

# Experimental evidence on the non-at-issueness of co-speech gestures and demonstratives as dimension shifters

Cornelia Ebert

Goethe-Universität Frankfurt

Robin Hörnig

Universität Tübingen

Aleksandra Ćwiek

Susanne Fuchs

Manfred Krifka

Leibniz-Zentrum Allgemeine Sprachwissenschaft Berlin

This research is funded by the DFG within the XPRAG.de program

Rijeka June 2019

# aims

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- show that gestures contribute meaning, which is not at-issue by default
- argue for a semantics of demonstratives as dimension shifters
- present experimental support for both claims
- (at-issueness as a gradient category)

# gestures

and their non-at-issueness

joint work with Christian Ebert (cabuu GmbH)

(cf. Ebert & Ebert 2014)

# gesture types

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- 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

# the SaGA copus

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Bielefeld Speech-and-Gesture-Alignment (SaGA)  
corpus (Lücking et. al 2013)

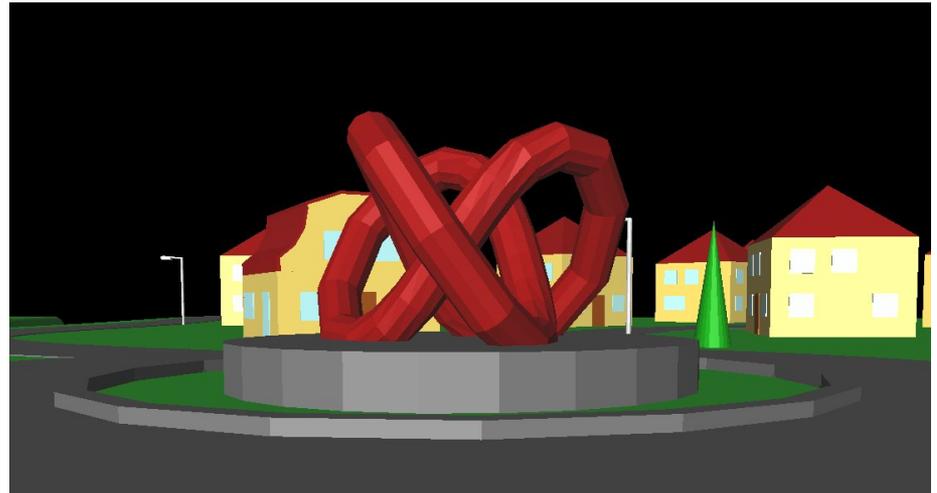


*It is on a [grey base made of concrete]<sup>+ic-g</sup>.  
Three meters high. And on it, there are [red tubes]<sup>+ic-g</sup>.*

# co-speech gesture

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- Gesture information adds semantic content to the utterance
- 'Gesture and speech work together to convey one thought' (cf. McNeill 1992, Kendon 1980)



# gestures

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(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."*

# non-at-issueneess

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- Gestures contribute **non-at-issue meaning** (in the sense of Potts 2005)
- **at-issue:** asserted content; main claim of the utterance; what the speaker wants to convey
- **not at-issue:** an aside that comes with the utterance; not towards what the speaker wants to drive the conversation

# non-at-issueneess

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- Typical example for conveyers of non-at-issue information: appositives
- Claim: 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 doping.*

# non-at-issueness

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- 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

# non-at-issueneess

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## The direct denial test

### protest to appositive

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

Direct denial response:

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

# non-at-issueneess

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## 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.*

# non-at-issueneess

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## 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.*

# non-at-issueneess

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## 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.*

# gesture meaning is not at-issue

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(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*

# Ebert & Ebert 2014

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- Lexical meaning of a gesture: direct reference to gesture referent **g** by means of a rigid designator
- coverbal performance of gesture  **g** :

...  $\exists z \wedge z = \ulcorner \text{pointing hand } \mathbf{g} \urcorner$  ...

- Constructional meaning of a gesture  
(due to temporal alignment):

indefinite article

+  **g**

}

**g** is **similar** to verbal referent

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

# Ebert & Ebert 2014

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- 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
- Keep track of at-issue/non-at-issue content via propositional variables  $p, p^*$ :
  - At-issue proposal:  $p$
  - Non-at-issue imposition:  $p^*$

