The non-at-issue contributions of gestures

and speculations about their origin

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Aim A
(non-at-issueness of gestures)

- Relate the interaction of gesture and speech to 'multidimensional' phenomena

- Show that speech and (certain) speech-accompanying gestures interact in the same way as different dimensions of speech among each other (i.e. 'at issue' vs. 'non-at-issue' material, Potts 2005)

Gesture : Speech
⇔
Non-at issue : At-issue

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Aim B
(source for non-at-issueness)

- Speculate on the possible source for the non-at-issueness of speech-accompanying gestures

  a) the nature of gesture as such

  b) their iconic character

  c) the fact that they are speech-accompanying

Aim C
(demonstratives)

- Discuss the role of demonstratives (German *dies-* and *so*)

- Proposal: they act as 'dimension shifter' from non-at-issue to at-issue

Aim D
(formal semantic modeling)

- First attempt towards a formal analysis

- Propose a semantic interpretation for gestures

- Define 'constructional meanings' for alignment of gesture and speech depending on whether the gesture

  (i)   accompanies an NP or

  (ii) a (referential) DP, and here

  (ii-a) the associated DP is indefinite

  (ii-b) the associated DP is definite

Outline

- **Some notes on gestures**

- Gestures as non-at-issue material (A)

- Source of non-at-issueness (B)

- The role of demonstratives (C)

- Towards a formal analysis (D)

What are gestures?

- Gesture =

  communicative movements of hands and arms transporting emotions, intentions, and thoughts

Types of gestures

- Pointing gestures

- Iconic gestures

- Metaphorics

- Emblems

- Beats

Types of gestures relevant for this talk

- Iconic gestures

- Pointing gestures

- Emblems

Corpus examples

- Speech-accompanying iconic gestures

- Taken from the Bielefeld Speech-and-Gesture-Alignment (SaGA) corpus of project B1 *Speech-gesture-alignment* of the SFB 673 *Alignment in Communication*

- Multimodal corpus (video and audio) collecting dialogues from an experiment where one subject gives directions for navigation through a dynamic virtual world (Lücking et. al 2013)

- The corpus is annotated for gestures
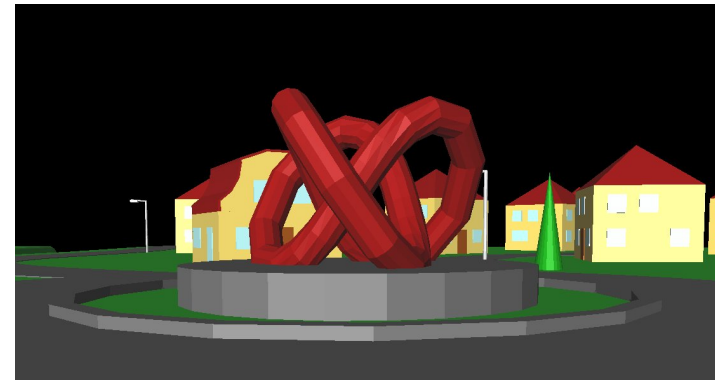
A corpus example

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]$^{+ic-g}$.

What do these examples show?

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

    - Preparation phase (preparation, pre-hold)

    - Stroke

    - Retraction phase (post-hold, retraction)

What do these examples show?

- Gesture and speech are temporally aligned:

  - **stroke and main accent** (see among others: Pittenger, Hockett, & Daheny 1960; Kendon 1980; McNeill 1992; Loehr 2004, Jannedy & Mendoza-Denton 2005)

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

  - **gesture phrases and 'tone groups'** (i.e. 'the smallest grouping of syllables over which a completed intonation tune occurs', Kendon 1972) / **'information units'** (Kendon 1988, cf. Halliday 1985) / **'intermediate phrases'** (Loehr 2004) / **focus phrases** (Ebert, Evert & Wilmes 2011)

What do these examples show?

- Gesture information adds semantic content to the utterance

- It adds information about the shape of the base (it is round) and the sculpture (shape and arrangement of the tubes)

- Gesture and speech work together to convey one thought (cf. McNeill 1992, Kendon 1980)

Objects of interest

- What exactly is the additional information of the gesture?

- How can it be represented?

- How does it combine with the semantic information from the speech signal?

- What role do demonstratives play?

Outline

- Some notes on gestures

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- Source of non-at-issueness (B)

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Two dimensions within speech

- Recent trend in formal pragmatics: study of 'multidimensional meanings', **at-issue** vs. **non-at-issue** material (e.g. Potts 2012)

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

- Recent contributions: formal frameworks modeling multidimensionality and making predictions about interactions among these dimensions (Potts 2005, 2007; Gutzmann 2012; Koev 2013; AnderBois et al. to appear among many others)

Two dimensions within speech

- Core phenomena: '**expressives**' like *damn* (or 'mixed items' like *cur*) and '**supplements**' like appositive relative clauses or appositive NPs

- 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

Non-at-issue material

- Epithets

  That bastard/idiot Kresge is famous. (Potts 2007, p. 168)
  Dieser Depp von Peter wusste mal wieder alles besser.

- Expressive adjectives

  I hear your damn/bloody dog barking. (Potts 2005, p. 18)
  Ich habe euren verdammten Hund die ganze Nacht bellen hören.

- 'Expressively colored' expressions (mixed items)

  This cur howled the whole night. (Gutzmann 2012, p.23)
  Dieser Köter hat die ganze Nacht gejault.

Non-at-issue material

- Appositives

Ames, a former spy, is now behind bars.   (Potts 2007, p. 90)

Ames, who was a successful spy, is now behind bars.

Paul, der beste Reitlehrer der Welt, unterrichtet in unserem Stall.

Paul, der sicher der beste Reitlehrer der Welt ist, unterrichtet in unserem Stall.

Expressives and emblems

- Expressives are comparable to (speech-accompanying) emblematic gestures

- Both transmit attitudes and feelings, often negative ones, which are also 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)

Expressives and emblems

- Parallels:

  a) *Meine Schwester soll noch den* *nervigen* *Rasen mähen.*

  b) *Meine Schwester soll noch den [Rasen] mähen.*

  <div align="center">+ 'balla-balla' gesture</div>

- E.g. parallel 'projection' behaviour of negative attitude:
  a)/b): the fact that the sister has to mow the lawn is annoying

- But:

  c) *Meine* *nervige* *Schwester soll noch den Rasen mähen.*

  d) *Meine [Schwester] soll noch den Rasen mähen.*

  <div align="center">+ 'balla-balla' gesture</div>

- c)/d): The sister is annyoing, no projection to entire event

Appositives and iconic gestures

- Appositives are comparable to (speech-accompanying) iconic gestures

Iconic gestures

Recall corpus example

- Semantic content of the speech signal:

  🗩   The sculpture has a base made of concrete

- Semantic content of the gesture (approximation):

  ✋   The base is round

- Apparent combined semantic content of the signal:

  🗩 + ✋   The sculpture has a round base made of concrete

  $\exists x[\text{base}(x) \wedge \text{of-concrete}(x) \wedge \text{have}(\iota y.\text{sculpture}(y),x) \wedge \text{round}(x)]$
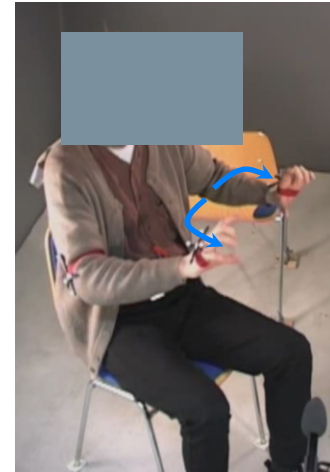
Gesture and speech

- **<u>BUT</u>:** contribution of gesture and speech of different nature

- **The gesture** contributes **non-at-issue** information

  The sculpture has [a base made of concrete]
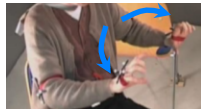
- **At issue:** The sculpture has a base made of concrete

  Not at issue: The base is round

- Means roughly the same as:

  The sculpture has [a base made of concrete], which is round by the way.

