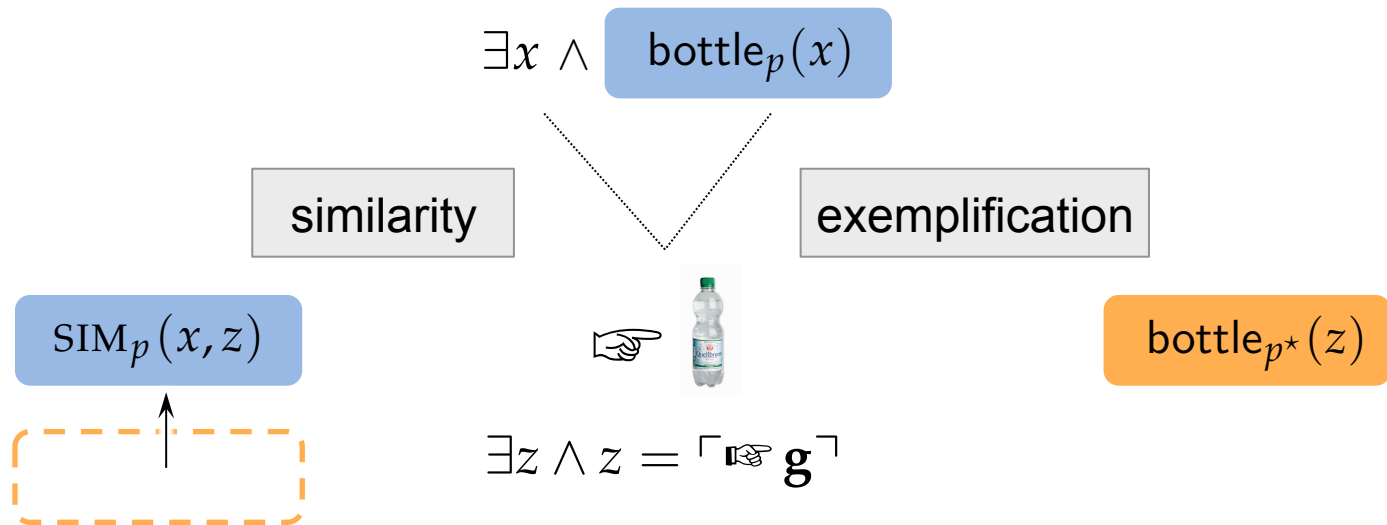|	*eine* *a*	*SO eine* —	*die* *the*	*diese* *this*
	$\exists x$	$\exists x$	$\exists x$	$\exists x$
At-issue:		$\mathrm{SIM}_p(x,z)$		$x =_p z$
Non-at-issue:	$\mathrm{SIM}_{p^\star}(x,z)$		$x =_{p^\star} z$	

A Formal Example

(*so* + indefinite article)

Combined meaning contributions of speech and gesture:

SO eine Flasche

$$\exists x \wedge \boxed{\text{bottle}_p(x)}$$

| similarity | | exemplification |

$$\boxed{\text{SIM}_p(x,z)}$$

☞

$$\boxed{\text{bottle}_{p^\star}(z)}$$

$$\exists z \wedge z = \ulcorner \text{☞ } \mathbf{g} \urcorner$$

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

(cf. Umbach & Gust to appear)

A Formal Example

(34) *Cornelia hat [SO eine Flasche] mitgebracht.*
      Cornelia brought [a bottle like that].

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

$\wedge$ $\boxed{\text{bring}_p(\text{cornelia}, x)}$

At-issue: there is a bottle **which is similar to the gesture referent** that Cornelia brought

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

Conclusion

- The division of labour between speech and gesture is (partly) determined by the communicative goals of the speaker

- How does gesture meaning combine with verbal meaning?