# Ebert & Ebert 2014

Combined meaning contributions of speech and gesture:

indefinite article  
+ gesture

*a*

$\exists x$

similarity



$SIM_{p^*}(x, z)$

name/definite article  
+ gesture

*the*

$\exists x$

identity



$x =_{p^*} z$

noun phrase  
+ gesture

*bottle*

$bottle_p(x)$

exemplification



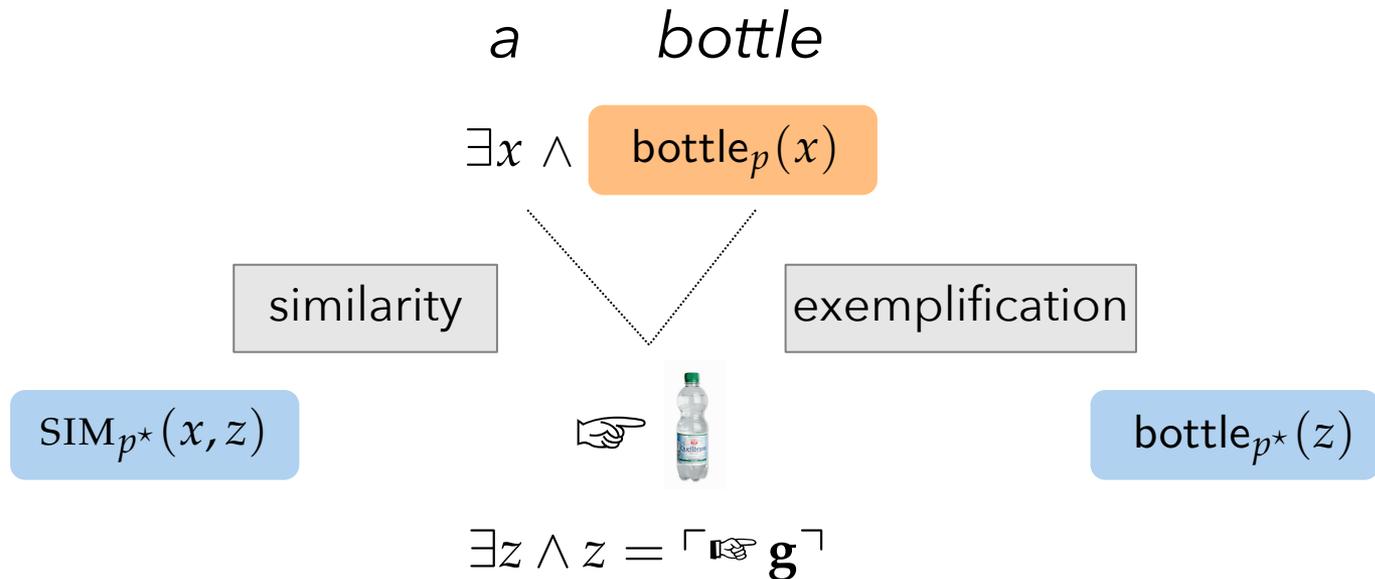
$bottle_{p^*}(z)$

+ presuppositions  
(existence & uniqueness)

# a formal example

(indefinite article + NP)

Combined meaning contributions of speech and gesture:



$$\exists z \wedge z = \lceil \text{pointing hand } \mathbf{g} \rceil \wedge \exists x \wedge \text{bottle}_p(x) \wedge SIM_{p^*}(x, z) \wedge \text{bottle}_{p^*}(z)$$

# a formal example

(indefinite article + NP)

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



$$\exists z \wedge z = \ulcorner \text{hand pointing } \mathbf{g} \urcorner \wedge \exists x \wedge \text{bottle}_p(x) \wedge \text{SIM}_{p^*}(x, z) \wedge \text{bottle}_{p^*}(z) \wedge \text{bring}_p(\text{cornelia}, x)$$

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

# demonstratives

and their dimension shifting potential

joint work with Christian Ebert (cabuu GmbH)

(cf. Ebert & Ebert 2014)

# German SO as dimension shifter

## The negation test

speech & gesture

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



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

Negation elaboration:

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

speech + SO & gesture

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



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

Negation elaboration:

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

# German SO as dimension shifter

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- What happened here?