Test cases

- Non-at-issue material is independent of the main assertion (see e.g. Potts 2005)

- Thus, it is predicted that the gestures

  (a) cannot be denied directly in discourse

  (b) project, hence they cannot be negated by ordinary negation

  (c) are not part of what is questioned in interrogatives

Direct denial
within speech

- Krifka 2013: *das/that* picks up at-issue assertions

- Direct denial impossible to appositive content:

  A: *Ludger Beerbaum, an outstanding show jumper, was accused of doping.*

  B: *That's not true! He was not accused of doping! It was actually poling!*

  B: *#That's not true! He is no show jumper!*

- Objection to appositive content only with certain effort (cf. presupposition protest):

  B: *Hey, wait a minute! Actually, he is no show jumper. He does dressage.*

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Direct denial
with gestures
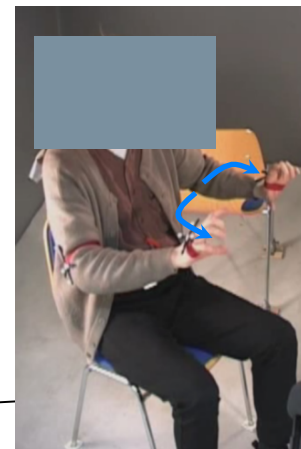
A: *The sculpture has [a base made of concrete]*

Plain contradiction:

B: ✔ *That's not true! The base is made of glass (, not concrete).*

B: #*That's not true! The base is square (, not round).*

'Discourse interrupting' protest is fine:

B: *Hey, wait a minute! Actually, the base is square and not round.*

Projection
within speech

- Negation targets only main clause predicate:

It is not true that Ludger Beerbaum, an outstanding show jumper, was accused of doping.

✓*He was actually accused of poling.*

#*He is actually a lousy show jumper.*

Projection
with gestures

- Negation does not target gesture material:

  🗨 + ✋   *I would never buy [a casserole].*

  #Lasagne sheets would not fit in properly.

- Compare to:

  🗨 *I would never buy an oval casserole.*

  Lasagne sheets would not fit in properly.

Target of question
within speech

- Appositive information is not part of the question:

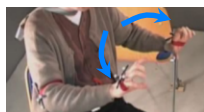A: *Have you ever met Paul, the best horse riding instructor in the world?*

B: *#No, but I have met Paul. (But I don't agree he is so great.)*

B: *Yes, however, I don't think he is such a great instructor.*

Target of question
with gestures

- Gesture material not part of the question:

  A: *Did you buy [a casserole] yesterday?*

  B: *#No, but I bought a square one.*

  B: *Yes, but actually it was a square one.*

- Compare:

  A: *Did you buy an oval casserole yesterday?*

  B: *No, but I bought a square one.*

  B: *#Yes, but actually it was a square one.*

Target of questions
emblems and expressives

- Expressives are not part of the question:

  A: *Have you ever met that bastard Kresge?*   (Gutzmann 2012, p. 48)

  B: *#No, but I have met Kresge.*

  B: *Yes, however, I like him.*

- Emblems:

  A: *Have you met [Paul] recently?*
            + 'balla-balla' gesture

  B: *#No, but I have met Paul. (no additional gesture)*

  B: *Yes, but why don't you like him?*

Pilot study
(Ebert in prep. based on Bsc-thesis 2012 by C. Krämer)

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

① ②

Auf diesem Bild sieht man ein Auto, das auf [einer Straße] fährt
(In this picture, you see a car that drives on a street)

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Pilot study
(Ebert in prep. based on Bsc-thesis 2012 by C. Krämer)

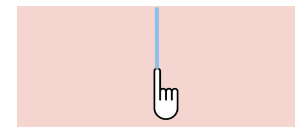pilot rating study: influence of iconic gestures on truth-value judgements

① ②

Auf diesem Bild sieht man ein Auto, das auf...
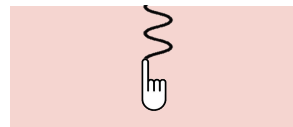
...[einer Straße] fährt　　　*...[einer Straße] fährt*

...einer kurvigen *Straße fährt*　　*... einer* geraden *Straße fährt*

match vs. mismatch

gesture vs. adjective

③

How well does the description in the video fit the picture?

☐ 5 (perfect)　☐ 4 (quite good)　☐ 3 (ok)　☐ 2 (not so good)　☐ 1 (not at all)

Pilot study
(Ebert in prep. based on Bsc-thesis 2012 by C. Krämer)

- materials:

    12 experimental items (no fillers)

- independent variables:

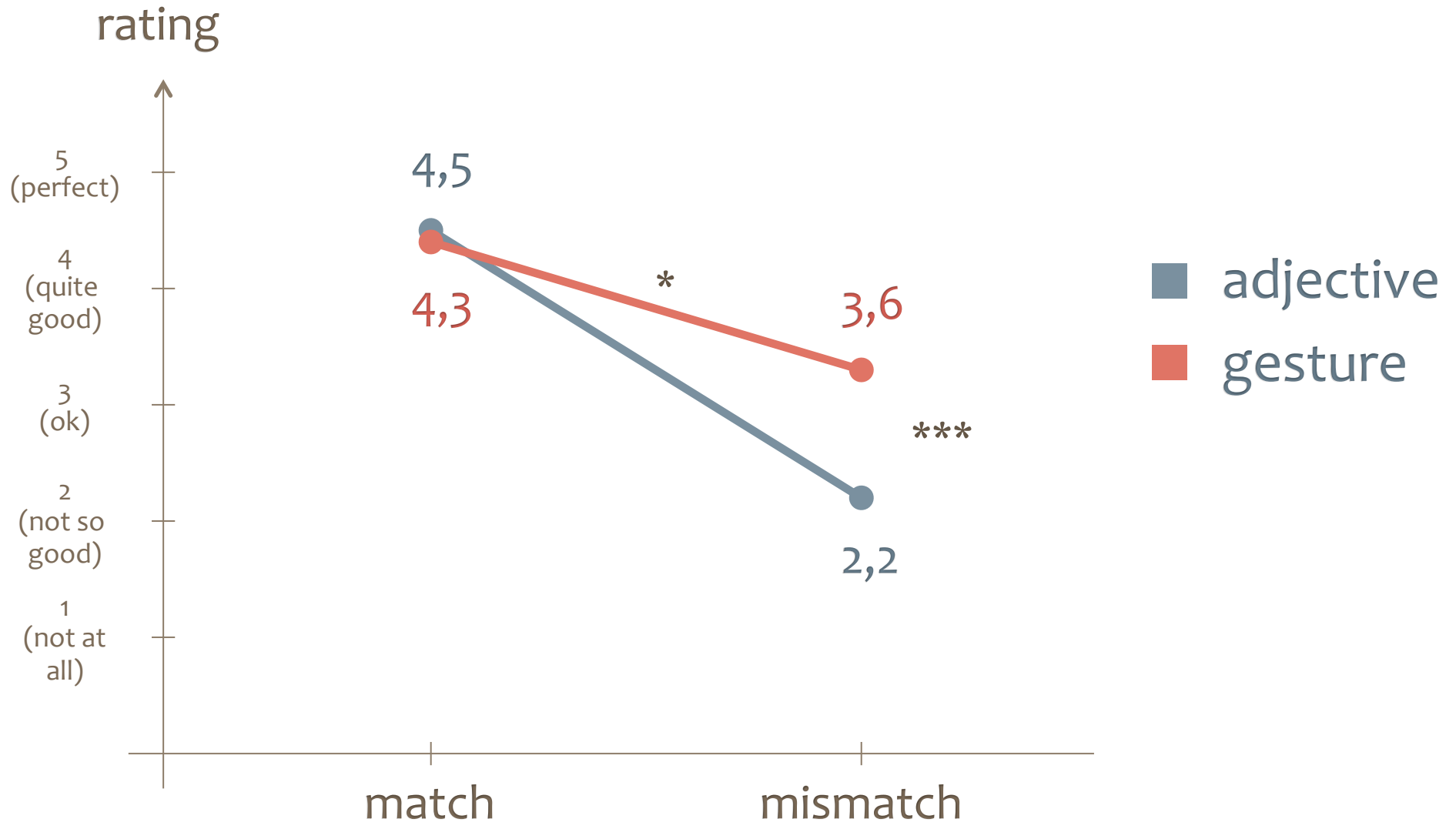   MATCH: match vs. mismatch

    MODE: gesture vs. adjective

- participants:

    20 students of the University of Stuttgart; native speakers
    of German

expectation: gesture mismatch >> adjective mismatch

Pilot study
(Ebert in prep. based on Bsc-thesis 2012 by C. Krämer)

Experimental studies

- Pilot study on iconic gestures: mismatching gesture (= non-at-issue) information does not influence truth value judgements in the same way as mismatching adjective information (=at-issue information)

- currently under design:

  - fullfledged experiment along the lines of the pilot study

  - same experiment contrasting appositives and adjectives
    (see Syrett et al. to appear for two experiments on truth value judgements with appositives; result: no difference between contribution of appositives and at-issue material)

✓Aim A

- Gesture contributions are not at issue

- Well, … actually we have seen that:
  speech-accompanying iconic and emblematic gestures are not at issue

Outline

- Some notes on gestures

- Gestures as non-at-issue material (A)

- **Source of non-at-issueness (B)**

- The role of demonstratives (C)

- Towards a formal analysis (D)

The source of 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

The nature of gesture

- Hypothesis (a) seems not tenable

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

- To yield the intended combined meaning with the speech-signal, the meaning of speech-replacing gestures has to enter the at-issue dimension

  a) A: *Have you met Paul recently?*
     B: *shakes head.*

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

  c) *Heute waren wir [ ].* + iconic 'swim' gesture

Iconicity

- What about hypthesis (b)?

- So far: iconic gestures and emblematic gestures

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

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

- test cases:
  - other types of gestures that involve iconicity to a lesser extent, i.e. pointing gestures
    (Prediction: they contribute at issue)
  - 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)

Sign languages

- Well-known that 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

Ideophones

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

- Play a far more significant role in many African and Asian languages (cf. e.g. 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??

    a) *Er kam holterdipolter die Treppe herunter.*

    b) A: *Wie kam er die Treppe herunter?*   B: *???Holterdipolter*

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

Pointing gestures

- What is the contribution of a pointing gesture?

- Example with indefinite:

    The sculpture has [a base made of concrete]

    ☞

- Claim: The base of the sculpture talked about must be similar to the base of the sculpture pointed at

- We will come back to that question and compare the contribution of gestures accompanying indefinites, definites, and NPs

- For now: do pointing gestures contribute at issue or not?

Pointing gestures
Independence

- Indefinite with pointing gesture (to casserole in shop window):

    a) A: *Peter hat sich gestern [eine Auflaufform] gekauft.*

    ☞ 🍲

    B: *Stimmt. Allerdings war sie eckig und weiß.*

    B': #*Stimmt nicht. Er hat sich eine eckige weiße gekauft.*

    B'': *Stimmt nicht. Er hat sich eine Schüssel gekauft.*

    b) A: *Ich würde mir nie [eine Auflaufform] kaufen.*

    ☞ 🍲

    A: #*Da passen Lasagneblätter ja gar nicht rein.*

    ➔ The contribution of the pointing gesture is not at issue

Pointing gestures
Independence

- Indefinite with pointing gesture (to casserole in shop window):

  c) A: *Hast Du gestern [eine Auflaufform] gekauft?*

  ☞ 🍽

  B: #*Nein, aber ich hab eine eckige weiße gekauft.*

  B: *Ja, allerdings war sie eckig und weiß.*

  ➔ The contribution of the pointing gesture is not at issue

Iconicity and non-at-issueness

- **Not clear whether iconicity is the driving force for non-at-issueness**

- Future project to research into this question

- First hints:
    - Pointing gestures probably contribute not at issue (-)
    - Ideophones are probably not at issue (+)
    - Iconic elements in sign languages can probably be at issue (-)
    - Iconic speech-replacing gestures can be at issue (-)

Speech-accompanying function

- To be investigated: hypothesis (c)

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

- So far no evidence against this hypothesis, but it is only a default as we will see...

✓Aim B

- Iconicity might be (partly) responsible for the non-at-issue status of the gestures at hand

- Probably, it is also their speech-accompanying character

Outline

- Some notes on gestures

- Gestures as non-at-issue material (A)

- Source of non-at-issueness (B)

- **The role of demonstratives (C)**

- Towards a formal analysis (D)
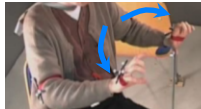
so **as dimension shifter**

- Speech-accompanying gestures are not at issue by default (as shown), but they can be made at issue via the use of demonstratives

- E.g. by way of the demonstrative *so (such a)* or *dies- (this)*

- Cf. Fricke 2012, Umbach & Ebert 2009, Streeck 2002 for placeholder-function of *so (such a)* and Cassell et. al. 1999 for *dies- (this)*

- The demonstrative *so* functions like a dimension shifter (from non-at-issue to at-issue, pace Potts 2005, 2007 and Gutzmann 2012)

so as dimension shifter
direct denial

- With *so*, gesture material can be denied directly:
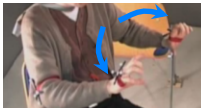
  A: *Die Skulptur hat [SO einen Betonsockel].*

  B: *Das stimmt nicht. Der Sockel ist eckig, nicht rund.*

- Compare to:

  A: Die Skulptur hat *[einen Betonsockel].*

  B: #*Das stimmt nicht. Der Sockel ist eckig, nicht rund.*

so as dimension shifter
projection behaviour

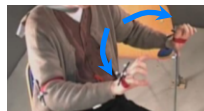- With *so*, gesture material can be targeted by negation:

  Ich würde mir niemals [SO eine Auflaufform] kaufen.

  Lasagne sheets would not fit in properly.

- Compare to:
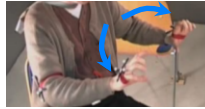
  Ich würde mir niemals [eine Auflaufform] kaufen.