    - Co-speech gestures are non-at-issue by default

    - Demonstratives make gesture meaning at-issue

- What exactly is the meaning contribution of the gesture

    - lexical: co-speech gestures are directly referential and denote rigid designators to their referent

    - constructional: depending on the verbal phrase, they add similarity to (indefinte), identity to (definite) or exemplification of (NP) the speech referent

Thank you

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References

AnderBois, S., A. Brasoveanu & R. Henderson (t.a.): At-issue proposals and appositive impositions in discourse. *Journal of Semantics*. doi:10.1093/jos/fft014

Bühler, K. (1934): *Sprachtheorie: Die Darstellungsfunktion der Sprache*. Jena: Fischer.

Cassell, Justine, D. McNeill & K.-E. McCullough (1999): Speech-gesture mismatches: Evidence for one underlying representation of linguistic and nonlinguistic information. *Pragmatics & Cognition* 7(1): 1-34.

Diessel, H. (2006): Demonstratives, joint attention, and the emergence of grammar. *Cognitive Linguistics* 17: 463-489.

Ebert, C., S. Evert, & K. Wilmes (2011): Focus marking via gestures, in I. Reich, E. Horch and D. Pauly (eds.), Sinn & Bedeutung 15. *Proceedings of the 2010 annual conference of the Gesellschaft für Semantik*. Saarbrücken: universaar.

Fricke, E. (2012): Grammatik multimodal. *Wie Wörter und Gesten zusammenwirken*, de Gruyter, Berlin/Boston.

Gerwing, J., & J. B. Bavelas (2004): Linguistic influences on gesture's form. *Gesture* 4, 157-195.

Giorgolo, Gianluca (2010): Space and Time in Our Hands, *PhD Dissertation*, LOT Dissertation Series 262. Utrecht: LOT.

Özçaliskan, S. & S. Goldin-Meadow (2005): Gesture is at the cutting edge of early language development. *Cognition* 96, B101-B113

References

Grice, P. (1975): Logic and conversation, in P. Cole and J. Morgan (eds.), *Syntax and Semantics* 3: 41-58.

Gutzmann, D. (2012): *Use-conditional meaning. Studies in multidimensional semantics.* Doctoral dissertation. Institute of Linguistics, University of Frankfurt.

Halliday, M. A. K. (1985). *Introduction to Functional Grammar*. London: Edward Arnold.

Holler, J., & R. Stevens (2007): The effect of common ground on how speakers use gesture and speech to represent size information. *Journal of Language & Social Psychology* 26, 4-27.

Hostetter, A. B., & M. W. Alibali (2008): *Psychonomic Bulletin & Review* 15 (3), 495-51.

Kendon, A. (1972). Some relationships between body motion and speech: An analysis of an example. In A. Siegman & B. Pope (Eds.), *Studies in dyadic communication*. New York: Pergamon Press.

Kendon, A. (1980): Gesticulation and speech: Two aspects of the process of utterance. In Mary Ritchie Key (Ed.), *The Relationship of Verbal and Nonverbal Communication*. The Hague: Mouton.

Kendon, A. (1988). Goffman's approach to face-to-face interaction. In P. Drew & A. Wootton (Eds.), *Erving Goffman: Exploring the interaction order*. Boston: Northeastern University Press.

References

Kita, S. (2000): How representational gestures help speaking. In D. McNeill (Ed.), *Language and gesture*, pp. 162-185. Cambridge: Cambridge University Press.

König, E. (2012): Le rôle des déictiques de manière dans le cadre d'une typologie de la deixis, *Bulletin de la Société des Linguistique des Paris CVII*.

Koev, T. (2013): *Apposition and the Structure of Discourse*. Rutgers University.

Krauss, R. M. (1998): Why do we gesture when we speak? *Current Directions in Psychological Science* 7, 54-60.

Lascarides, A. and Stone, M. (2009). A formal semantic analysis of gesture. *Journal of Semantics*, pp. 1-57.

Loehr, D. (2004). *Gesture and Intonation*. PhD thesis, Georgetown University, Washington.

Lücking, A. (2013): *Ikonische Gesten. Grundzüge einer linguistischen Theorie*, De Gruyter, Berlin/Boston.