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



is synonymous to

(26) *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

# demonstratives as dimension shifters

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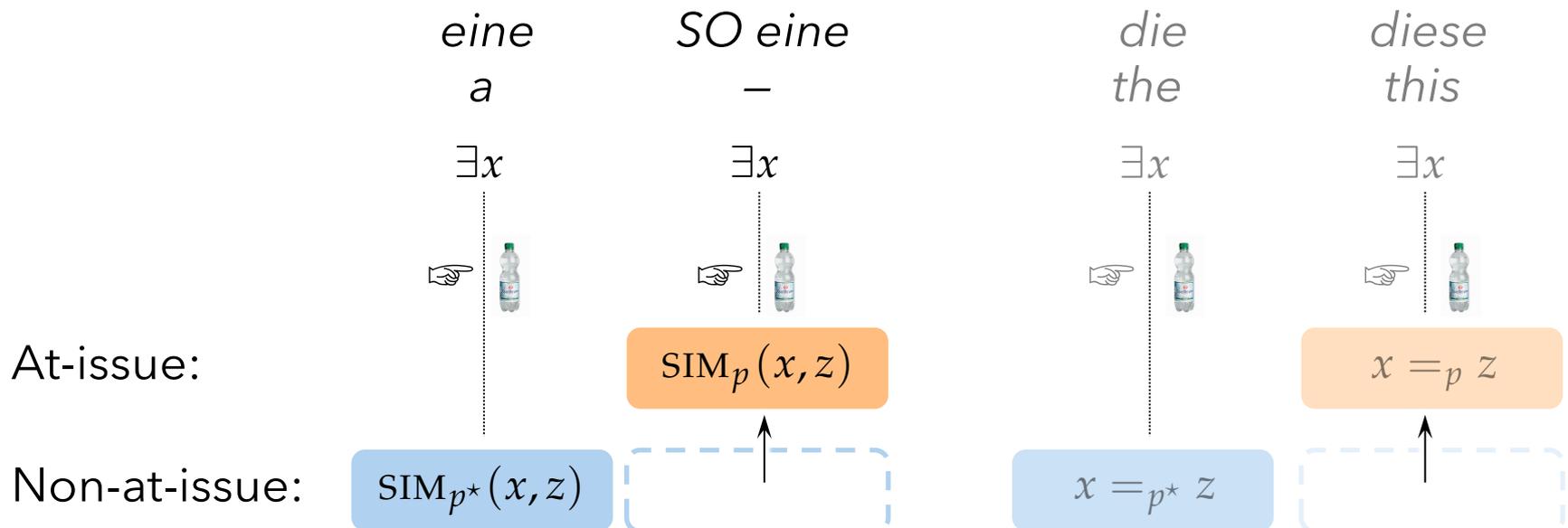
- Demonstratives make speech-accompanying gesture meaning at-issue
- Comes close to Tomasello's (1999) claim (in the spirit of Bühler 1934) that demonstratives serve to create 'joint attention' (cf. Diessel 2006)
- Cf. Fricke 2012, Umbach & Ebert 2009, Streeck 2002 for placeholder-function of so (see 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*

*this* = *so* + *the*

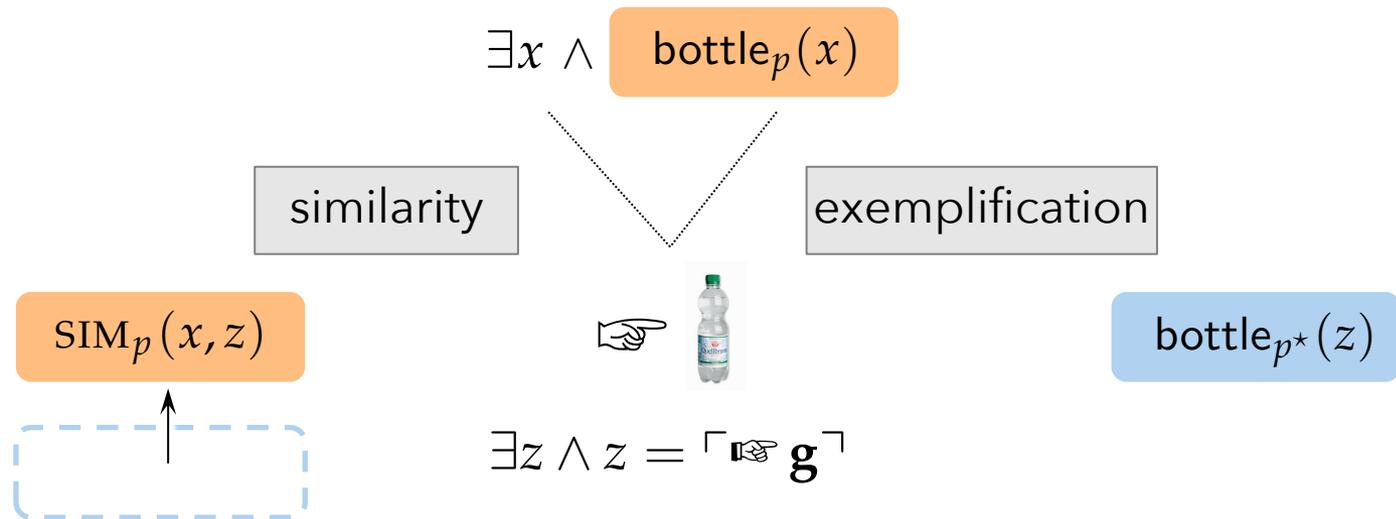


# a formal example

(SO + indefinite article)

Combined meaning contributions of speech and gesture:

*SO eine Flasche*

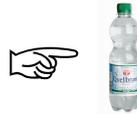


$$\exists z \wedge z = \lceil \text{point } g \rceil \wedge \exists x \wedge \text{bottle}_p(x) \wedge \text{SIM}_p(x, z) \wedge \text{bottle}_{p^*}(z)$$