  #Lasagne sheets would not fit in properly.

so as dimension shifter

target of question

- *so* makes the gesture material part of the question:

  A: *Hast Du [SO eine Auflaufform] gekauft?*
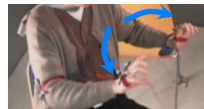

  B: *Nein, aber ich hab eine eckige gekauft.*

  B: *#Ja, allerdings war sie eckig.*

- Compare to:

  A: *Hast Du gestern [eine Auflaufform] gekauft?*

  B: *#Nein, aber ich hab eine eckige gekauft.*

  B: *Ja, allerdings war sie eckig.*

With pointing gestures

- Indefinite with pointing gesture (to casserole in shop window):

  A: *Hast Du gestern [eine Auflaufform] gekauft?*

  ☞ 🍊

  B: *#Nein, aber ich hab eine eckig/ weiße gekauft.*

  B: *Ja, allerdings war sie eckig/ weiß.*

- Indefinite with pointing gesture (to c. in s.) and demonstrative:

  A: *Hast Du [SO eine Auflaufform] gekauft?*

  ☞ 🍊

  B: *Nein, aber ich hab eine eckige/ weiße gekauft.*

  B: *#Ja, allerdings war sie eckig/ weiß.*

With pointing gestures

- Indefinite with pointing gesture (to casserole in shop window):

    A: *Peter hat sich gestern [eine Auflaufform] gekauft.*

    ☞ 🥘

    B: *#Nein, das stimmt nicht. Sie war weiß und eckig.*

    B': *Nein, das stimmt nicht. Er hat sich einen Topf gekauft.*

- Indefinite with pointing gesture (to c. in s.) and demonstrative:

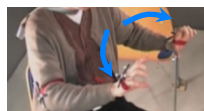   A: *Peter hat sich gestern [SO eine Auflaufform] gekauft.*

    ☞ 🥘

    B: *Nein, das stimmt nicht. Sie war weiß und eckig.*

    B': *Nein, das stimmt nicht. Er hat sich einen Topf gekauft.*

The role of *dies-*

- Gestures with definites:

    A: *Hast du [unsere Auflaufform] weggeschmissen?*

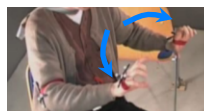
    B: *#Nein, aber die eckige/denn sie war ja eckig.*

    B: *Ja, wobei sie ja etwas anders aussah.*

- Gestures with demonstrative *dies-*:

    A: *Hast du [DIESE Auflaufform] weggeschmissen?*

    B: *Nein, aber die eckige.*

    B: *#Ja, wobei sie ja etwas anders aussah.*

With pointing gestures

- Definite with pointing gesture (to a picture in a catalogue):

  A: *Hast du [unsere Auflaufform] weggeschmissen?*

  ☞ 🥘

  B: *#Nein, die nicht, aber die eckige/ so sah sie ja nicht aus.*

  B: *Ja, allerdings war es ja eine ganz andere.*

- Definite with pointing gesture (to pic in c.) and demonstrative:

  A: *Hast Du [DIESE Auflaufform] weggeschmissen?*

  ☞ 🥘

  B: *Nein, aber die eckige.*

  B: *#Ja, allerdings war es ja eine ganz andere/ sah sie ja ganz anders aus.*

✓Aim C

- Reasonable to assume that demonstratives act as 'dimension shifters'

Outline

- Some notes on gestures

- Gestures as non-at-issue material (A)

- Source of non-at-issueness (B)

- The role of demonstratives (C)

- **Towards a formal analysis (D)**

Meaning construction for gesture and speech

- What is the meaning of a gesture (pointing and iconic)?

- What are the constructional rules, i.e. how does the synchrony of gesture and speech influence the interpretation?

Denotation of gestures

- Assumption: iconic and pointing gestures function alike

- Note: for pointing deferred reference is possible (Nunberg 1993)

- For iconic gestures: represented individual is abstract and carries at least those features that are crucial for the comparison of this referent with the referent introduced in the verbal signal

- Only individuals can be pointed at/represented (and possibly events), but not properties (cf. Umbach & Gust to appear)

- Gestures denote rigid designators

$$[\![\text{☞} \bigcirc]\!] \quad = \quad \lambda w.\mathbf{g} \quad = \quad$$

$$\begin{array}{c} w_1 \\ w_2 \\ w_3 \\ \ldots \end{array} \searrow \mathbf{g}$$
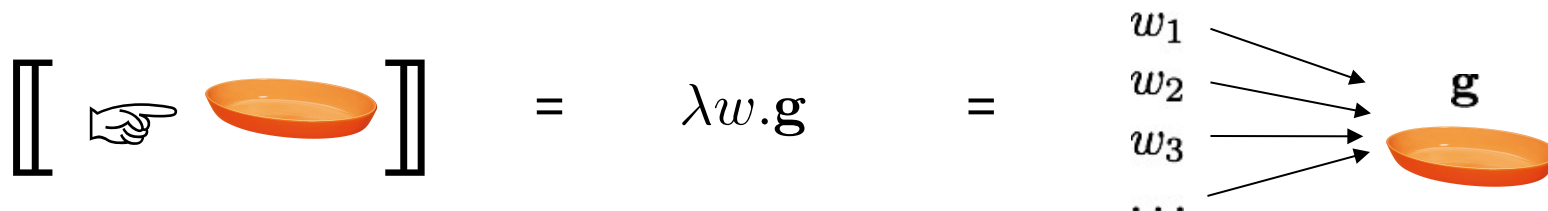
Relation of gesture and coverbal referent

- Pointing or making an iconic gesture does not make a difference

- However, it makes a difference whether the respective gesture associates with an indefinite or a definite or with an NP only

- Claim: gesture relates to intended referent in different ways

Indefinite: similarity (cf. Umbach & Gust to appear for s_0)

**Definite: identity**

NP: exemplification

Relation of gesture and coverbal referent

- Fricke 2012, pp. 230ff: object vs. interpreter related gestures (**objektbezogene- vs. interpretantenbezogene Gesten**)

- Object-related gestures: gestures that relate to an intended referent (cf. example of the base made of concrete)

- Intepreter-related gestures: gestures that relate to a certain concept (or prototypical properties) of the noun phrase denotation

  Then you pass through a [barn door]. [+ oval gesture]

- Could indicate that the speaker's prototypical concept of a barn door is that of an oval door. (Actual door could not be oval. Can lead to misinterpretations, see Fricke 2012)

Relation of gesture and coverbal referent

- Claim: this is actually an ambiguity of whether gesture associates with NP or entire DP

- Gesture with NP: gesture referent exemplifies/is an NP

- Gesture with DP: gesture referent stands in a certain relation to referent introduced in speech (similarity or identity)

- Prediction: only referential DPs (definites, specific indefinites) with accompanying gesture are ambiguous, not genuine quantifiers

Ich hab mir gestern [$_A$ eine [$_B$ Auflaufform $_B$]$_A$] gekauft.
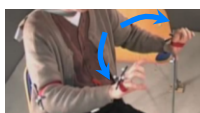
A: The casserole I bought is (btw) as shown
B: My prototype of a casserole is as shown

[Wenige Auflaufformen] sind grün.
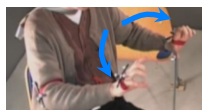
Only: My prototype of a casserole is as shown
Not: The few casseroles that are green are (btw) as shown

Reinterpretation of phenomenon

- Further prediction: gesture representing an atypical property ok with referential DPs, not with genuine quantifiers

    [A Eine [B Auflaufform B]A] in unserer Ferienwohnung war total unpraktisch. (+Ziczac-g)

    #Fast alle [Auflaufformen] in unserer Ferienwohnung waren total unpraktisch. (+Ziczac-g)

- Research question: Is there an empirical reflex of what the gesture associates with, i.e. concerning the exact alignment of gesture and speech (onset or offset of gesture phrase, stroke, etc.)? (cf. Loehr 2004; Ebert, Evert, & Wilmes 2010, among others)
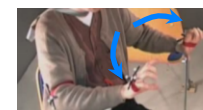
Relation of gesture
and coverbal referent

