

**“From Hand to Mouth.
A dialogue between signed and spoken languages”**

Conference, 5-7 September 2013, University of Zurich

Form – Image – Meaning
Why signs don’t correspond to words
(5 September 2013)

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Outline

- ▶ Changing viewpoints on iconicity in sign language research
- ▶ Signs versus words
- ▶ The sign language lexicon
- ▶ Lexical database building and lemmatisation

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Changing viewpoints on iconicity in sl research

- ▶ Linguistic turn (1970-1990)
- ▶ Cognitive turn (~2000)
- ▶ Gestural turn (~2010)



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Changing viewpoints ...

Linguistic turn (1970-1990)

- ▶ Klima/Bellugi: *The Signs of Language* (1979)
 - ▶ Sign languages are real languages (not pantomime or a kind of monkey-talk).
 - ▶ The meaning of signs is not tied to concrete objects they illustrate or actions they mime.
 - ▶ Signs correspond to words: arbitrary symbols, dual patterning (Stokoe 1960).
 - ▶ Rules and constraints on linguistic levels (phonology, morphology, syntax)



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Changing viewpoints ...

Linguistic turn (1970-1990)

Iconicity is pervasive, but:

“degree of iconicity” → “submergence of iconicity” →
“insignificance of iconicity” → “suppression of iconicity”
(headings of *The two faces of sign*; Klima/Bellugi
1979:9-34)

- ➡ Establishing sign languages (ASL) as object of research in its own right
- ➡ Socio-political effect: recognition of sign languages as national (minority) languages



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Changing viewpoints ...

Linguistic turn (1970-1990)

Two preliminary remarks

1. Modality bias
Hockett: *The origin of speech* (1960): 13 design-features of language
Inter alia:
 - Vocal-auditory channel
 - Arbitrariness
 - Discreteness
 - Duality of patterning



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Changing viewpoints ...

Linguistic turn (1970-1990)

Two preliminary remarks

1. Modality bias
“There is solid empirical justification for the belief that all the languages of the world share every one of them.” (Hockett 1960:6)

“Now, while arbitrariness has its points, it also has its drawbacks, so that it is perhaps more revealing to put it the other way around, as a limitation of spoken languages. Indeed, the dimensionality of signing is that of life itself, and it would be stupid not to resort to picturing, pantomiming, or pointing whenever convenient.” (Hockett 1978:274)



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Changing viewpoints ...

Linguistic turn (1970-1990)

Two preliminary remarks

2. Sociology of science
“What members of a collective call truth, from the point of view of sociology of cognition is the up-to-date stage of changes of thought-style.” (Fleck 1936)

Fleck (1979): *Genesis and Development of a Scientific Fact*
key words: thought collective, thought style



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Changing viewpoints ...

Linguistic turn (1970-1990)

Klima/Bellugi (1979) as an answer to Friedman (1977):

On the other hand: New perspectives on American Sign Language

- ▶ Mandel: Iconic devices in American Sign Language
- ▶ DeMatteo: Visual imagery and visual analogues in American Sign Language
- ➡ Mainstream linguistics
 - ▶ Focus on structure, theory and linguistic universals
 - ▶ Iconicity is pervasive in sign language but peripheral
- ➡ On the other (european) side
 - ▶ Tervoort (1973), Brennan (1992), Engberg-Pedersen (1996a/b), Pizzuto/Volterra (2000), Cuxac (2000), Pietrandrea (2002), Russo et al. (2001)
 - ▶ Boyes Braem (1981): *Features of the Handshape in American Sign Language*
 - ▶ van der Kooij (2002): *Phonological categories in sign language of the Netherlands. The role of phonetic implementation and iconicity*



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Changing viewpoints ...

Linguistic turn (1970-1990)

On the other (european) side

- ▶ Tervoort (1973): Could there be a human sign language?

"The manual sign not only functions as a global whole, it also can and does derive great expressive force, directness, and unambiguousness from representing what it stands for through indication of its shape or movement, outline, or any other typical visual characteristic. This is at least how signs usually are born ... and no matter how much they mature into arbitrary and conventional signs thereafter, they retain a dormant relation to this force that can be reawakened at any time ... 'Iconicity' is not a more or less *accidental* feature because it comes to the surface once in a while, but a basically *concomitant* characteristic that is potentially present all the time." (Cited in Sandler/Lillo-Martin 2006:499)



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Changing viewpoints ...

Linguistic turn (1970-1990)

On the other (european) side

- ▶ Cuxac (2000): *La Langue des Signes Française (LSF). Les voies de l'iconicité*
- ➡ reflecting the sociology of science problem and taking an outside position
 - ▶ Each linguistic description of sign language(s) has to be based on iconicity.
 - ▶ Linguistic structures of iconicity (highly iconic structures/structures de grande iconicité)
 - ▶ Phonology/dual patterning: "There is no phonology of iconicity" (Cuxac 2004:102)
 - ▶ Constraint of maintenance of iconicity



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Changing viewpoints ...