# a formal example

(SO + indefinite article)

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



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

At-issue:

there is a bottle **which is similar to the gesture referent** that Cornelia brought (cf. Umbach & Gust 2014)

Non-at-issue:

the gesture referent is itself a bottle

# experiment 1

gesture content is not at-issue

# hypothesis

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- **Hypothesis:**

gesture meaning is not at-issue, i.e., not treated like asserted material and does not enter truth conditions straightforwardly

- **Assumption:**

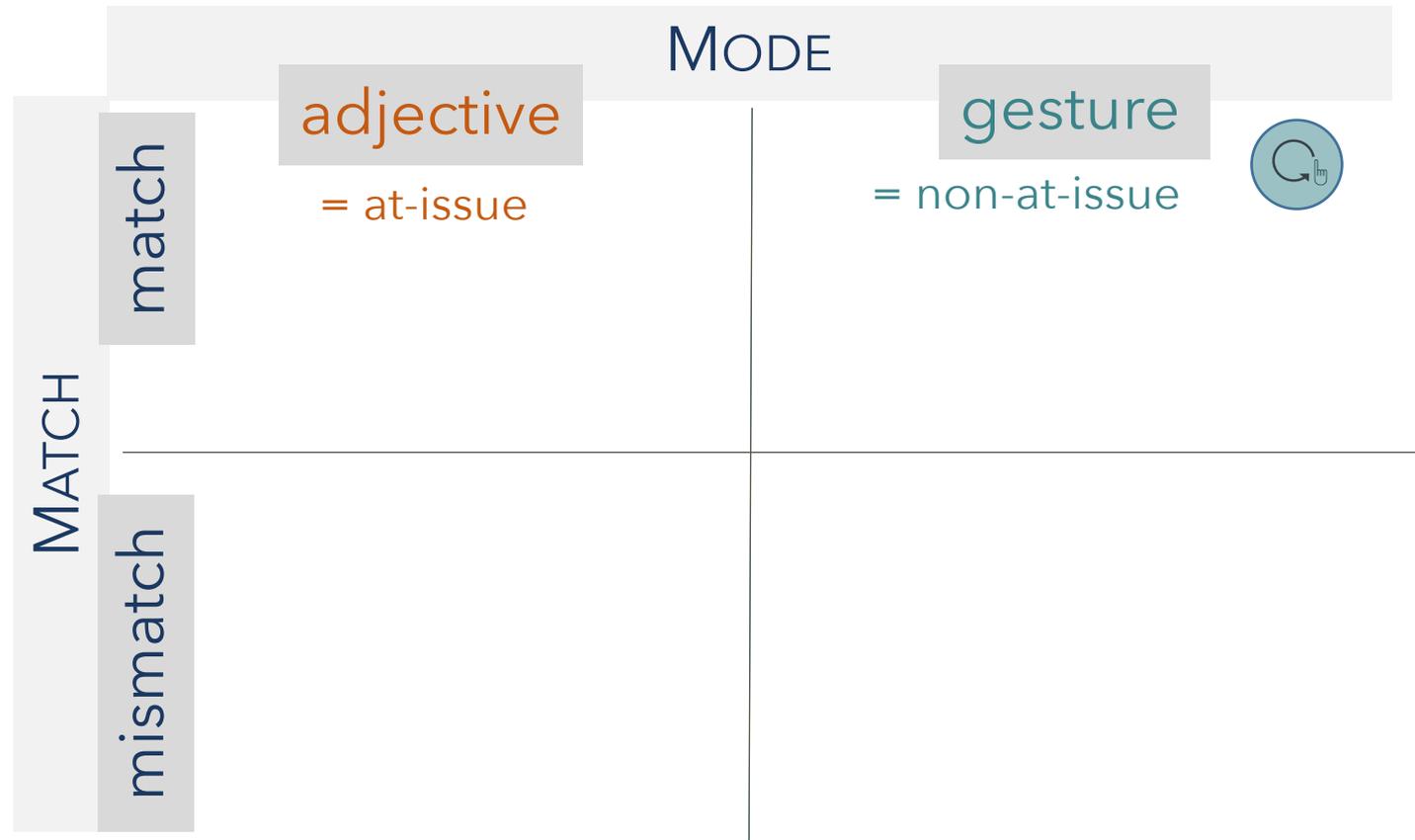
mismatching **non-at-issue** material impairs matching judgements less strongly than mismatching **at-issue** material (cf. Potts 2005; Syrett & Koev 2015)

- **Operationalization:**

Mismatching **gesture** impairs matching judgements significantly less strongly than mismatching linguistic **at-issue** material (here: **adjective**)

# 2 × 2 design: MODE × MATCH

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# factor MODE: video stimuli