- **Indefinites: similarity** (see Umbach & Gust 2013 for *so*)

Ich habe mir gestern [eine Auflaufform] gekauft.

at issue: sp bought a casserole yesterday

not at issue:
 the casserole is <u>similar to</u> the intended referent with respect to shape;
 the referent exemplifies a casserole (cf. Fricke 2007, Lücking 2013)

Ich habe mir gestern [SO eine Auflaufform] gekauft.

at issue: sp bought a casserole yesterday
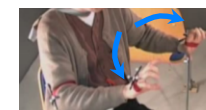   which <u>is similar</u> to the intended referent with respect to shape

not at issue (this intonation): the referent exemplifies a casserole

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Relation of gesture and coverbal referent

- **Definites: identity**
  (not necessarily with index, but with referent; see Nunberg 1993)

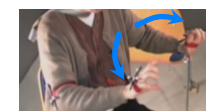*Peter hat [unsere Auflaufform] fotografiert.* ☞ 🍲

at issue: Peter took a picture of our casserole

not at issue:
the casserole is <u>identical with</u> the intended referent;
the referent exemplifies a casserole

Peter hat [DIESE Auflaufform] fotografiert. ☞ 🍲

at issue: Peter took a picture of our casserole
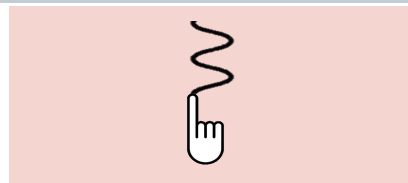which is <u>identical with</u> the intended referent

not at issue: the referent exemplifies a casserole

Formal modeling: example
based on AnderBois et al.'s (to appear) model for appositives

Ich sehe [eine Straße] *(I see a street)*

$$[x] \wedge x = \mathsf{speaker} \wedge [y] \wedge \mathsf{street}_p(y) \wedge \mathsf{see}_p(x, y) \wedge [z] \wedge z = \,\hat{}\mathbf{g} \wedge \mathrm{SIM}_{p^{cs}}(y, z) \wedge \mathsf{street}_{p^{cs}}(z)$$

$$[y] \wedge \mathsf{street}_p(y) \wedge \mathsf{see}_p(x, y) \wedge [z] \wedge z = \,\hat{}\mathbf{g} \wedge \mathrm{SIM}_{p^{cs}}(y, z) \wedge \mathsf{street}_{p^{cs}}(z)$$

$$[y] \wedge \mathsf{street}_p(y) \wedge [z] \wedge z = \,\hat{}\mathbf{g} \wedge \mathrm{SIM}_{p^{cs}}(y, z) \wedge \mathsf{street}_{p^{cs}}(z)$$

		$\mathrm{SIM}_{p^{cs}}(y, z)$	$[z] \wedge z = \,\hat{}\mathbf{g}$	$\mathsf{street}_{p^{cs}}(z)$
$[x] \wedge x = \mathsf{speaker}$	$\mathsf{see}_p(x, y)$	$[y]$		$\mathsf{street}_p(y)$
Ich	*sehe*	*[eine*		*Straße]*

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Conclusion

A: The gestures investigated contribute their material non-at-issue

B: What is responsible for the non-at-issue status of the gestures is not
settled yet

Liekely candidates: speech-accompanying function, iconicity

Pointing and iconic gestures serve the same aim and can be used
interchangeably

C: Demonstratives like *so* and *dies-* act as dimension shifters
(from non-at-issue to at-issue)

D: Gestures are rigid designators

If accompanying NPs, they exemplify the NP-predicate

If accompanying a referential DP, they establish a relation to the
referent introduced in speech:

with indefinites it is similarity; with definites, it is identity

Thank you!

I would like to thank

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 me access to the SAGA corpus and for their constant support and cooperation,

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

Fabian Bross and Barbara Herold for information and discussion about sign languages,

and **David Bausch, Robin Hörnig, Carolin Krämer, Fabian Schlotterbeck, Qingfeng Schwaderer, and Britta Stolterfoht** for help with and discussion on experiment designs, setups, execution, and evaluation

Appendix
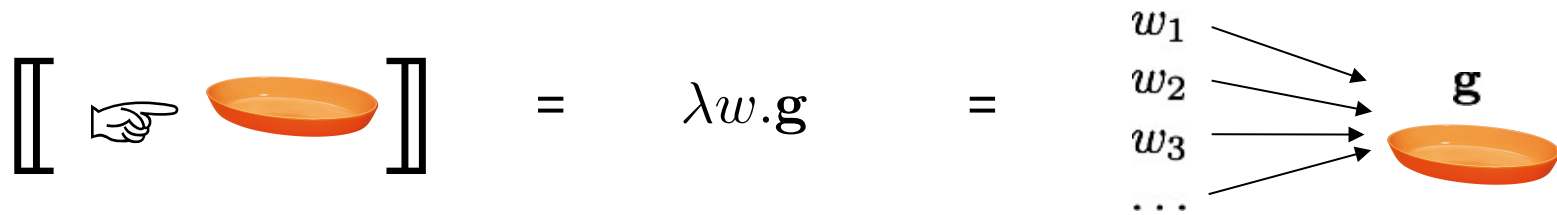## Towards a formal analysis
joint work with Christian Ebert

Towards a formal analysis

Gesture meaning:

direct reference to intended referent **g**:

$$[\![\; \text{☞} \; \text{🍽} \;]\!] \quad = \quad \lambda w.\mathbf{g} \quad = \quad$$

In formulas, we use the formal language expression ⌜→ **g**⌝ to stand for this individual concept (i.e. the rigid designator)

Towards a formal analysis

Make use of AnderBois, Brasoveanu & Henderson's (to appear) system to account for at-issue/non-at-issue distinction

uni-dimensional and dynamic

→ accounts for anaphora/binding between meaning levels

Mary, who had been called by John, met HIM *later.*

Mary called John, who met HER *later.*

Towards a formal analysis

Keep track of at-issue/non-at-issue content via propositional variables:

non-at-issue **impositions** are evaluated w.r.t. the context set: p^{cs}

at-issue **proposals** are evaluated w.r.t. an at-issue proposition: $p \subseteq p^{cs}$

Introduction of discourse referents: $[x], [p], \ldots$

Example: *Mary, who had been called by John, met* HIM *later.*

$$[x] \wedge x = \mathsf{mary} \wedge [y] \wedge y = \mathsf{john} \wedge \mathsf{call}_{p^{cs}}(y, x) \wedge \mathsf{meet}_p(x, y)$$

Non-at-issue imposition on context set: $\mathsf{call}_{p^{cs}}(y, x)$

At-issue proposal to add to context set: $\mathsf{meet}_p(x, y)$

Towards a formal analysis

Important for later:
discourse referents stand for individual concepts

For instance:

$$\llbracket \mathsf{meet}_p(x, y) \rrbracket^{\langle g, h \rangle} = 1 \text{ iff } \forall w \in h(p) : \langle h(x)(w), h(y)(w) \rangle \in \mathfrak{I}_w(\mathsf{meet})$$

