

Sign language linguistics, Part I: Phonology and morphology

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Language, Summer 2014



Italiano
日本語
Deutsch shqip
Kreyòl
ayisyen
한국어
اردو
Français
Español
русский
Português
lingua
ελληνικά
हिन्दी
普通话
Latīna

Two modalities of language

Spoken language



Articulators: Mouth/tongue

Signal: Linear, acoustic waveform

Perception: Auditory (ears)

Sign language



Articulators: Hands/face

Signal: Multi-dimensional image

Perception: Visual system (eyes)

Section 1

Getting started

Some myths about sign language

- ▶ **Myth 1:** Sign language is mime.
- ▶ Sign languages can talk about non-tangible things: ideas, philosophy, mathematics, ...
- ▶ Words are arbitrary:



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American Sign Language: 'where'

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American Sign Language: 'where'

French Sign Language: 'not'

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American Sign Language: 'where'

French Sign Language: 'not'

Israeli Sign Language: 'who'

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American Sign Language: 'where'

French Sign Language: 'not'

Israeli Sign Language: 'who'

Japanese Sign Language: 'what'

Some myths about sign language

- ▶ Myth 2: There is one sign language.



Dr. Peter Hauser (right) presenting in ASL at TISLR 11, simultaneously being translated into English, British Sign Language (left), and various other sign languages (across the bottom of the stage).

Some myths about sign language

From airbnb.com:

Spoken Languages ✕

What languages can you speak fluently? We have many international travelers who appreciate hosts who can speak their language.

<input type="checkbox"/>	Bahasa Indonesia	<input checked="" type="checkbox"/>	Sign Language
<input type="checkbox"/>	Bahasa Malaysia	<input type="checkbox"/>	Suomi
<input type="checkbox"/>	Bengali	<input type="checkbox"/>	Svenska
<input type="checkbox"/>	Dansk	<input type="checkbox"/>	Tagalog
<input type="checkbox"/>	Deutsch	<input type="checkbox"/>	Türkçe
<input checked="" type="checkbox"/>	English	<input type="checkbox"/>	Čeština
<input type="checkbox"/>	Español	<input type="checkbox"/>	Ελληνικά
<input checked="" type="checkbox"/>	Français	<input type="checkbox"/>	Русский
<input type="checkbox"/>	Hindi	<input type="checkbox"/>	українська
<input type="checkbox"/>	Italiano	<input type="checkbox"/>	עברית
<input type="checkbox"/>	Magyar	<input type="checkbox"/>	العربية
<input type="checkbox"/>	Nederlands	<input type="checkbox"/>	ภาษาไทย
<input type="checkbox"/>	Norsk	<input type="checkbox"/>	中文
<input type="checkbox"/>	Polski	<input type="checkbox"/>	日本語
<input type="checkbox"/>	Português	<input type="checkbox"/>	한국어
<input type="checkbox"/>	Punjabi		

Some myths about sign language

- ▶ **Myth 3:** ASL is signed English.
- ▶ Sign languages have their own grammar.
- ▶ In fact...
 - ▶ ASL and BSL (British SL) are different languages!
 - ▶ ASL is descended from LSF (French SL).
 - ▶ So: it would be easier for an American signer to understand a French signer than a British signer!

In short...

- ▶ Sign language is a **natural human language**.
- ▶ We see the same grammatical patterns that we see in spoken language.
 - ▶ Syntax, semantics, morphology, even phonology!
 - ▶ **Conclusion:** the same underlying cognitive system.
- ▶ But, several places where 'modality matters'.
 - ▶ What can you do with signs that you can't with speech?

Section 2

Sign language 'phonetics'

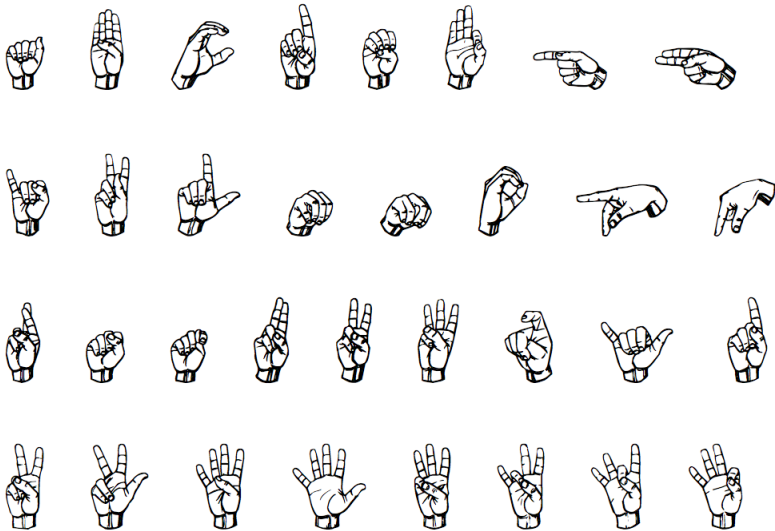
Parameters of sign language

- ▶ Recall our first description of spoken language phonology...
- ▶ Three phonetic parameters:
 - ▶ Place of articulation
 - ▶ Manner of articulation
 - ▶ Voicing
- ▶ Sign language is exactly parallel
- ▶ Four phonetic parameters:
 - ▶ Handshape
 - ▶ Location
 - ▶ Movement
 - ▶ Orientation

Minimal pairs

- ▶ In spoken language, we can find **minimal pairs** for each parameter.
- ▶ Spoken language:
 - ▶ Place of articulation: /pap/, /kap/, /tap/
 - ▶ Manner of articulation: /dɛd/, /nɛd/, /zɛd/
 - ▶ Voicing: /bʌg/, /pʌg/
- ▶ In sign language, we can also find minimal pairs.