Lücking, A., K. Bergmann, F. Hahn, S. Kopp & H. Rieser (2013): Data-based analysis of speech and gesture: the Bielefeld Speech and Gesture Alignment corpus (SaGA) and its applications. *Journal on Multimodal User Interfaces* 7(1-2): 5-18. Special issue on multimodal corpora. Macedonia 2010

Macedonia, M., K. Müller, & A. D. Friederici (2011): The Impact of Iconic Gestures on Foreign Language Word Learning and Its Neural Substrate, Human Brain Mapping 32(6): 982-98.

References

McNeill, D. (2005): *Gesture and Thought*. Chicago: University of Chicago Press.

McNeill, D. (ed.) (2000): *Language and Gesture: Window into Thought and Action*. Cambridge: Cambridge University Press.

McNeill, D. (1992). *Hand and Mind: What gestures reveal about thought.* The University of Chicago Press, Chicago and London.

Nouwen, R. (2014): *How Pervasive is non at issue Content?*, talk held at the Institute for Linguistics, University of Stuttgart, 13th January 2014.

Nunberg, G. (1993): Indexicality and deixis. *Linguistics & Philosophy* 16:1–43.

Pittenger, R., Hockett, C., Danehey, D. (1960). *The First Five Minutes: A Sample of Microscopic Interview Analysis.* Ithaca, NY.

Parrill, F. (2010): Viewpoint in speech–gesture integration: Linguistic structure, discourse structure, and event structure, *Language and Cognitive Processes* 25:5, 650-668

Potts, Ch. (2012): Conventional implicature and expressive content. In: Claudia Maienborn, K. von Heusinger & P. Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning*, Vol. 3, 2516-2536. Berlin: Mouton de Gruyter.

Potts, Ch. (2007): The expressive dimension, *Theoretical Linguistics* 33(2): 165-197.

Potts, Ch. (2005): *The Logic of Conventional Implicatures*. Oxford University Press.

de Ruiter, J. P. (2000): The production of gesture and speech. In D. McNeill (Ed.), *Language and gesture*, pp. 284-311. Cambridge: Cambridge University Press.

References

Stec, K. (2012): Meaningful shifts. A review of viewpoint markers in co-speech gesture and sign language, *Gesture* 12:3, 327-360.

Streeck, J. (2002): Grammars, words, and embodied meanings. On the evolution and uses of so and like. *Journal of Communication* 52(3): 581-596.

Syrett, K. & T. Koev (to appear): Experimental Evidence for the Truth Conditional Contribution and Shifting Information Status of Appositives. *Journal of Semantics*.

Tomasello, M. (1999): *The Cultural Origins of Human Cognition.* Cambridge, MA: Harvard University Press.

Umbach, C. & C. Ebert (2009): German demonstrative 'so' - intensifying and hedging effects. *Sprache und Datenverabeitung* 1-2/2009: 153-168.

Umbach, C. & H. Gust (erscheint): Similarity Demonstratives, *Lingua*.

Appendix A

formal analysis, definites and demonstrative '*this*'

A Formal Analysis

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

- uni-dimensional and dynamic system
  $\rightarrow$ 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):
  p is on the table for discussion
  $p^{\star}$ is not for discussion and silently imposed

A Formal Analysis

(A1) *Ludger Beerbaum, an outstanding show jumper, was accused of poling*

$\exists x \wedge x = \mathsf{ludger\_beerbaum} \wedge \boxed{\mathsf{outstanding\_show\_jumper}_{p\star}(x)} \wedge \boxed{\mathsf{accused\_of\_poling}_{p}(x)}$

- derives two propositions:

  - At-issue proposal: Ludger Beerbaum is accused of poling

  - Non-at-issue imposition: Ludger Beerbaum is an outstanding show jumper

A Formal Analysis

- in the formal system: variables such as x stand for an individual concept (i.e. they are of type $\langle s,e \rangle$)