Cognitive turn (~2000)

- ▶ Reception of linguistic theory developed in the late 1980s, esp. Lakoff's work on *metaphors* and metonymy, Langackers' *Cognitive Grammar* and Fouconniers' *Mental Space Theory*
 - ▶ Wilcox (2000): *Metaphor in American Sign Language*
 - ▶ Taub (2001): *Language from the body. Iconicity and metaphor in American Sign Language*
 - ▶ Liddell (2003): *Grammar, gesture and meaning in American Sign Language*
 - ▶ Wilcox (2004): *Cognitive Iconicity*
 - ▶ Johnston/Ferrara (2012): *Lexicalization in Signed Languages: When is an Idiom not an Idiom?*



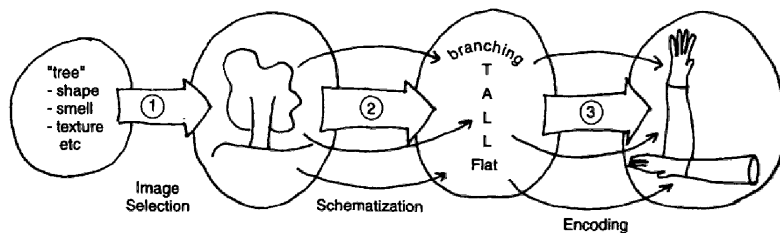
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Changing viewpoints ...

Cognitive turn (~2000)

Structure-preserving mapping



"The Analogue-Building Model of Linguistic Iconicity" (Taub 2001:43-62)

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Changing viewpoints ...

Cognitive turn (~2000)

- ▶ "Iconicity is not a relation between the objective properties of a situation and the objective properties of articulators. Rather, the iconic relation is between construals of real-world scenes and construals of form." (Wilcox 2004:123)
- ▶ "Thus cognitive iconicity is defined not as a relation between the form of a sign and what it refers to in the real world, but as a relation between two conceptual spaces. Cognitive iconicity is a distance relation between the phonological and semantic poles of symbolic structures." (Wilcox 2004:122)

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Changing viewpoints ...

Gestural turn (~ 2010)

- ▶ Enfield (2009): *The anatomy of meaning: Speech, gesture, and composite utterances*
 "There is meaning in language for the same reason there is meaning elsewhere in our social lives: because we take signs to be public elements of cognitive processes (Peirce 1955), evidence of others' communicative intentions (Grice 1957, 1975). Our clues for figuring out those intentions are found not only in conventional symbols like words, but in the rich iconic-indexical relations which weave threads between just about everything in sight." (p. 2)
- ▶ Embodied language
 "The analog relation to referents helps ground linguistic forms into our perceptual-motor experiences of the world, giving rise to embodied language (i.e., language grounded in our sensori-motor experience)." (Perniss et al. 2010:12)
- ▶ Embodied language conference 2011, 2013

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Changing viewpoints ...

Gestural turn (~ 2010)

- ▶ Perniss et al. (2010): Iconicity as a general property of language: evidence from spoken and signed languages
 "Children and their caregivers make ample use of iconic, analog representation in interactive and communicative situations. For spoken languages, the use of iconic forms is prevalent in the prosody of IDS [infant directed speech], in the use of onomatopoeia, and in the use of spoken and manual gesture. All of these may bridge the gap between our experience of the world and our ability to communicate about it – ultimately between conceptual and linguistic form – because they are analog mappings linking to analog referents in the world. The analog relation to referents helps ground linguistic forms into our perceptual-motor experiences of the world, giving rise to embodied language (i.e., language grounded in our sensori-motor experience)." (p. 12)
- ▶ Embodied language: Embodied language conference 2011, 2013

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Signs versus words

The 'word' in sign language:

- ▶ Meir (2012): Word classes and word formation
- ▶ Kimmelman (2009): Parts of speech in Russian Sign Language
- ▶ Hohenberger (2008): The word in sign language: empirical evidence and theoretical controversies
- ▶ Schwager/Zeshan (2008): Word classes in sign languages
- ▶ Zeshan (2002): Towards a notion of 'word' in sign languages
- ▶ Johnston (2001): Nouns and Verbs in Australian Sign language: An Open and Shut Case?
- ▶ Erlenkamp, Sonja. 2000: *Syntaktische Kategorien und lexikalische Klassen. Typologische Aspekte der Deutschen Gebärdensprache.*
- ▶ Supalla/Newport (1978): How many seats in a chair? The derivation of nouns and verbs in ASL



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Signs versus words

Some steps made to push sign language description and theory to the level of spoken language linguistics, but ... **iconicity**

"However, although the word/sign unit can be determined in sign languages rather straightforwardly in most cases, and coherent arguments can be advanced for more complicated cases of complex words as well, **this is not the whole story.**" (Zeshan 2002:167)

..., and also ... **metalinguistic knowledge of signers**

"SL users do experience signs as having 'two faces' – as simultaneously unitary symbolic units *and* constructions in their own right." (Johnston/Ferrara 2012:245)



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Signs versus words

..., and also ... **metalinguistic knowledge of signers**

"Iconicity of course does not mean either that a sign can only be used when the user understands its iconic basis. Use of the sign is completely independent of its iconicity most of the time. However, there are some situations where the latent iconic potential can suddenly surface. Many sign puns and instances of word play and creative use of signs in poetry are dependent on a sign's iconicity and are evidence for peoples underlying awareness of the iconic basis of a sign. Moreover, deaf people will often 'explain' the meaning of a sign in terms of its iconicity." (Zeshan 2002:170)



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Signs versus words

Are the linguistic tools that provide linguistic theory of spoken languages adequate to describe sign language phenomena?

"In spite of these demonstrations [McNeill's work on co-speech gestures], gradience and modality have kept intonation and gesture outside of the mainstream of linguistic analysis. This choice is not available in the analysis of ASL. **Ignoring gestures and gradient aspects of the signal produced by the hands leaves out too much.** [...]

It is much more likely that spoken and signed languages both make use of multiple types of semiotic elements in the language signal, but that **our understanding of what constitutes language has been much too narrow.**" (Liddell 2003:362)



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Signs versus words

Are the linguistic tools ... adequate to describe sign language phenomena?