## MODE

adjective

= at-issue



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

„In this picture, you see a wall with a **round** window“

gesture

= non-at-issue



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

„In this picture, you see a wall with a window“



# factor MATCH: picture stimuli

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MATCH

match



round window

mismatch



rectangular window

# 2x2 design: MODE×MATCH

		MODE	
		adjective	gesture
MATCH	match	<p>adjective</p> <p>„... you see a wall with a round window“</p> 	<p>gesture</p> <p>„... you see a wall with a window“</p> 
	mismatch	<p>adjective</p> <p>„... you see a wall with a round window“</p> 	<p>gesture</p> <p>„... you see a wall with a window“</p> 

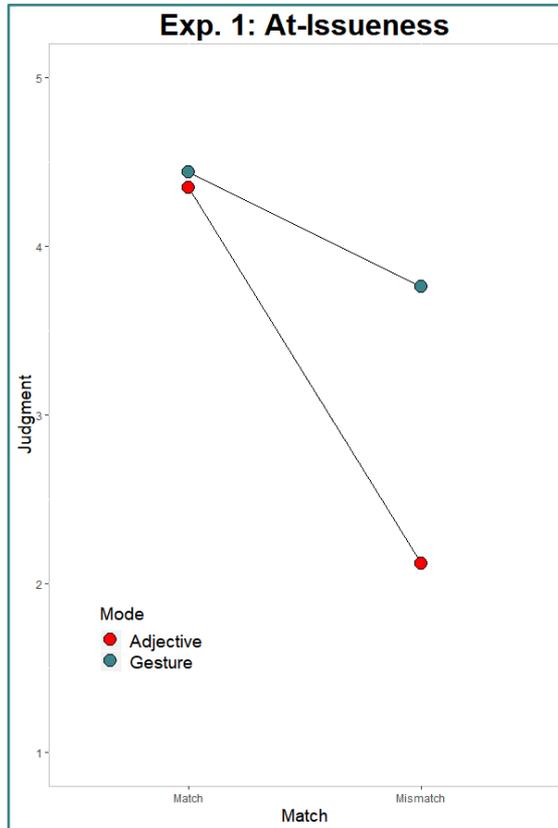
# dependent variable: matching judgement

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no match = □ 1 □ 2 □ 3 □ 4 □ 5 = perfect match

- materials: 24 experimental items + 48 fillers (4 lists, Latin square)
- participants:  
40 native speakers of German, students of University of Stuttgart
- prediction: interaction of MODE x MATCH  
(adj|match - adj|mismatch) > (gest|match - gest|mismatch)

# results



## Experiment 1: at-issueness

MODE:  $F_1(1,39) = 164.0^{***}$ ;  $F_2(1,23) = 102.1^{***}$

MATCH:  $F_1(1,39) = 556.1^{***}$ ;  $F_2(1,23) = 127.9^{***}$

MO  $\times$  MA:  $F_1(1,39) = 93.7^{***}$ ;  $F_2(1,23) = 68.6^{***}$

# discussion

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## interpretation

- clear interaction effect: mismatching **gestures** (**non-at-issue**) impaired judgments much less strongly than mismatching **adjectives** (**at-issue**)
- gesture meaning does not enter truth conditions straightforwardly → not treated like asserted material