- basic gesture meaning of ☞ **g** :

  direct reference to gesture referent **g** by means of a rigid designator, noted as $\ulcorner$ ☞ **g** $\urcorner$:

  $$\text{for all possible worlds } w: [\![\ulcorner ☞ \mathbf{g} \urcorner]\!](w) = \mathbf{g}$$

- coverbal performance of gesture ☞ **g** :

  $$\ldots\ \exists z \wedge z = \ulcorner ☞ \mathbf{g} \urcorner\ \ldots$$

A Formal Example
(definite article + NP)

- Definite descriptions come with presuppositions of existence and uniqueness:
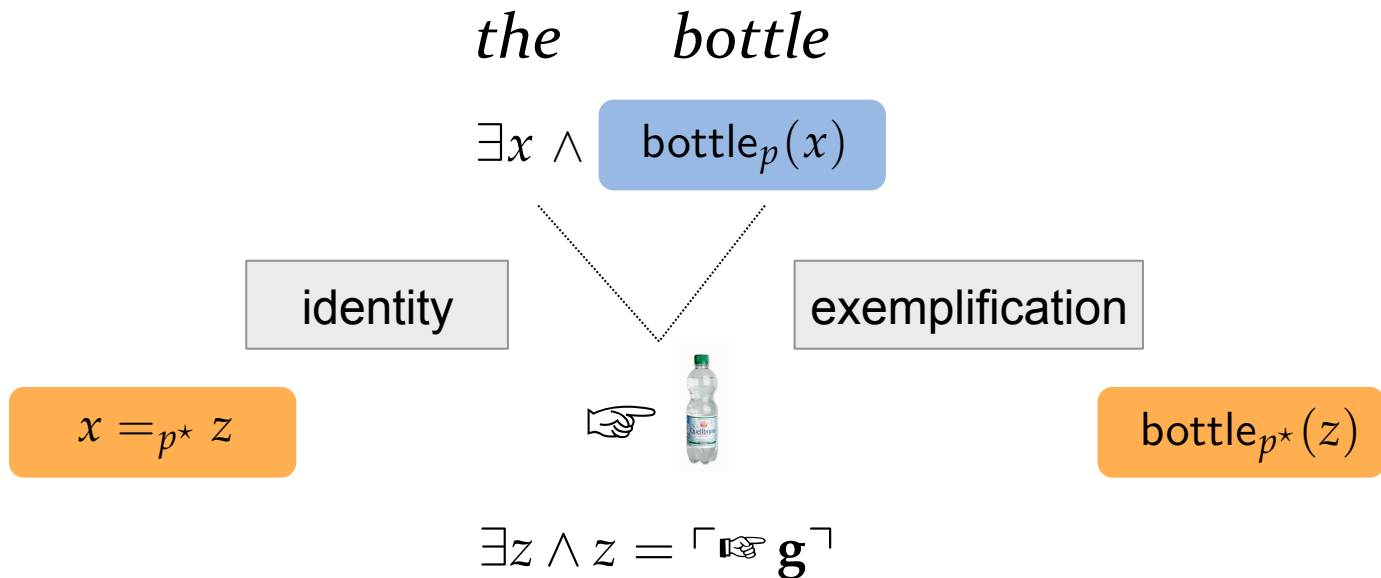
  the bottle presuppositions:
  - there is a bottle
  - there is not more than one salient bottle

- presuppositions (not formally spelled out here) must be satisfied by the context set

A Formal Example

Combined meaning contributions of speech and gesture:

the   *bottle*

$\exists x \land$ $\text{bottle}_p(x)$

identity   exemplification

$x =_{p^\star} z$ ☞ $\text{bottle}_{p^\star}(z)$

$\exists z \land z = \ulcorner ☞ \mathbf{g} \urcorner$

$\exists z \land z = \ulcorner ☞ \mathbf{g} \urcorner \land \exists x \land$ $\text{bottle}_p(x)$ $\land$ $x =_{p^\star} z$ $\land$ $\text{bottle}_{p^\star}(z)$