"To put this another way, both deaf signers and hearing speakers use 'gesture' a great deal, but the *forms* and *functions* of these utterance actions are diverse and receive different kinds of elaborations and work in somewhat different ways, according to how they can be orchestrated or not with other semiotic codes in other modalities. Some of this 'gesturing' attracts the term 'signing' and although such signing is certainly very different from the sort of utterance visible bodily action use that speakers engage in when they are speaking, there is, it would seem "common ground" between them which deserves exploration [...]. This should **encourage the development of a new vocabulary which does not divide 'gesture' from 'sign' in the apparently categorical way** that seems to have prevailed lately." (Kendon 2008:359)



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Signs versus words

Are the linguistic tools ... adequate to describe sign language phenomena?

"We must be careful to find ways of describing signed languages that make it possible to meaningfully compare them with spoken languages. This brief example is only part of a much larger endeavor – an endeavor that will have to **first pay full attention to the gradient and iconic dimensions of signed languages** and will then have to search for possible parallels in spoken languages." (Slobin 2008:127)



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The sign language lexicon

Iconicity in sl lexicology/lexicography

- ▶ almost never taken into account
- ▶ aide-mémoire for adult L2 learners
- ▶ Why?

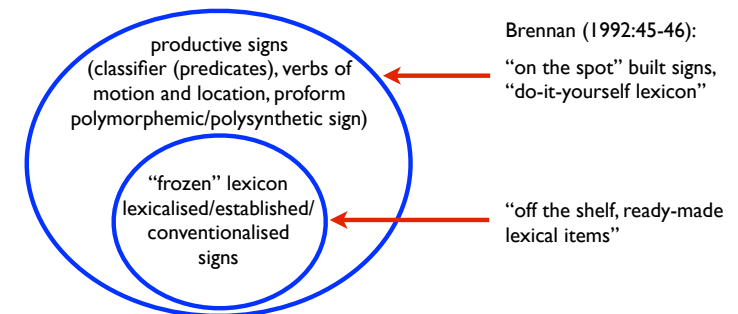


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The sign language lexicon

Conventionalised vs. productive signs



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The sign language lexicon

Conventionalised vs. productive signs

Grammar: phono-morphology, morphology, morpho-syntax

productive signs
(classifier (predicates), verbs of motion and location, proform polymorphemic/polysynthetic sign)

Brennan (1992:45-46):
“on the spot” built signs,
“do-it- yourself or DIY lexicon”

“Of course, the particular co-occurrence constraints do seem reminiscent of verbal classifiers in spoken languages, but the primary function of the handshape seems not to be one associated with classifiers, but representation.”
(Schembri 2003:25)

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The sign language lexicon

Conventionalised vs. productive signs

Productive sign: example 1 – substitutive technique (~ entity classifier)



Isolated sign



Sign in context

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The sign language lexicon

Conventionalised vs. productive signs

Productive sign: example 2 – right hand: manipulative technique (~ handle classifier)
left hand: substitutive technique (~ entity classifier)



Isolated sign



Sign in context

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The sign language lexicon

Conventionalised vs. productive signs

Productive sign: example 3 – sketching/tracing technique (~ size and shape specifier)



Isolated sign



Sign in context

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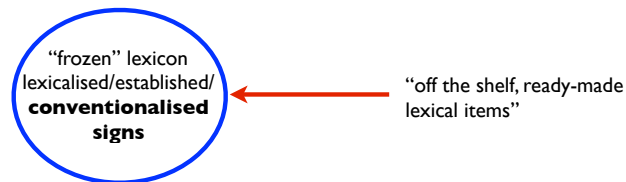
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The sign language lexicon

Conventionalised vs. productive signs

Lexicology/lexicography

Brennan (1992:45-46):



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The sign language lexicon

Conventionalised vs. productive signs

Two levels of conventionalisation (Johnston/Schembri 1999:116)

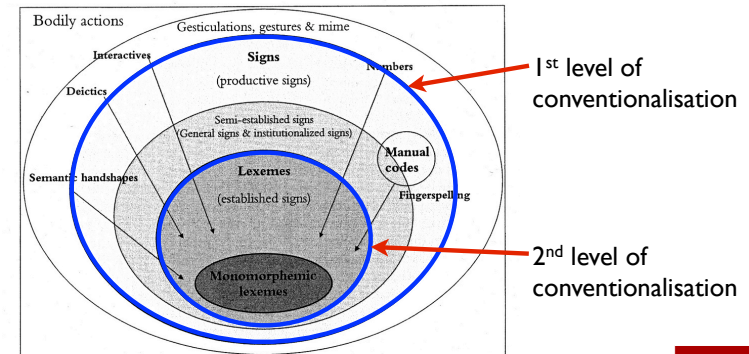


Figure 1: A hierarchy of lexicalization in signed languages

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The sign language lexicon

Conventionalised vs. productive signs

1st level of conventionalisation

- ▶ Phonomorphemes
 - ▶ "By this we simply mean that the minimal identifiable emic units of the language – handshape, location, orientation, movement and nonmanual features – are the **substantive building blocks** and are **themselves meaningful**. This is not to disregard the frequent instances of signs in which these phonomorphemes do not appear to act as individual meaningful units [...]" (Johnston/Schembri (1999:118))

Components = parameters:

- handshape
- location
- movement
- orientation
- nonmanuals (facial expression, mouthing, mime, eye gaze)

Battison (2005): *Signs Have Parts. A Simple Idea*
 Stokoe (1960): 3 parameters:

- handshape
- location
- movement

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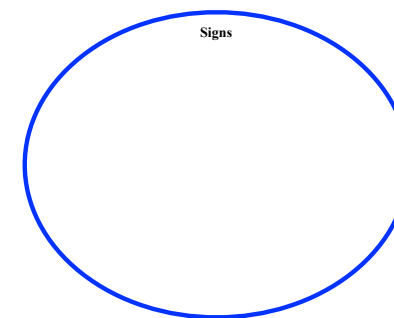


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The sign language lexicon

Conventionalised vs. productive signs

1st level of conventionalisation



Meaning:
 ▶ principle of **compositionality**:
 The meaning can be predicted as the sum of the meanings of its components.