In AnderBois et. al. 's system: equality of discourse referents means equality of concepts (w.r.t. all worlds)

$$\llbracket x = y \rrbracket^{\langle g, h \rangle} = 1 \text{ iff } g = h \text{ and } h(x) = h(y)$$
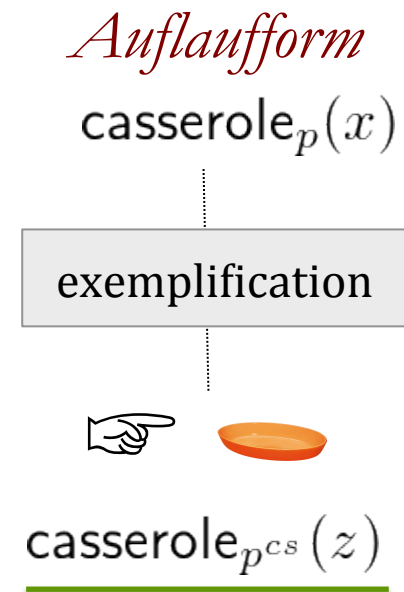
Towards a formal analysis

Gesture meaning: ☞ 🥘 $\quad [z] \wedge z = \ulcorner \to \mathbf{g} \urcorner$

Composition of meaning contributions of speech and coverbal gesture:

indefinite article + gesture   definite article + gesture   noun + gesture

eine	*die*	*Auflaufform*
$[x]$	$[x]$	$\mathrm{casserole}_p(x)$
similarity	identity	exemplification
☞ 🥘	☞ 🥘	☞ 🥘
$\mathrm{SIM}_{p^{cs}}(x, z)$	$x = z$	$\mathrm{casserole}_{p^{cs}}(z)$

(+ presuppositions)

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Towards a formal analysis

eine   *Auflaufform*

$$[x] \qquad \mathsf{casserole}_p(x)$$

$$\mathsf{SIM}_{p^{cs}}(x, z)$$ | similarity | | exemplification | $$\mathsf{casserole}_{p^{cs}}(z)$$

☞ 🍲

$$[z] \wedge z = \ulcorner \to \mathbf{g} \urcorner$$

$$[x] \wedge [z] \wedge z = \ulcorner \to \mathbf{g} \urcorner \wedge \mathsf{SIM}_{p^{cs}}(x, z) \wedge \mathsf{casserole}_p(x) \wedge \mathsf{casserole}_{p^{cs}}(z)$$

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Towards a formal analysis

Speaker *S*:   *"Ich habe mir [eine Auflaufform] gekauft."*

☞ 🥘

$$[x] \wedge [z] \wedge z = \ulcorner \rightarrow \mathbf{g} \urcorner \wedge \mathsf{SIM}_{p^{cs}}(x, z) \wedge$$

$$\mathsf{casserole}_p(x) \wedge \mathsf{casserole}_{p^{cs}}(z) \wedge \mathsf{buy}_p(\mathsf{speaker}, x)$$

Non-at-issue **impositions** *on context set* (AnderBois et. al., to appear; Farkas & Bruce, 2010):

$$\mathsf{SIM}_{p^{cs}}(x, z)$$

$$\mathsf{casserole}_{p^{cs}}(z)$$

At-issue **proposal** *to add to context set*:

$$\mathsf{casserole}_p(x) \wedge \mathsf{buy}_p(\mathsf{speaker}, x)$$

Towards a formal analysis

so as a dimension shifter:

eine

$[x]$

similarity

☞ 🥟

$\mathsf{SIM}_{p^{cs}}(x, z)$

$\longrightarrow$

so eine

$[x]$

similarity

☞ 🥟

$\mathsf{SIM}_{p}(x, z)$

Towards a formal analysis

so eine Auflaufform

$$[x] \qquad \text{casserole}_p(x)$$

$$\text{SIM}_p(x, z) \quad \boxed{\text{similarity}} \qquad \boxed{\text{exemplification}} \quad \text{casserole}_{p^{cs}}(z)$$

☞ 🍲

$$[z] \wedge z = \ulcorner \rightarrow \mathbf{g} \urcorner$$

$$[x] \wedge [z] \wedge z = \ulcorner \rightarrow \mathbf{g} \urcorner \wedge \text{SIM}_p(x, z) \wedge \text{casserole}_p(x) \wedge \text{casserole}_{p^{cs}}(z)$$

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Towards a formal analysis

Speaker *S*:   *"Ich habe mir [so eine Auflaufform] gekauft."*

☞ 🍲

$$[x] \wedge [z] \wedge z = \ulcorner \rightarrow \mathbf{g} \urcorner \wedge \mathsf{SIM}_p(x, z) \wedge$$
$$\mathsf{casserole}_p(x) \wedge \underline{\mathsf{casserole}_{p^{cs}}(z)} \wedge \mathsf{buy}_p(\mathsf{speaker}, x)$$
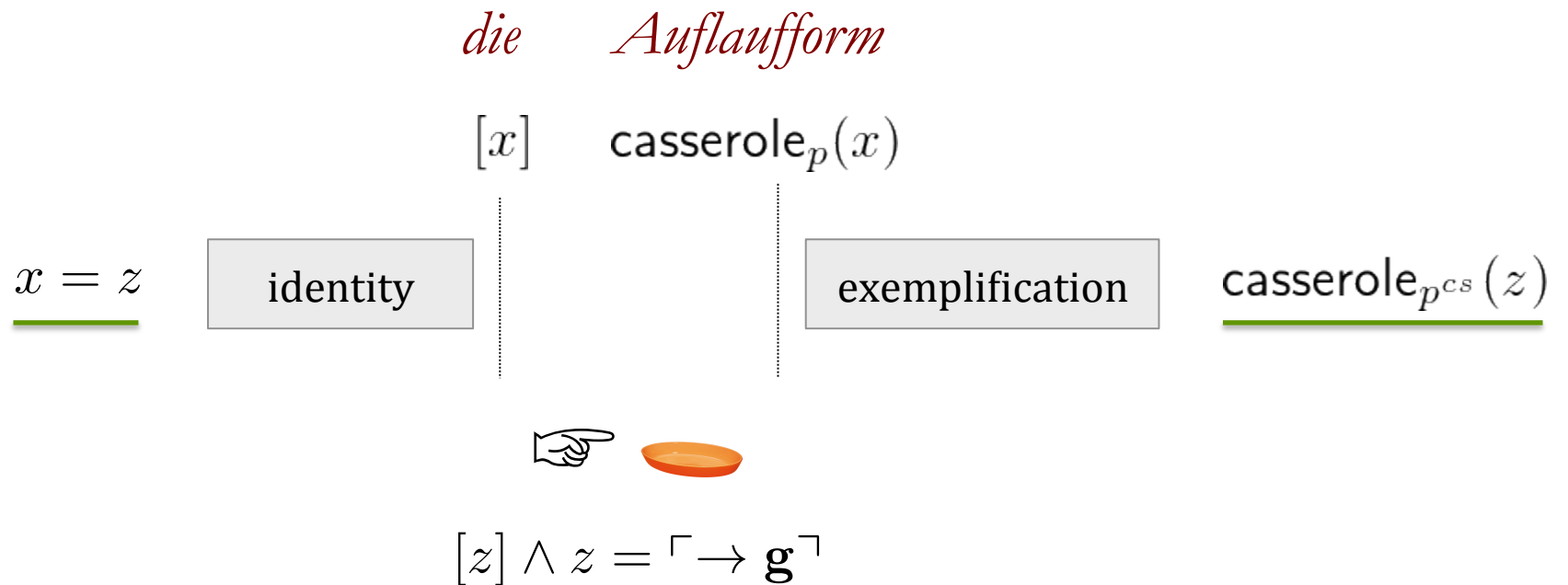
Non-at-issue imposition on context set:

$$\mathsf{casserole}_{p^{cs}}(z)$$

At-issue proposal to add to context set (cf. Umbach & Gust to appear):

$$\mathsf{SIM}_p(x, z) \wedge \mathsf{casserole}_p(x) \wedge \mathsf{buy}_p(\mathsf{speaker}, x)$$

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Towards a formal analysis

die   *Auflaufform*

$$[x] \quad \mathsf{casserole}_p(x)$$

$$x = z \quad \boxed{\text{identity}} \qquad\qquad \boxed{\text{exemplification}} \quad \mathsf{casserole}_{p^{cs}}(z)$$

☞ 🍲

$$[z] \wedge z = \ulcorner \rightarrow \mathbf{g} \urcorner$$

+ presuppositions (uniqueness/existence)

$$[x] \wedge [z] \wedge z = \ulcorner \rightarrow \mathbf{g} \urcorner \wedge x = z \wedge \mathsf{casserole}_p(x) \wedge \mathsf{casserole}_{p^{cs}}(z)$$

Towards a formal analysis

Speaker *S*:   *("Maria hat hier diverse Küchenutensilien zurecht gelegt.")*

"Peter hat [die Auflaufform] fotografiert."