Handshape



Minimal pairs: handshape

THINK ~ KNOW

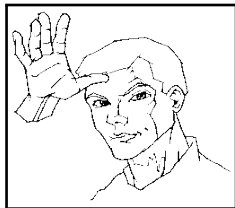
TWIN ~ RESTAURANT ~ ISRAEL

Minimal pair: orientation

NAME ~ CHAIR

STAR ~ SOCKS

Minimal pairs: location



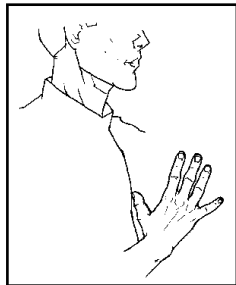
FATHER

~



MOTHER

~



FINE

▶ DRY ~ SUMMER ~ UGLY

Minimal pair: motion

TRAIN ~ CHAIR

COFFEE ~ MAKE

Practice: minimal pairs

LUCKY ~ SMART

SCIENCE ~ CHEMISTRY

BROOKLYN ~ BOSTON ~ BLUE

MARRY ~ PROOF

Non-manual markers

▶ JOHN LIKE ICECREAM

▶ JOHN LIKE ICECREAM^{br}

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- ▶ JOHN LIKE ICECREAM
'John likes icecream.'
- ▶ JOHN LIKE ICECREAM^{br}
'Does John like icecream?'

The function of non-manuals

- ▶ **Grammatical:** Y/N questions, *wh*-questions, negation, conditionals. (Similar to **intonation** in spoken language.)
- ▶ Affective (adverbial): repeatedly, slowly, carefully. . .

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- ▶ Affective (adverbial): repeatedly, slowly, carefully. . .
- ▶ Non-manuals articulated *concurrently* with manual signs.
 - ▶ Modality-specific effects (both today and tomorrow).

Features

- ▶ In both spoken language and sign language, we can break down phonological parameters into **features**.
- ▶ Spoken language:
 - ▶ **Place** =
[±coronoal], [±velar], [±anterior], [±labial], ...
- ▶ Spoken language:
 - ▶ **Handshape** =
[±thumb], [±bent], [±ulnar], [±one], ...

Section 3

Phonology

Phonological processes

- ▶ So far, a first approximation of sign language **phonetics**.
- ▶ Now: we look at **phonology**: rules and patterns.
- ▶ The cognitive status of **natural classes**:
 1. They are a phonetically coherent group of sounds.
(E.g. [+high] vowels produced with a raised tongue).
 2. They can be targeted by phonological rules.
(E.g. [+high] vowels devoiced in Japanese.).

Phonological processes

- ▶ Today, we will look at two processes in sign language:
 - ▶ Weak-hand drop
 - ▶ Assimilation
- ▶ Throughout: parallels to spoken language.

Weak-hand drop

Weak-drop

- ▶ TEACH + ER = TEACHER
- ▶ SCIENCE + ER = SCIENTIST
- ▶ LEARN + ER = STUDENT

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weak-drop

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A phonological process in a phonological environment.
What's the rule?

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What's the rule?

- ▶ LAW + ER = LAWYER
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weak-drop

A phonological process in a phonological environment.
What's the rule?

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- ▶ MANAGE + ER = MANAGER

weak-drop

none

Assimilation in English (Review)

- ▶ **Assimilation** is the phonological process where one sound becomes *similar to* an adjacent segment.
- ▶ *Example:* nasal place assimilation in English
 - ▶ interminable /n/ → [ŋ]
 intangible
 intolerant
 - ▶ impossible /n/ → [m]
 implausible
 impolite
 - ▶ inconceivable /n/ → [ŋ]
 incongruous
 incomplete

Assimilation in English

An optional process of nasal assimilation:

▶ in + kɒmplit → ɪŋkɒmplit

▶ More schematized:

n	+	k	=	ŋ	k
[+nasal]		[-voice]		[+nasal]	[-voice]
[+coronal]		[+velar]		[+velar]	[+velar]

Assimilation in English

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Assimilation in English

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n	+	k	=	ŋ	k
[+nasal]		[−voice]		[+nasal]	[−voice]
[+coronal]		[+velar]		[+velar]	[+velar]

▶ **Generalization:** the /n/ of 'in-' changes its place to match the following consonant.