Conventional form-meaning association:
 handshapes
 → partly-lexicalised signs (Johnston 2010)

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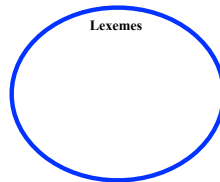
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Conventionalised vs. productive signs

2nd level of conventionalisation

"A lexeme in Auslan is defined as a sign that has a clearly identifiable and replicable citation form which is regularly and strongly associated with a meaning which is

- (a) unpredictable and/or somewhat **more specific** than the sign's componential meaning potential, even when cited out of context, and/or
- (b) quite unrelated to its componential meaning potential (i.e., lexemes may have **arbitrary links** between form and meaning)." (Johnston/Schembri 1999:126)



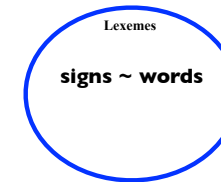
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Conventionalised vs. productive signs

2nd level of conventionalisation

Meaning:

- ▶ principle of **idiomaticity**: "principle of 'specificity of meaning'"



Conventional form-meaning association

- ▶ fully-lexicalised signs (Johnston 2010)



The sign language lexicon

Conventionalised vs. productive signs

Nonmanuals

- ▶ body posture (movement of the upper part of the body and/or the head)
- ▶ facial expression (forehead, eye, nose, cheek, mouth, lower jaw)
 - ▶ eye gaze
 - ▶ mouth movements
 - ▶ mouth gesture: expressive function
 - ▶ mouthing: referring to words of the spoken language



The sign language lexicon

Words in sign languages:

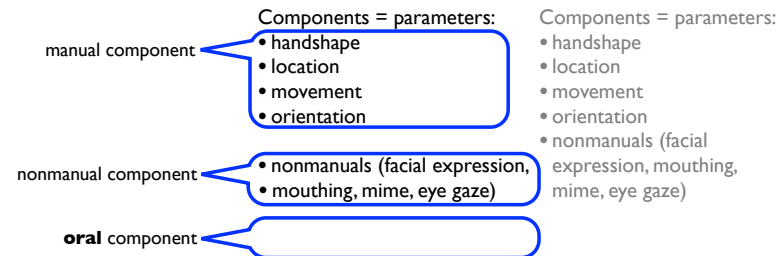
"Besides the obvious enormous role that the productive lexicon (including proform, handle, and tracing signs) plays in meaning creation in sign languages, account must also be made **of the vast store of lexical items that can be borrowed from the surrounding community's spoken language** through fingerspelling and other means. Indeed, the core or basic vocabulary of the community spoken language can be so well integrated into the language system of signers that 'lexical borrowing' may be an inappropriate word to describe the phenomenon." (Johnston/Schembri 1999:178)



The sign language lexicon

Words in sign languages

Sign components revisited



Theoretical positions and viewpoints on mouthings:
Boyes Braem/Sutton-Spence (2001)



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The sign language lexicon

Words in sign languages

- ▶ "Mouthing is sign, not speech"
(Sandler/Lillo-Martin 2006:104-105)
- ▶ Mouthing is speech, not sign
(Ebbinghaus/Heßmann 1996, 2001; Ebbinghaus 2012)
 - ▶ signs + words = **simultaneous collocations**
 - ▶ Integration of mouthed words in sign languages (like DGS) is a basic principle that brings together the **semantic potential of words** and the **iconic potential of signs**. They **mutually contextualise** each other. Therefore it is different from language contact phenomena like code switching or code mixing.



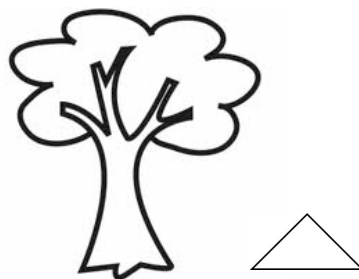
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Words in sign languages

Mutual contextualisation



(Ebbinghaus/Heßmann 1990:64)



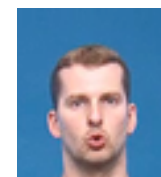
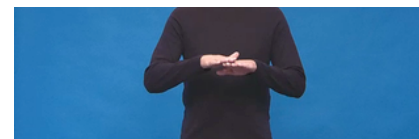
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The sign language lexicon

Words in sign languages

Mutual contextualisation



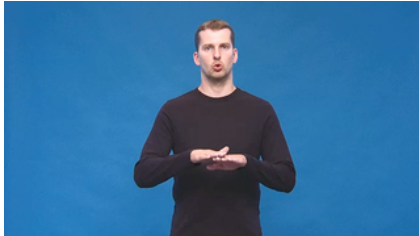
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The sign language lexicon

Words in sign languages

Mutual contextualisation



➔ Iconic signs can cover a far wider range of meanings than words.