☞ 🍽

$$[x] \wedge [z] \wedge z = \ulcorner \to \mathbf{g} \urcorner \wedge \underline{x = z} \wedge$$

$$\mathsf{casserole}_p(x) \wedge \underline{\mathsf{casserole}_{p^{cs}}(z)} \wedge \mathsf{photograph}_p(\mathsf{peter}, x)$$

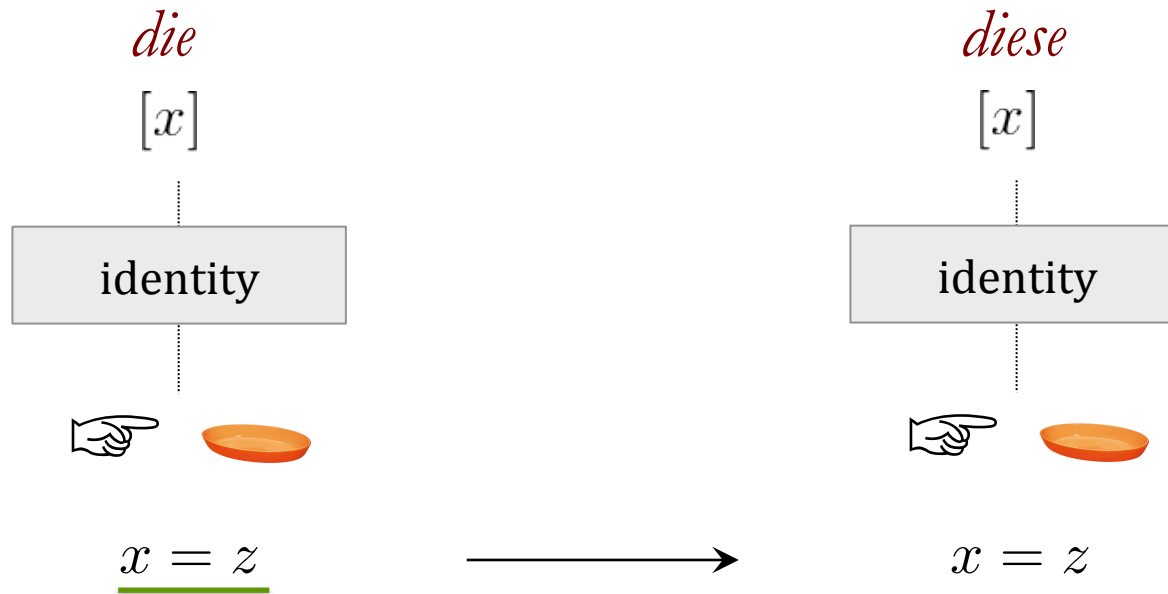*Non-at-issue imposition on context set*: $\mathsf{casserole}_{p^{cs}}(z)$

$x = z$

At-issue proposal to add to context set: $\mathsf{casserole}_p(x) \wedge \mathsf{photograph}_p(\mathsf{peter}, x)$

+ presuppositions (uniqueness/existence)

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Towards a formal analysis

dies- as a dimension shifter:

difference can't be expressed in the formal system

roughly: *diese = so + die*

Towards a formal analysis

Speaker S: *"Peter hat [diese Auflaufform] fotografiert."*

☞ 🍲

$$[x] \wedge [z] \wedge z = \ulcorner \rightarrow \mathbf{g} \urcorner \wedge x = z \wedge$$

$$\mathsf{casserole}_p(x) \wedge \underline{\mathsf{casserole}_{p^{cs}}(z)} \wedge \mathsf{photograph}_p(\mathsf{peter}, x)$$

Non-at-issue imposition on context set: $\mathsf{casserole}_{p^{cs}}(z)$

At-issue proposal to add to context set:

$$x = z \wedge \mathsf{casserole}_p(x) \wedge \mathsf{photograph}_p(\mathsf{peter}, x)$$

(no presuppositions)

Discussion

The identity requirement $x = z$ expresses identity of individual concepts,

i.e. $h(x) = h(z) = \ulcorner \rightarrow \mathbf{g} \urcorner$

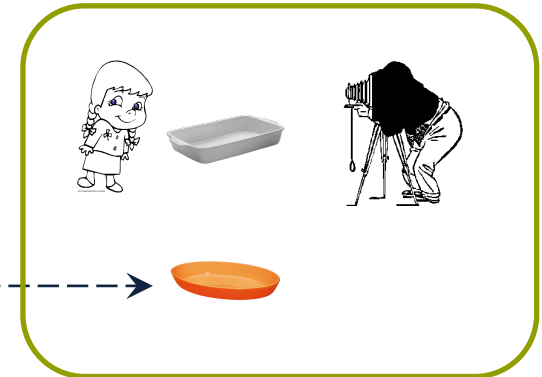This derives Kaplan's (1989) crucial observation for *dthat:*

diese Auflaufform is **directly referential**

☞

Discussion
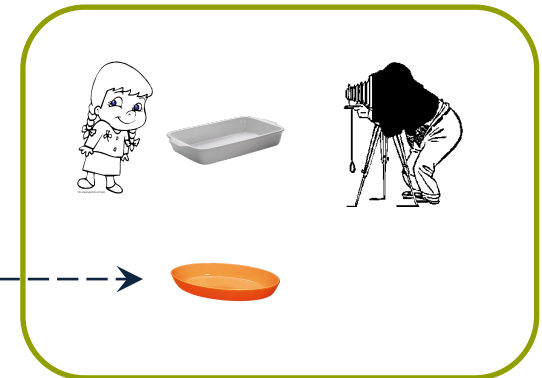
Identity of concepts $x = z$ is part of at-issue proposition only with the demonstrative:

- A: *Peter hat [DIESE Auflaufform] fotografiert.*

  ☞ - →

  B: *Stimmt nicht. Das Objekt, auf das du zeigst, hat er nicht fotografiert.*

- A: *Peter hat [die Auflaufform von Maria] fotografiert.*

  ☞ - →

  B: #*Stimmt nicht. Das Objekt, auf das du zeigst, hat er nicht fotografiert.*

  B: *Stimmt. Aber das ist nicht die Auflaufform von Maria.*

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Discussion

Quantificational readings of definites are not possible/degraded with accompanying gesture:

A: *Es ist möglich, dass der Präsident der USA nicht Barack Obama ist.*

A': #*Es ist möglich, dass [der Präsident der USA] nicht Barack Obama ist.*

☞ - →

Non-at-issue identity statement $x = z$ makes the definite directly referential/a rigid designator. Likewise:

B: *Der Präsident von Amerika war immer ein Mann..*

B': #*[Der Präsident von Amerika] war immer ein Mann.*

☞ - - - - - - - - - - -

Possibly, there is a resolution strategy to ignore the non-at-issue contribution

Discussion

Mistaken identity cases and the **referential/attributive** (speaker's/semantic reference) distinction
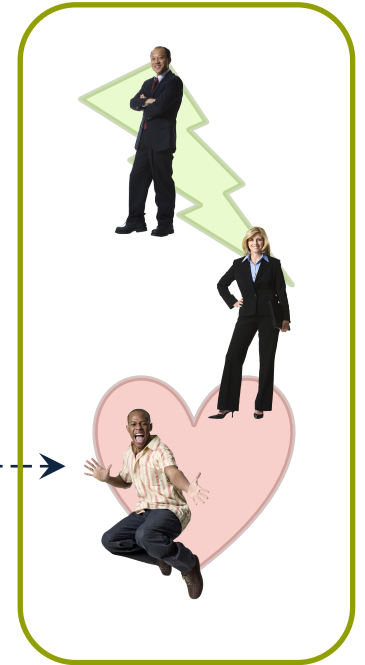(Donellan 1966, Kripke 1977)

A: *[Her husband] is kind to her.*

☞ - →

B: *No, he* [= her actual husband] *isn't.*

   The man you are referring to isn't her husband. (Kripke 1977, p. 90)

Attributive ('standard') interpretation:

   At-issue proposal: $\mathsf{husband\_of}_p(x, y) \wedge \mathsf{kind}_p(x, y)$

   Non-at-issue imposition: $x = z \wedge \mathsf{husband\_of}_{p^{cs}}(z, y)$

Discussion

A: *[Her husband] is kind to her.*

☞ - →

B: *Yes, he* [= the man referred to by the speaker via gesture]

    is kind to her.

But he isn't her husband. (Kripke 1977, p. 90)

Referential interpretation:

  At-issue proposal: $\mathsf{husband\_of}_p(x, y) \wedge \mathsf{kind}_p(z, y)$

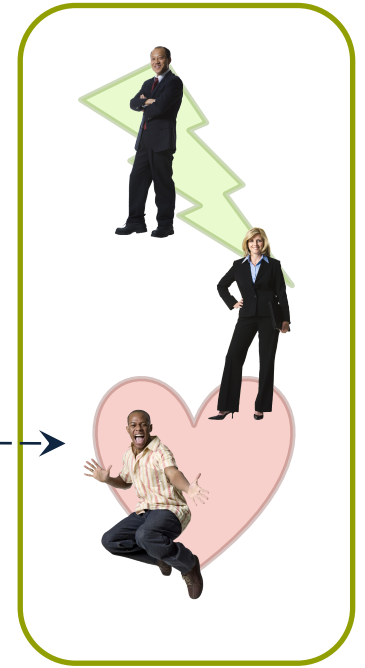 Non-at-issue imposition: $x = z \wedge \mathsf{husband\_of}_{p^{cs}}(z, y)$
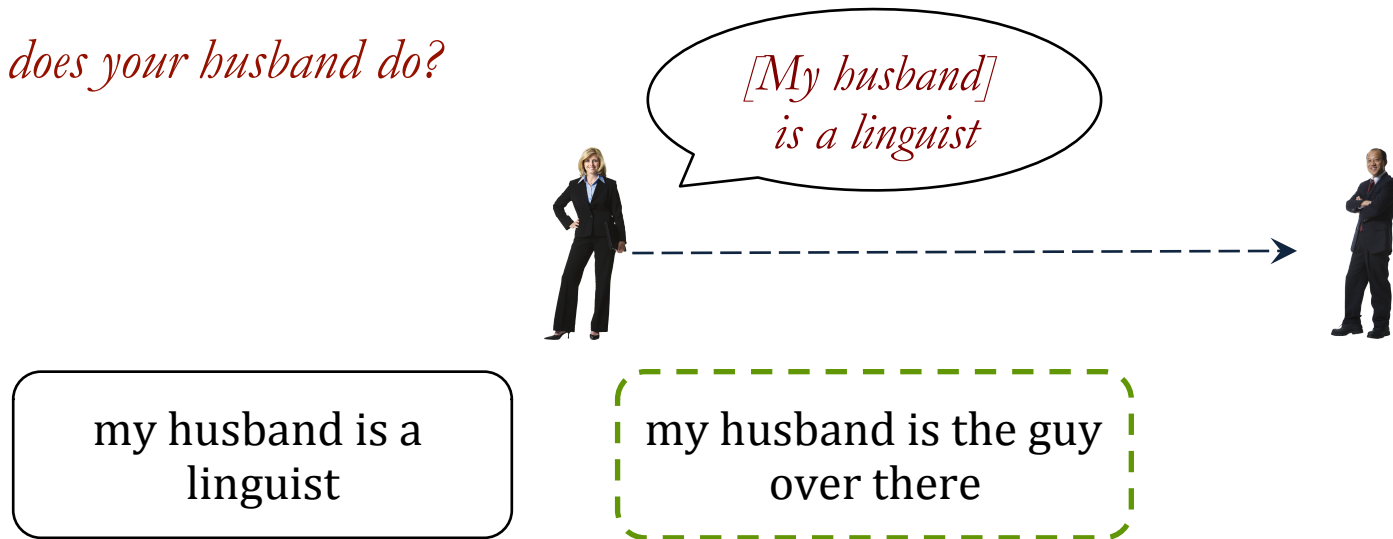
semantic vs. speaker's referent ↔ at-issue reference via speech vs. gesture

Discussion

Possibly carries over to **referential uses of definites** (and specific indefinites) in general

Attributive ('standard') interpretation:

A: *What does your husband do?*

[My husband] is a linguist

my husband is a linguist

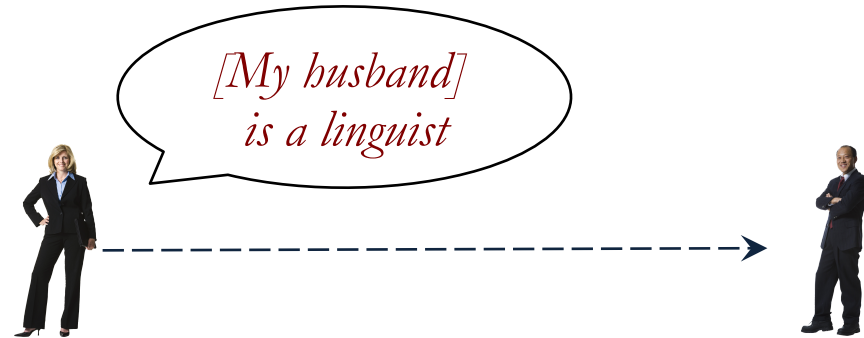my husband is the guy over there

At-issue proposal: $\text{husband\_of}_p(x, \text{speaker}) \wedge \text{linguist}_p(x)$

Non-at-issue imposition: $x = z \wedge \text{husband\_of}_{p^{cs}}(z, \text{speaker})$

Discussion

Referential interpretation:

A: *What does the guy over there do?*

[*My husband*]
is a linguist

the guy over there
is a linguist

the guy over there is
my husband

At-issue proposal: $\text{husband\_of}_p(x, \text{speaker}) \land \text{linguist}_p(z)$

Non-at-issue imposition: $x = z \land \text{husband\_of}_{p^{cs}}(z, \text{speaker})$

Reference to same object via different concepts
(future work: compare to Aloni, 2001)

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