## confirmation

- Gesture meaning is **non-at-issue**

# experiment 2

demonstratives as dimension shifters

# hypothesis

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- **Hypothesis:**

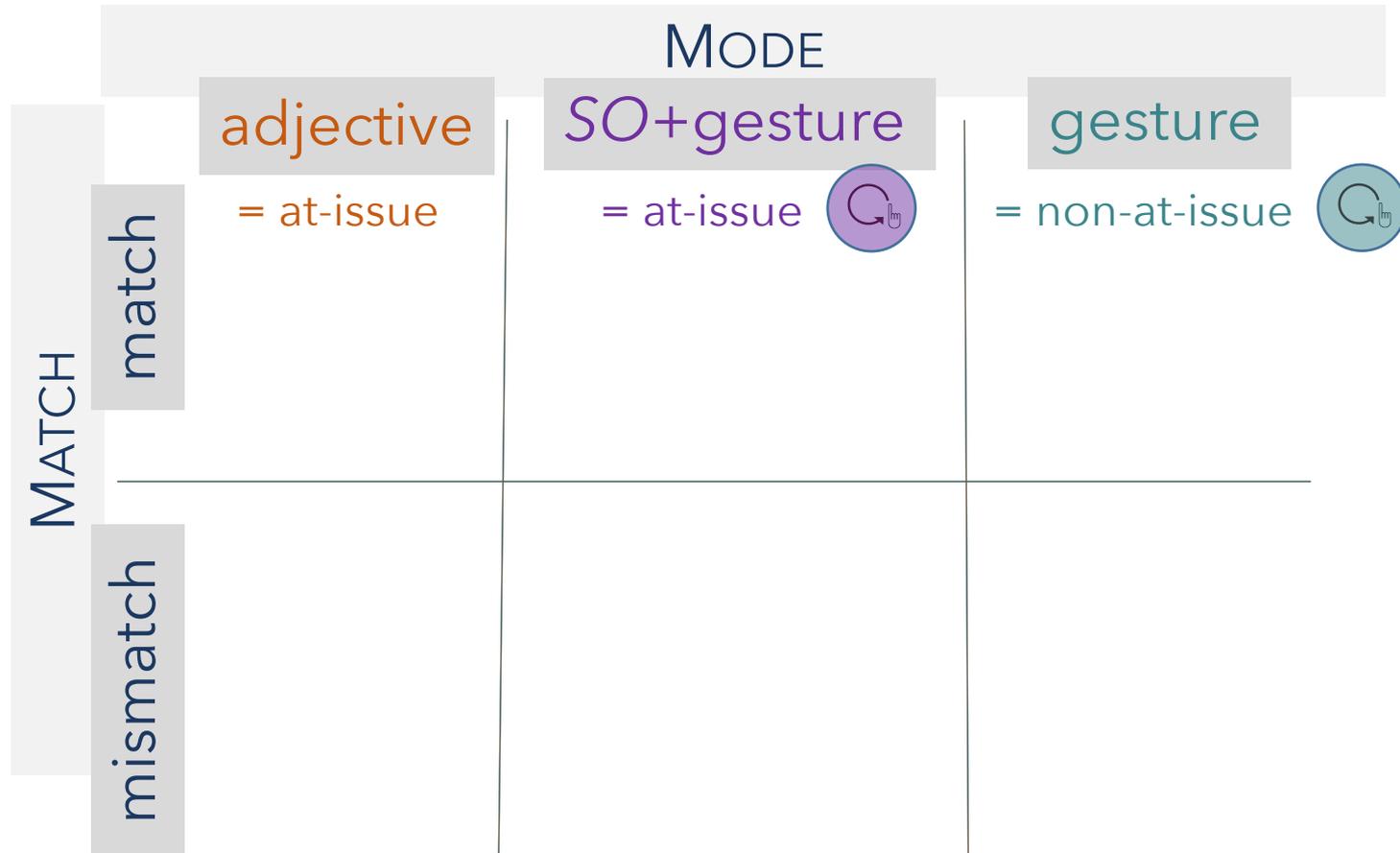
accompanying demonstrative like *SO* ,such' renders gesture meaning at-issue

- **Operationalization:**

Mismatching gesture with accompanying demonstrative (**at-issue**) impairs matching judgements significantly more than without a demonstrative (**non-at-issue**)

# 3x2 design: MODExMATCH

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# factor MODE: video stimuli

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adjective

= at-issue

MODE

SO+gesture

= at-issue

gesture

= non-at-issue



*Auf diesem Bild ist eine Mauer mit SO einem Fenster zu sehen*

*,In this picture, you see a wall with such a window'*



# 3x2 design: MODE×MATCH

		MODE		
		adjective	SO+gesture	gesture
MATCH	match	<p>= at-issue ,... a wall with a round window'</p> 	<p>= at-issue ,... a wall with such a window'</p> 	<p>= non-at-issue ,... a wall with a window'</p> 
	mismatch	<p>,... a wall with a round window'</p> 	<p>,... a wall with such a window'</p> 	<p>,... a wall with a window'</p> 

# dependent variable: matching judgement

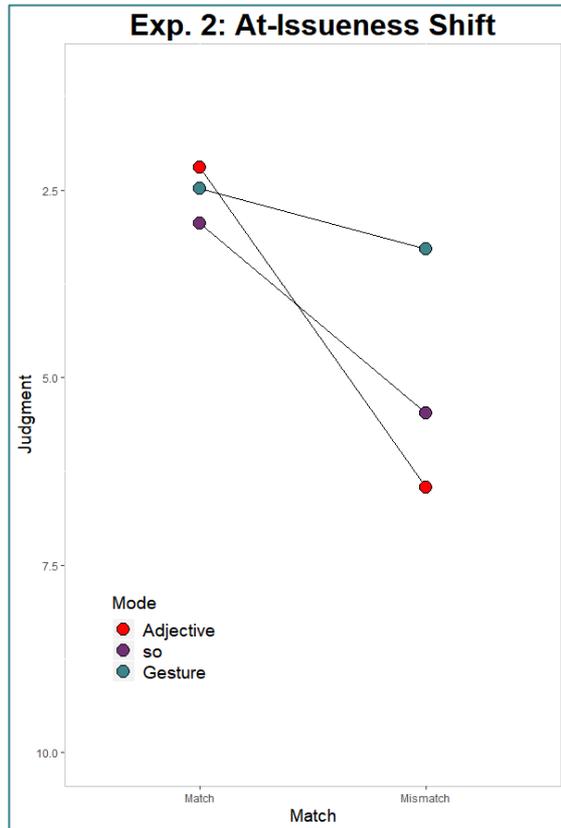
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no match =  $\square_{10} \square_9 \square_8 \square_7 \square_6 \square_5 \square_4 \square_3 \square_2 \square_1$  = perfect match