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The sign language lexicon

Words in sign languages

Division of labour (discourse level)

sign + mouthing: **denoting/naming** (of objects and actions)

- ▶ sign with/without nonmanuals: **illustrating/showing** of actions, events, specifics of objects

Cuxac: coming and going between **lexical signs** and **highly iconic structures**.

- ➔ Sign languages (like DGS) as **heterogenous sign systems** combining manual, nonmanual and oral components to convey meaning (see Macken et al. (1993): "dual-representation language")



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Consequences for the lexicon

- ▶ Iconicity is pervasive in the sign language lexicon.
- ▶ "The meaningfulness of the formational building blocks of signs has consequences for the organization of the sign language lexicon." (Meir 2012:79).
- ▶ Iconicity has been excluded from lexicological/lexicographical work.
 - ▶ conventional signs → lexicology/lexicography
 - ▶ productive signs and modification of signs → grammar
 - ▶ e.g.: "The process of de-lexicalization in discourse gives SL users a powerful tool to modify and qualify conventional meaning **non-lexically**." (Johnston/Ferrara 2012:246)



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Consequences for the lexicon

Motivation of linguistic signs: modality effect

- ▶ Sign languages: expressing visually perceivable objects and actions by visually perceivable forms: **many** iconic, metonymic or metaphorical relations can be established between linguistic signs and extra-linguistic referents. (In terms of cognitive iconicity: iconic mappings)
- ▶ Spoken/vocal languages: expressing acoustically perceivable objects and actions by acoustically perceivable forms: **few** iconic, metonymic or metaphorical relations can be established between linguistic signs and extra-linguistic referents: onomatopoeic words.

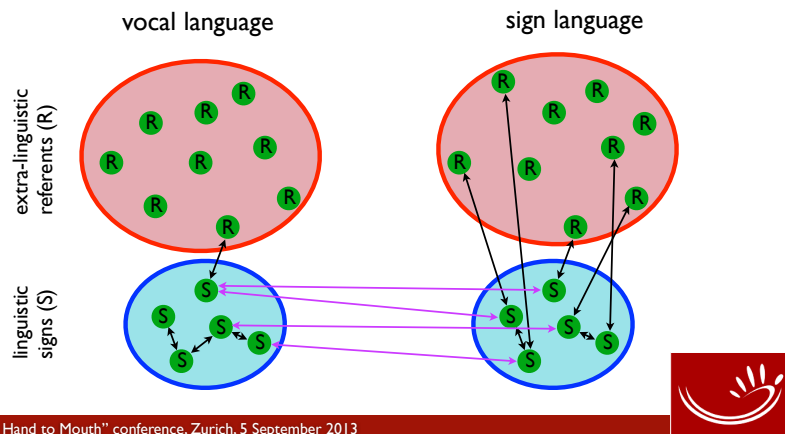


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Consequences for the lexicon

Motivation of linguistic signs (Konrad 2011)



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Consequences for the lexicon

Signs and words: mutual contextualisation

- ➔ Iconic signs can cover a far wider range of meanings than words.
- ▶ Consequences for the identification of lexical signs (lemmatisation)
 - ▶ Basic assumption of linguistics: "In a speech-community some utterances are alike 'or partly alike' in sound and meaning." (Bloomfield 1965:159)

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Consequences for the lexicon

Rule: *same form, same meaning* → *same lexical item (type)*

Form	Lexical item (type)		
☞ $\text{O} \rightarrow \text{[} \sim \text{]} \text{X} \rightarrow$	Mouthing	Meaning	Gloss
	flach (plain, flat)	flach (plain, flat)	FLACH
	boden (ground)	Boden (ground)	BODEN
	feld (field)	Feld (field)	FELD
	tisch (table)	Tisch (table)	TISCH

- ➔ mapping the German lexicon onto the DGS lexicon
- ➔ unsatisfying

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Consequences for the lexicon

Identification of lexical signs (lemmatisation)

- ▶ *same form, same iconic value* (+ *same image producing technique*) → *same sign*
- ▶ description and analysis of the underlying image of signs (image producing techniques; Langer (2005), König et al. (2008))
- ➔ Productivity is not restricted to the productive lexicon, but also concerns sign-mouthing combinations ("iconic-combinatorial procedure"; König et al. (2008))

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Consequences for the lexicon

Form – Image – Meaning

	Form	Image	Meaning	Sign type
1. Level of conventionalisation	form	iconic value	meaning specified by context	productive sign
2. Level of conventionalisation	form	[passive iconicity]	meaning specified by convention	conventionalised sign

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Consequences for the lexicon

Form – Image – Meaning

	Form	Image	Meaning	Sign type	Type of use
1. Level of conventionalisation	form	iconic value	meaning specified by context	productive sign	
2. Level of conventionalisation		[passive iconicity]	meaning specified by convention		conventional uses
1. Level of conventionalisation	form	iconic value	meaning specified by mouthing	conventionalised sign	productive uses

Double glossing:
 FLACHIA/TISCH I (flat/table)
 FLACHIA/BODEN I A (flat/ground)
 FLACHIA/... (flat/...)