A Formal Example
(definite article + NP)

(A2) *(Consider all the things on the table.)*

Cornelia brought [the bottle].

$$\exists z \wedge z = \ulcorner \text{☞} \; \mathbf{g} \urcorner \wedge \exists x \wedge \boxed{\text{bottle}_p(x)} \wedge \boxed{x =_{p\star} z} \wedge \boxed{\text{bottle}_{p\star}(z)}$$

$$\wedge \boxed{\text{bring}_p(\text{cornelia}, x)}$$

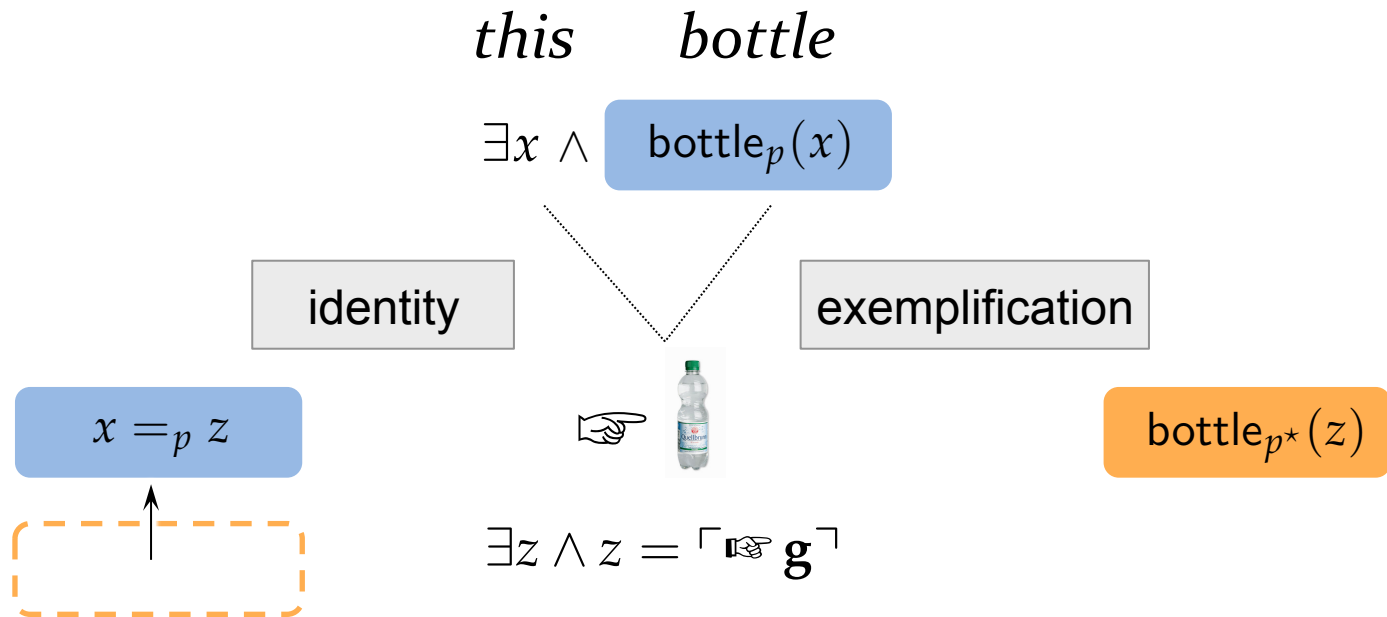| Presupposition:	there is a unique (contextually salient) bottle
At-issue:	Cornelia brought that bottle
Non-at-issue:	the gesture referent is that bottle the gesture referent is itself a bottle

A Formal Example
(this)

Combined meaning contributions of speech and gesture:

this   *bottle*

$\exists x \wedge$ $\text{bottle}_p(x)$

identity   exemplification

$x =_p z$ $\text{bottle}_{p^\star}(z)$

☞ 🍾

$\exists z \wedge z = \ulcorner \text{☞} \, \mathbf{g} \urcorner$

$\exists z \wedge z = \ulcorner \text{☞} \, \mathbf{g} \urcorner \wedge \exists x \wedge \quad \text{bottle}_p(x) \quad \wedge \quad x =_p z \quad \wedge \quad \text{bottle}_{p^\star}(z)$