/n/ → [+velar] / ___ [+velar]

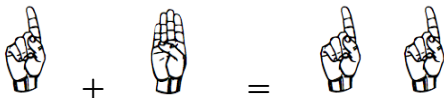
Assimilation in sign language

- ▶ Handshape assimilation in sign language:
- ▶ RED + CHOP = TOMATO

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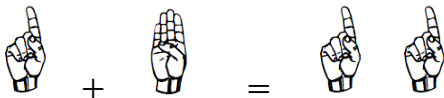
▶ RED + CHOP = TOMATO



Assimilation in sign language

- ▶ Handshape assimilation in sign language:

▶ RED + CHOP = TOMATO



- ▶ Assimilation of the entire handshape.

Handshape assimilation

- ▶ Partial assimilation:

THINK + SELF = 'think for yourself'



+



=



[+index]
[-thumb]

+

[-index]
[+thumb]

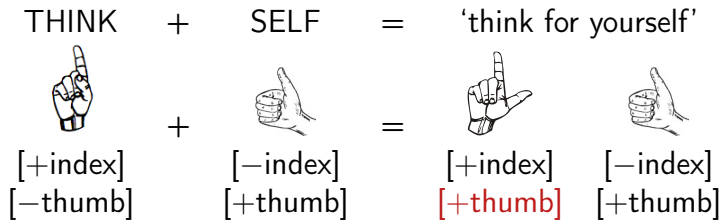
=

[+index]
[+thumb]

[-index]
[+thumb]

Handshape assimilation

- ▶ Partial assimilation:



Handshape assimilation

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THINK + SELF = 'think for yourself'



+



=



[+index]
[-thumb]

[-index]
[+thumb]

[+index]
[+thumb]

[-index]
[+thumb]

- ▶ A new handshape is produced!
- ▶ Just like [ŋ] + [k] produced [ŋ].

Handshape assimilation

- ▶ Partial assimilation:

TIME + SAME = 'simultaneous'



+



=



[+index]
[-thumb]
[-pinky]

+

[-index]
[+thumb]
[+pinky]

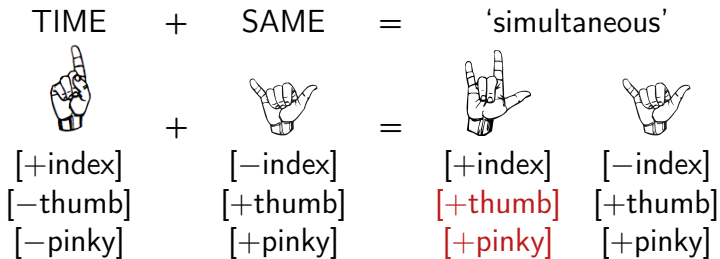
=

[+index]
[+thumb]
[+pinky]

[-index]
[+thumb]
[+pinky]

Handshape assimilation

- ▶ Partial assimilation:



Handshape assimilation

- ▶ Like with English velars, assimilation may be optional:
- ▶ *Example:*
BELIEVE (= THINK + MARRY) has two forms.
- ▶ We can represent the pattern as an optional rule:

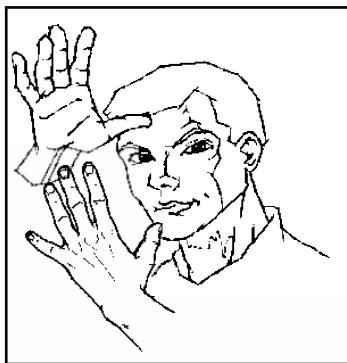


Section 5

Simultaneity in morphology

Simultaneity

- ▶ Although hands are independent articulators, we never we simultaneous, two-handed compounds.
- ▶ FATHER + MOTHER = PARENTS
- ▶ Signed in succession with a single hand, not simultaneously with two.



(not possible)

Simultaneity

- ▶ **A possible exception:**
- ▶ Brazilian sign language has some lexical signs which are entirely non-manual.
 - ▶ SEX (cheek puff)
 - ▶ STEAL (lip lick)

Simultaneity

- ▶ **A possible exception:**
- ▶ Brazilian sign language has some lexical signs which are entirely non-manual.
 - ▶ SEX (cheek puff)
 - ▶ STEAL (lip lick)
- ▶ Simultaneous compounds in Brazilian Sign Language?
 - ▶ HONEYMOON = SEX + TRAVEL
 - ▶ MOTEL = SEX + HOTEL
 - ▶ ENRAPTURE = STEAL + GET-ATTENTION

(Data courtesy of Aline Garcia Rodero Takahira)

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(Data courtesy of Aline Garcia Rodero Takahira)

- ▶ **Why?**

Simultaneity

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(Data courtesy of Aline Garcia Rodero Takahira)
- ▶ **Why?** Non-manuals easier to dissociate than H1 and H2?

Section 6

Epenthesis (if there's time)

Section 7

Summary

Summary

- ▶ Sign language, too, has linguistic patterns.
- ▶ Sign language segments categorized by four parameters:
 - ▶ Handshape
 - ▶ Location
 - ▶ Movement
 - ▶ Orientation
- ▶ Within each parameter, further featural-breakdown.
- ▶ Phonological rules may target specific features.
 - ▶ Weak-drop
 - ▶ Assimilation
 - ▶ (Epenthesis)
- ▶ Occasionally: modality-specific effects.