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Consequences for the lexicon

Lexicography

- Degree of conventionalisation
 - signs: lexical ↔ productive
 - sign-mouthing combination: conventional ↔ productive
 - "Some such combinations occur with greater regularity than others and can be regarded as simultaneous collocations. **Information about regular collocations with nonmanually produced units should be part of the lexicographic description of the manual lexicon of a sign language**, though pairs of simultaneously related signals should not be reduced to the status of single signs." (Ebbinghaus/Heßmann 2001:134)

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Lexical database building and lemmatisation

- Constant switch back and forth between
 - bottom-up (lemma selection)
 - top-down (token-type matching)
- Lemma selection
 - best guess (data (tokens), transcriber's intuition) → lemma revision

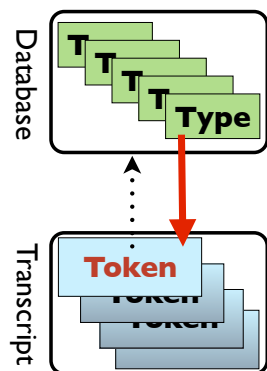
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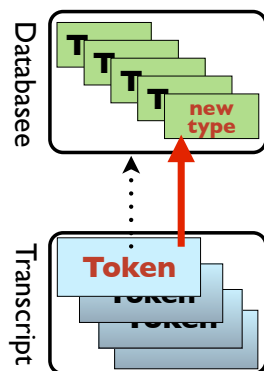
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Db building & lemmatisation

Top-down processing



Bottom-up processing



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Corpus annotation

▶ Lemmatisation

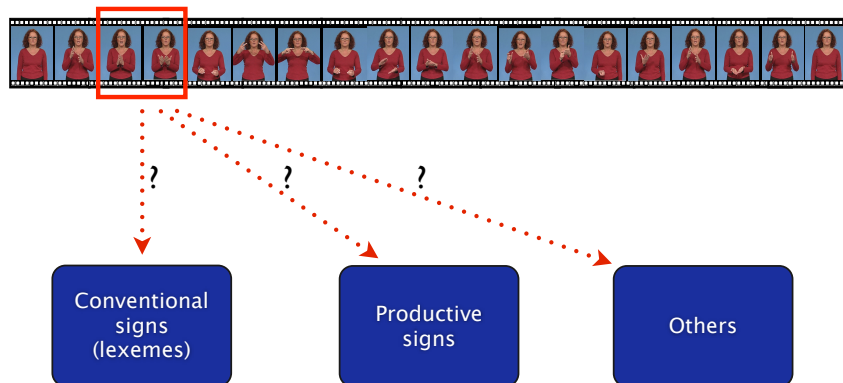
- ▶ identifying tokens as instantiations of types (lexical items)
- ▶ continuously (running text) → signs in context
- ▶ theoretical assumptions: type categories (levels? hierarchy?)
 - ▶ lexicon model → transcription system (database and annotation tool) → annotation guidelines, glossing conventions



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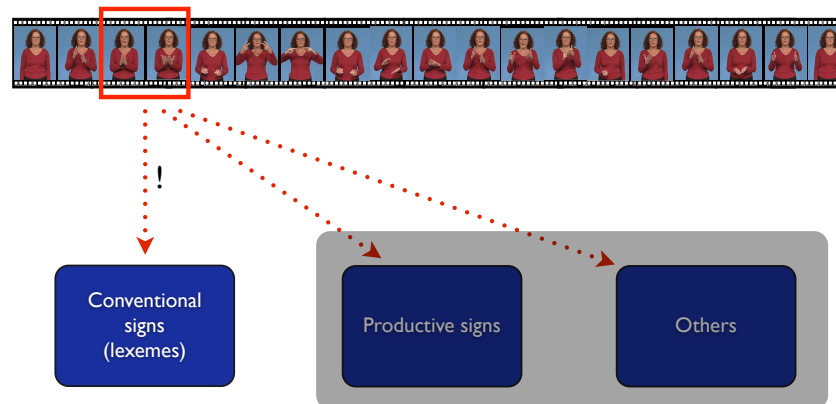
Lexical database building and lemmatisation



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Db building & lemmatisation



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Transcription conventions

Sign categories

- ▶ (3) Other signs or subsystems
 - ▶ manual alphabet
 - ▶ number signs
 - ▶ initialised signs
 - ▶ cued speech (PMS = phonem-bestimmtes Manualsystem)
 - ▶ signed german suffixes
- ▶ indexical signs
- ▶ gestures
- ▶ imitation (pantomime-like signs, e.g. embedded in constructed action)
- ▶ mouthing (without manual activity)
- ▶ neologisms
- ▶ coarticulation (e.g. holds



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Lemmatisation (sign languages)

- ▶ Iconicity as a valid criterion to distinguish
 - ▶ sign types (lexical items)
 - ▶ relations between sign types: synonyms, homonyms, phonological variants, citation form and modifications
 - ▶ conventional and productive uses of (lexical) signs
- ➔ Modelling: type hierarchy (types and subtypes) and types relations



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Type hierarchy

- ▶ Type = lexical item
 - ▶ [form + iconic value] + meaning(s)
(+ at least one lexical meaning; unlike productive signs: no lexicalised meaning)
- ▶ Subtype
 - intermediate level, presorting sign uses
- ▶ [form + iconic value] + meaning(s)
 - ▶ Meaning: expressed by German words ("keyword")




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Type hierarchy: type and subtypes

2 type levels

Form	Mouthing	Meaning	Subtype	Type	Sign-word combination
	flach [plain, flat]	flach [plain, flat]	FLACH	FLACH I A	conventional
	boden [ground]	Boden [ground]	BODEN		conventional
	feld [field]	Feld [field]	FELD		conventional
	tisch [table]	Tisch [table]	TISCH		conventional
	standard	Standard			productive