A Formal Example
(this)

- Since the identity $x =_p z$ is at issue it becomes part of the description relevant for the presuppositions of the definite.

  this bottle presuppositions:
  - – there is a bottle **which is identical to the gesture referent**
  - – there is not more than one salient bottle **which is identical to the gesture referent**

- presuppositions are satisfied if there is a unique bottle pointed at

A Formal Example
(indefinite article + NP)

(A3) *Cornelia brought [this bottle].*

☞ 🝆

$$\exists z \wedge z = \ulcorner \text{☞ } \mathbf{g} \urcorner \wedge \exists x \wedge \boxed{\text{bottle}_p(x)} \wedge \boxed{x =_p z} \wedge \boxed{\text{bottle}_{p^\star}(z)}$$

$$\wedge \boxed{\text{bring}_p(\text{cornelia}, x)}$$

Presupposition:	there is a unique (contextually salient) bottle **which is identical to the gesture referent**
At-issue:	Cornelia brought that bottle and **that bottle is identical to the gesture referent**
Non-at-issue:	the object pointed at is itself a bottle

Discussion

- The gesture is directly referential to g and determined by the utterance situation.

  (A4) ^{F} *If the two bottles changed places, [this bottle]* *would be blue.*

- This mirrors Kaplan's (1989a) crucial observation for 'true demonstratives' as directly referential concepts.
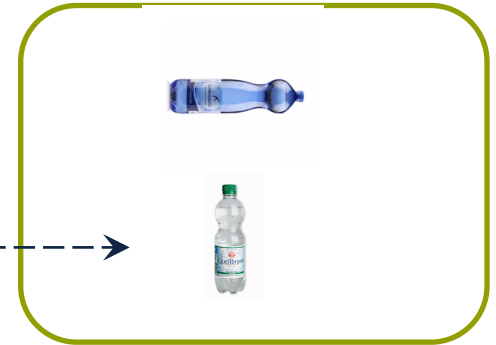
- Compare this to:

  (A5) ^{T} *If the two bottles changed places, [the bottle on the right] would be blue.*

Discussion

(A6) A: *[The bottle of Christian] is tipped over.*

☞ - →

(A7) B: *True. But this is not it/Christian's bottle.*

(A8) B: *True. But this is not a bottle of Christian.*

Presupposition: there is a unique (contextually salient) bottle of Christian

$$\exists z \land z = \ulcorner \text{☞} \mathbf{g} \urcorner \land \exists x \land \text{bottle\_of\_ch}_p(x) \land x =_{p^\star} z$$

$$\land \text{bottle\_of\_ch}_{p^\star}(z) \land \text{tip\_over}_p(x)$$

Discussion

(A9) A: *[This bottle] is tipped over.*

☞ - →

(A10) B: *False, the object you are pointing at is not tipped over.*

Presupposition: there is a unique (contextually salient) bottle which is identical to the gesture referent

$$\exists z \wedge z = \ulcorner ☞ \mathbf{g} \urcorner \wedge \exists x \wedge \boxed{\text{bottle}_p(x)} \wedge \boxed{x =_p z}$$

$$\wedge \boxed{\text{bottle}_{p^\star}(z)} \wedge \boxed{\text{tip\_over}_p(x)}$$

Appendix B

why are gesture contributions non-at-issue by default?

Sources for Non-At-Issueness

What is the source of the non-at-issueness of the gestures we have seen so far?

