

# 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

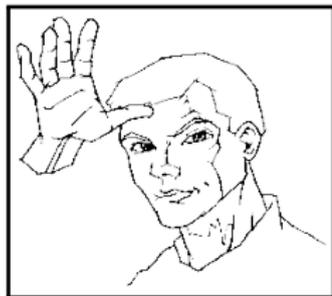
TWIN ~ RESTAURANT ~ ISRAEL

## 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<sup>br</sup>

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- ▶ JOHN LIKE ICECREAM  
'John likes icecream.'
- ▶ JOHN LIKE ICECREAM<sup>br</sup>  
'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** =  
[±coronoid], [±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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What's the rule?

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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]

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[+coronal]		[+velar]		[+velar]	[+velar]

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

/n/ → [+velar] / \_\_\_ [+velar]

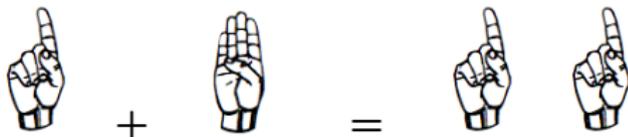
# Assimilation in sign language

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

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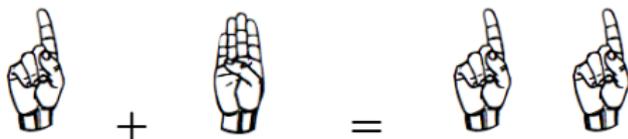
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# Assimilation in sign language

- ▶ Handshape assimilation in sign language:

▶ RED + CHOP = TOMATO



- ▶ Assimilation of the entire handshape.

# Handshape assimilation

- ▶ Partial assimilation:

THINK + SELF = 'think for yourself'



+



=



[+index]  
[-thumb]

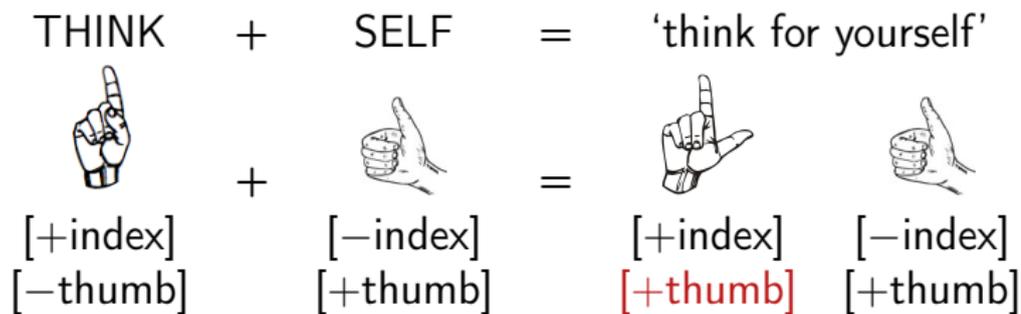
[-index]  
[+thumb]

[+index]  
[+thumb]

[-index]  
[+thumb]

# Handshape assimilation

- ▶ Partial assimilation:



# Handshape assimilation

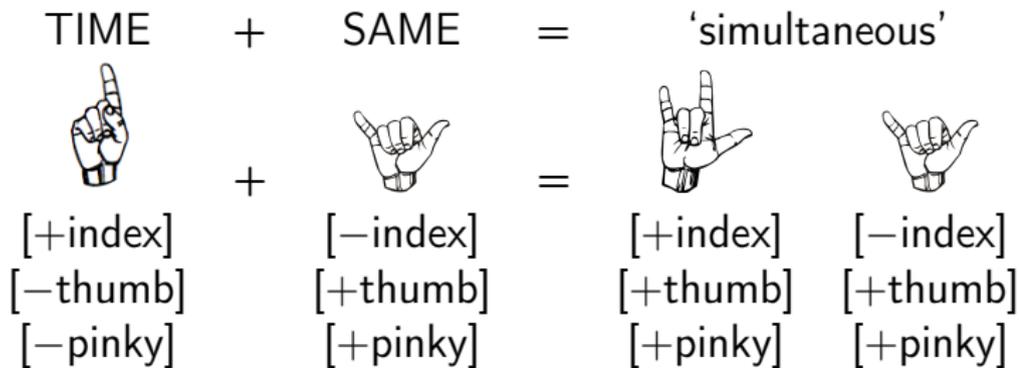
- ▶ Partial assimilation:

THINK	+	SELF	=	'think for yourself'
	+		=	 
[+index] [-thumb]		[-index] [+thumb]		[+index]    [-index] [+thumb]    [+thumb]

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

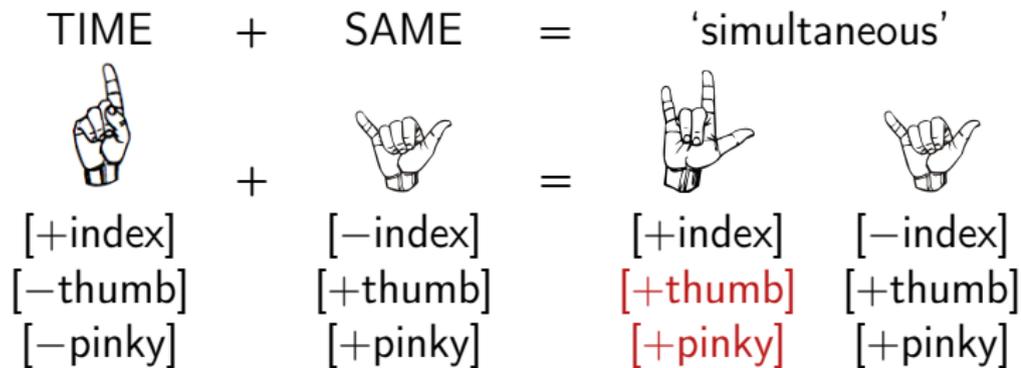
# Handshape assimilation

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# 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:

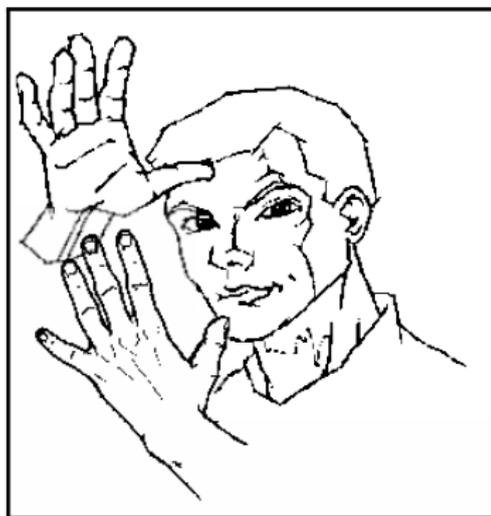


## Section 5

# 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)

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  - ▶ HONEYMOON = SEX + TRAVEL
  - ▶ MOTEL = SEX + HOTEL
  - ▶ ENRAPTURE = STEAL + GET-ATTENTION

(Data courtesy of Aline Garcia Rodero Takahira)

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- ▶ **Why?**

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- ▶ **Why?** Non-manuals easier to dissociate than H1 and H2?

## Section 6

**Epenthesis (if there's time)**

## Section 7

# Summary

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- ▶ 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.