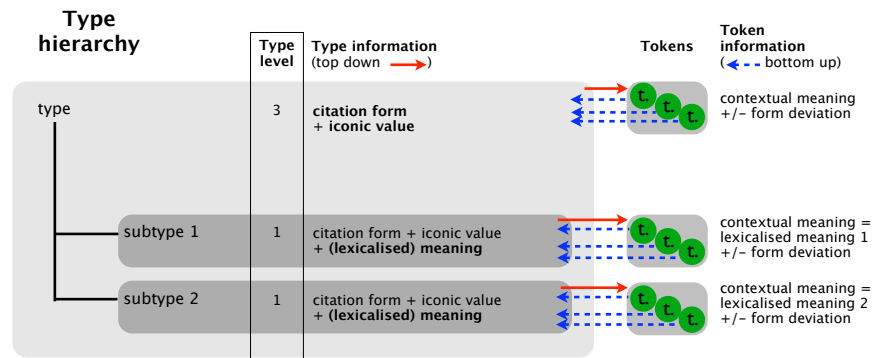


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Type hierarchy: Modelling



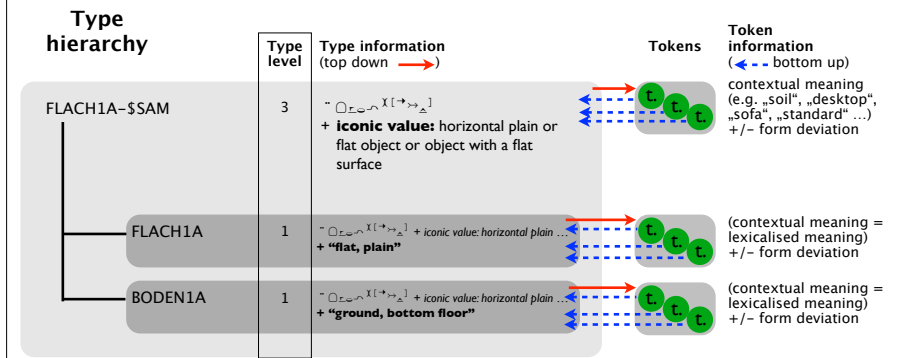
(Konrad et al. 2012)

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Type hierarchy: Modelling



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Type hierarchy: type and subtypes

Conventional uses of FLACH1A

Type	Subtype	Meaning	Meaning (engl.)	# Token
FLACH1A $\sim \square_{\text{flat}} \sim X[\rightarrow \rightarrow \rightarrow]$	BASIS1	Basis	basis	5
	BODENSEE1A	Bodensee	lake constance	3
	BODEN1A	Boden	ground (soil)	352
	BÜHNE1	Bühne	stage	6
	ERDGESCHOSS	Erdgeschoss	ground floor	10
	FELD3	Feld	field	9
	FLACH1A	Fläche flach	plain flat	87
	FUNDAMENT4	Fundament	basement	1
	FUSSBODEN1A	Boden Fußboden	ground floor	96
	GRUND3	Grund Grundlage	base basis	422
	LAND2A	Land	land	86
	PLATTE2	Platte	board	30
	PLATT3	platt	flat	1
	PLATZ1A	Platz	place	120
	PRINZIP1A	Prinzip	principle	87
	PULT1	Pult	desk	1
	SEE1C	See	lake	20
	TEPPICH1A	Teppich	carpet	47
	TISCH1	Tisch	table	108

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Type hierarchy: type and subtypes

Productive uses of FLACH1A

Type	mouthings (distinct)			
FLACH1A $\sim \square_{\text{flat}} \sim X[\rightarrow \rightarrow \rightarrow]$	auf	exis{tenz}	küche	standard
	bank	fensterbank	lage	terrasse
	basale	flachdach	lang	tresen
	belegen	fliesen	matte	unten
	beton	fließband	mittel	unterlage
	bett	fundiert	niveau	unterlegen
	blech	gerade	oberfläche	veranda
	bleiben	grundprinzip	öl	vlies
	bodenmatte	grundsatz	planum	waagrecht
	brett	grundsätzlich	plattform	wie
	ebene	holz	rasen	
	erde	klippe	regal	
	etage	konstant	sitz	

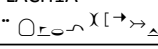

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Type hierarchy: type and subtypes

Productive uses of FLACHIA

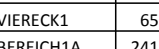
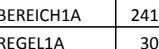
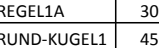
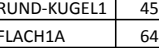
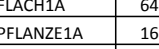
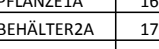
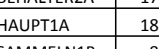
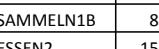
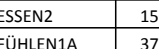
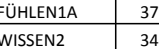
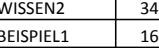
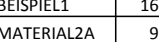

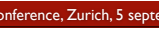
Type	mouthings (distinct)			
FLACH1A	on	exis{tence}	kitchen	standard
“  “	bench	window bench	situation/position	terrace
	basal	flat roof	long	bar
	to top (bread, roll)	to tile	mat	below
	cement	assembly line	means	support pad
	bed	well-grounded	level	to underlay
	sheet	straight	surface	veranda
	stay	basis principle	oil	mat of fibres
	floor mat	(basic) principle	ground level	horizontal
	board (wood)	basically	platform	as/like
	plain	wood	sod/lawn	
	soil	cliff	rack	
	floor	constant	seat	