3 hypotheses:

      a) the nature of gesture as such

      b) their iconic character

      c) the fact that they are speech-accompanying

Sources for Non-At-Issueness

The nature of gesture as such

- not tenable

- Ladewig (2012): speech-replacing gestures capable of conveying meaning on their own without speech;
they are often not emblematic, but what Müller (1998) calls 'referential'

- Meaning of speech-replacing gestures enters at-issue dimension

    (B1a) A: *Have you met Paul recently?*

              B: *shakes head.*

    (B1b) *Can you pass me the [ ]? + iconic 'shape' gesture*

    (B1c) *Have you been [ ]? + iconic 'swim' gesture*

Sources for Non-At-Issueness

Iconicity

- Iconic gestures are maximally iconic, also emblematic gestures involve some degree of iconicity

- Pointing gestures? Not iconic themselves, but their index often stands in an iconic relation to the referent

- Is iconicity the driving force for non-at-issue interpretation?
  (p.c. with Klaus von Heusinger)

- Test cases:

  other types of iconic signs like ideophones within spoken languages (p.c. with Manfred Krifka) and iconic signs in sign languages (p.c. with Philippe Schlenker)

  Prediction: they contribute non-at-issue

Sources for Non-At-Issueness

Iconicity

- Iconicity plays an important role in sign languages: many productive non-conventionalized signs and expression types

- One example: *GROW* in DGS (see Schlenker to appear for a related example in ASL)

- Depending on what grows, the sign looks different

- Also, iconic realization possibilities: *The group grew*

  - signer can vary distance between the endpoints and speed
  - small and slow movement = minor and slow growing process
  - big and quick movement = quick growing process

- A matter for intensive research whether these iconic meaning components can be interpreted at issue or not

Sources for Non-At-Issueness

Iconicity

- Ideophones (Dingemanse): 'marked words that vividly evoke sensory events' like *holterdipolter*

- Play a far more significant role in many African and Asian languages (Dingemanse 2012)

- Can be seen as vocal gestures (e.g., they often have onomatopoetic, i.e. iconic, properties, cf. also phonaesthemes, Firth 1964)

- Fixed inventory or productive? Are they non-at-issue??

  (B2a) *Er kam holterdipolter die Treppe herunter.*

  (B2b) A: *Wie kam er die Treppe herunter?* B: *???Holterdipolter.*

  (B2c) *Das kann nicht Peter sein.*
  ??Er würde niemals holterdipolter die Treppe runterkommen.
  ?Er würde niemals <u>so</u> holterdipolter die Treppe runterkommen.

Sources for Non-At-Issueness

Iconicity

- Could be (partly) responsible for non-at-issueness

- But we have seen examples of at-issue contributions of iconic gestures (if accompanied by demonstratives or speech-replacing)

- To be investigated more closely:

  ideophones, iconic elements in sign languages, possibly non-iconic gestures

Sources for Non-At-Issueness

Speech-accompanying character

- Because they come in a different mode, speech-accompanying gestures are naturally 'secondary'

- Could be (partly) responsible for non-at-issueness

- But we have seen examples of at-issue contributions of co-speech gestures (if accompanied by demonstratives)

- Further investigation needed

Appendix C
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 of Appendix

Dingemanse, M. (2012): Advances in the cross-linguistic study of ideophones. *Language and Linguistics Compass 6*: 654-672.

Farkas, D. & K. Bruce (2010): On reacting to assertions and polar questions. *Journal of Semantics 27(1)*: 81–118.

Firth, John Rupert. 1964. *The Tongues of Men: And, Speech.* London: Oxford University Press.

Kaplan, D. (1989a): Demonstratives. In J. Almog, J. Perry & H. Wettstein (eds.), *Themes from Kaplan*, 481-564. Oxford: Oxford University Press.

Ladewig, Silva (2012): *Syntactic and semantic integration of gestures into speech – Structural, cognitive, and conceptual aspects*. Dissertation, Europa-Universität Viadrina, Frankfurt (Oder).

Müller, C. (1998): *Redebegleitende Gesten. Kulturgeschichte – Theorie – Sprachvergleich* (Buchreihe: Körper, Zeichen, Kultur; Band 1). Berlin: Berlin Verlag.