- materials: 24 experimental items + 48 fillers (4 lists, Latin square)
- participants: 32 native speakers of German
- prediction: interaction of MODE (*SO* vs *gest*) x MATCH

$$(\text{SO} | \text{match} - \text{SO} | \text{mismatch}) > (\text{gest} | \text{match} - \text{gest} | \text{mismatch})$$

# results



## Experiment 2: at-issueness shift

MODE:  $F_1(2,62) = 22.7^{***}$ ;  $F_2(2,46) = 18.2^{***}$

MATCH:  $F_1(1,31) = 182.5^{***}$ ;  $F_2(1,23) = 70.0^{***}$

MO  $\times$  MA:  $F_1(2,62) = 26.8^{***}$ ;  $F_2(2,46) = 22.4^{***}$

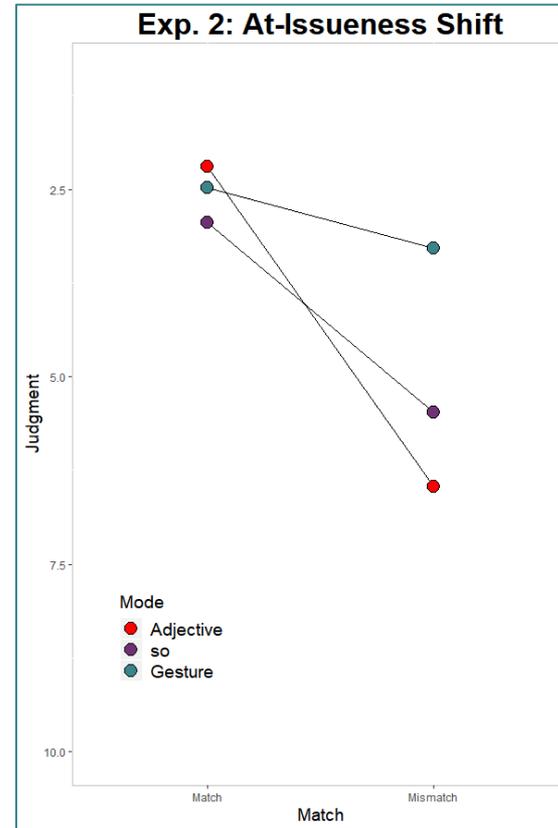
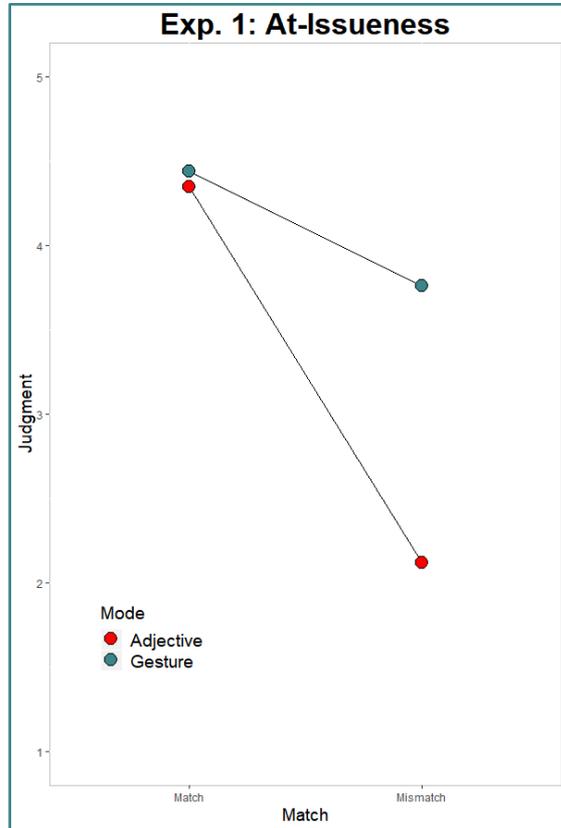
## Contrast Interactions

adj-so  $\times$  Ma:  $F_1(1,31) = 19.3^{***}$ ;  $F_2(2,46) = 10.8^{**}$

gest-so  $\times$  Ma:  $F_1(1,31) = 9.6^{**}$ ;  $F_2(2,46) = 14.3^{**}$

# experiments 1 and 2

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# conclusion

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Predictions (almost) confirmed:

- gesture meaning is, by default, **non-at-issue**
- demonstratives shift gesture meaning towards **at-issue** material
- **BUT**: mismatching gestures still impaired matching judgments less strongly than adjectives even if accompanied by a demonstrative
- seems to suggest that **at-issueness** is a gradient category (cf. Ebert 2017)

at-issueness as a gradient category

some thoughts

# gradual at-issueness

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- pieces of information from different dimensions or channels compete for at-issue status
- A new thought on competition: gradual at-issueness

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

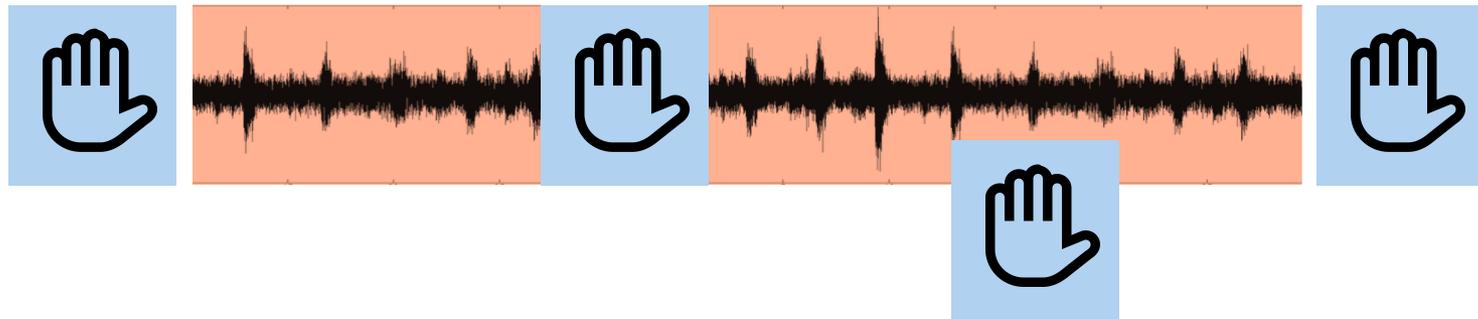
# at-issue appositives

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- As opposed to sentence-medial appositives, sentence-final appositive relative clauses *can* apparently be at-issue (AnderBois et al. 2015; Koev 2013; Syrett & Koev 2015)
- Occurrence at right periphery & finiteness are "stand-alone" features for appositives

# at-issue gestures

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**pre-speech**

**pro-speech**

**co-speech**

**post-speech**

at-issue

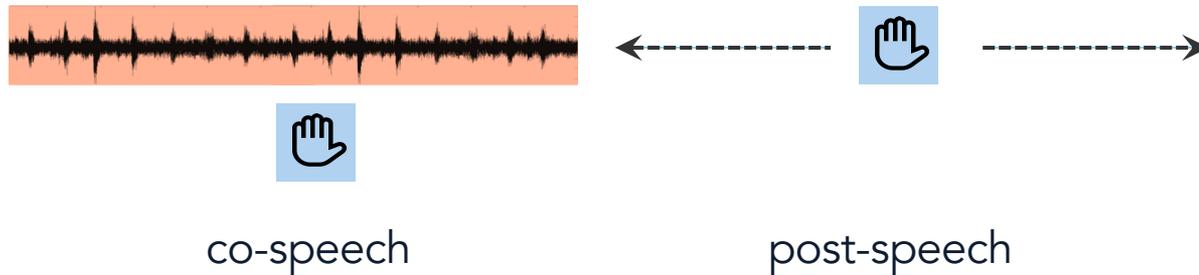
not at-issue

more distant  
→ more at-issue

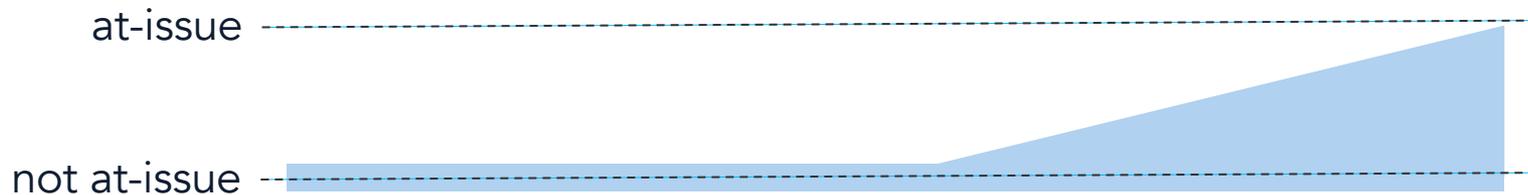
(Terminology of Schlenker 2017)

# gradual at-issueness

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dependent appositives  
(non-finite, sentence-medial, ...) → stand-alone appositives  
(finite, sentence-final, ...)



thank you!

This research is funded by the DFG within the XPRAG.de Priority Program  
and the SFB 833.