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Db building & lemmatisation

Type hierarchy: type and subtypes

Type	count_ tokens	HamNoSys	count_ subtypes	types.id
VIERECK1	6510	“  “	30	13078
BEREICH1A	24165		27	13215
REGEL1A	3066	“  “	21	13104
RUND-KUGEL1	4503	“  “	19	13202
FLACH1A	6460	“  “	19	13076
PFLANZE1A	1632		17	13322
BEHÄLTER2A	1734	“  “	17	13052
HAUPT1A	1840		16	13532
SAMMELN1B	864		16	14488
ESSEN2	1504		16	13121
FÜHLEN1A	3776	“  “	16	13129
WISSEN2	3456		16	13814
BEISPIEL1	1635	“  “	15	13546
MATERIAL2A	990		15	13149

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Type hierarchy: type and subtypes

	Types	Subtypes	Types_tokens
total	5947	9989	227510
subtypes>1	1638 = 27,5 %	5680 = 56,9 %	214969 = 94,5 %

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Type hierarchy: type and subtypes

	Types	Subtypes	Types_tokens
total	5947	9989	227510
subtypes>1	1638 = 27,5 %	5680 = 56,9 %	214969 = 94,5 %
			~ 75 % ?

Lemma revision!

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Type relations

- ▶ Synonyms (lexical variants)
 - ▶ Type level: different form, different underlying image
 - ▶ Subtype level: same meaning (subtypes are replaceable in context)
 - ▶ Ex.: 'Brot' (bread)

(König et al. 2008)



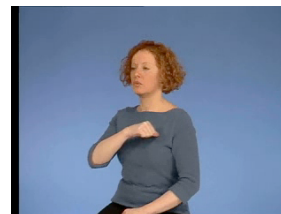
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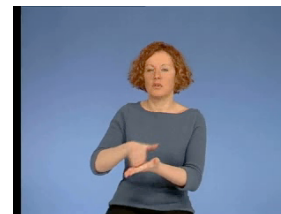
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Type relations: synonyms

BROT4



BROT7



BROT8



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Type relations

- ▶ Phonological variants
 - ▶ Type level: similar form, same underlying image
 - ▶ Subtype level: same meaning (subtypes are replaceable in context)
 - ▶ Ex.: 'Brot' (bread)



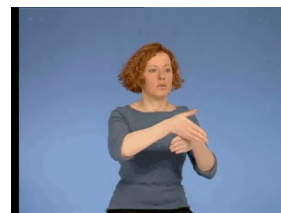
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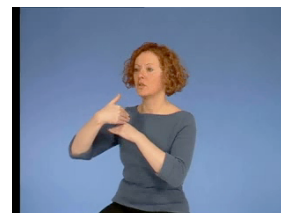
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Type relations: phonological variants

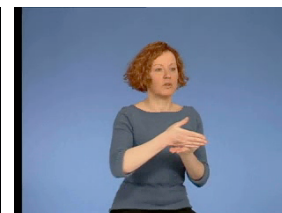
BROT3A



BROT3B



BROT3C



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Type relations

► Homonyms

- Type level: same form, different underlying image
- Subtype level: different meaning
- Ex.: 'Milch' – 'Konkurrenz'



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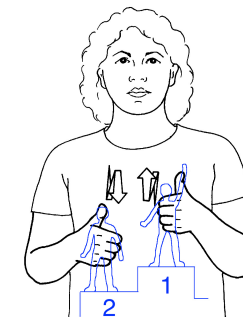
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Type relations: homonyms

MELKENIA



KONKURRENZI



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Type relations

► Citation form ↔ modification

- Type level: similar form, modified underlying image
- Subtype level: specified/extended meaning
 - ➔ Re-iconisation; delexicalisation or combination of lexical meaning and iconic value of sign component?
 - ➔ Continuum: lexical sign ("frozen") ↔ productive sign
- Grammatical modification: eg. plural
- "Iconic" modification (Becker 2003:186, 190)



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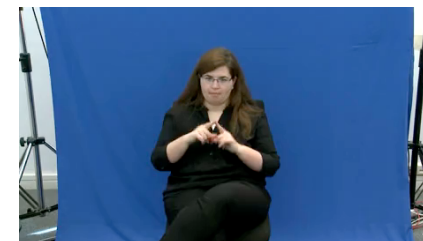
Type relations: modifications

Citation form



'Bild' (picture)

Grammatical modification



'Bilder' (pictures): plural



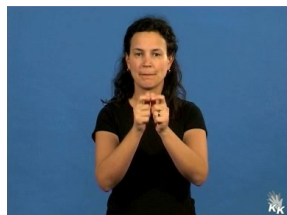
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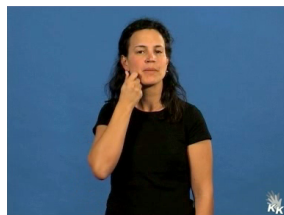
Type relations: modifications

Citation form



'Brücke' (bridge)

"Iconic" modification



'Zahnbrücke' (pontic)

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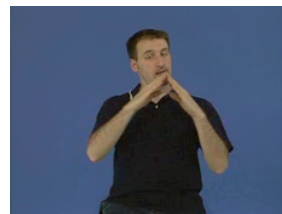


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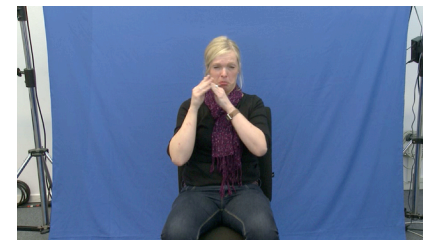
Type relations: modifications

Citation form



'Dach' (roof)

"Iconic" modification or productiv sign?



'Dach, das wackelt (beim Sturm)' (roof moving during a storm))

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Thank you!

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