

Language, two ways

Jeremy Kuhn

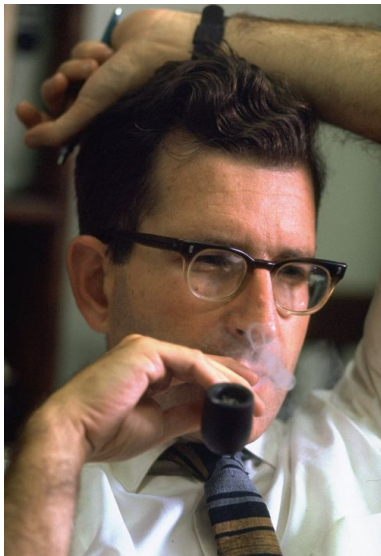
TEDxStuyvesantHS

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Language



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



(this guy)

“UG [universal grammar] may be regarded as a characterization of the genetically determined language faculty. One may think of this faculty as a 'language acquisition device,' an innate component of the human mind that yields a particular language through interaction with present experience, a device that converts experience into a system of knowledge attained: knowledge of one or another language.”

-Noam Chomsky

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'

Some myths about sign language

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- ▶ Words are arbitrary:



American Sign Language: 'where'

French Sign Language: 'not'

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:



American Sign Language: 'where'

French Sign Language: 'not'

Israeli Sign Language: 'who'

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 languages are natural human languages!
- ▶ I will show...
- ▶ We see the same grammatical patterns that we see in spoken language.
- ▶ Looking at two different modalities gives us a richer perspective on the deep properties of language

Section 2

Sign language 'phonology'

Classes of sounds (English)

	voiceless	voiced	nasal
lips	p	b	m
tongue tip	t	d	n
tongue back	k		

Classes of sounds (English)

	voiceless	voiced	nasal
lips	p	b	m
tongue tip	t	d	n
tongue back	k	g	

Classes of sounds (English)

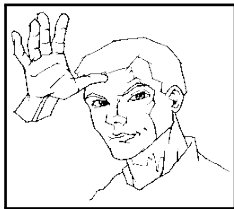
	voiceless	voiced	nasal
lips	p	b	m
tongue tip	t	d	n
tongue back	k	g	'ng'

Classes of sounds (English)

	voiceless	voiced	nasal
lips	p	b	m
tongue tip	t	d	n
tongue back	k	g	ŋ

Parameters of sign language

- ▶ Signs can also be put in 'natural classes'
 - ▶ Handshape
 - ▶ Location
 - ▶ Movement
 - ▶ Orientation



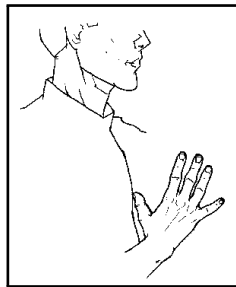
FATHER

~



MOTHER

~



FINE

Phonological processes

- ▶ In language production, segments change from one form to another in specific environments.
- ▶ Phonological processes target specific **natural classes**, along the dimensions we described.

Assimilation in English

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

Assimilation in English

▶ in + kʌmplit → ɪŋkʌmplit

▶ More schematized:

n	+	k	=	ŋ	k
[+nasal]		[-voice]		[+nasal]	[-voice]
[+tip]		[+back]		[+back]	[+back]

Assimilation in English

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Assimilation in English

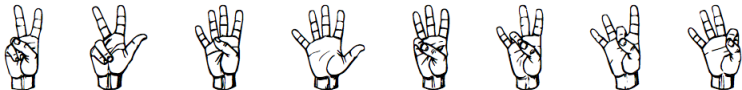
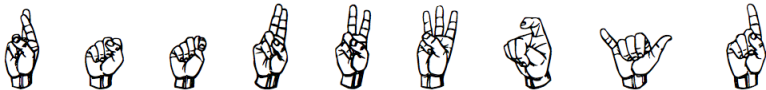
▶ in + kʌmplit → ɪŋkʌmplit

▶ More schematized:

n	+	k	=	ŋ	k
[+nasal]		[-voice]		[+nasal]	[-voice]
[+tip]		[+back]		[+back]	[+back]

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

Handshape



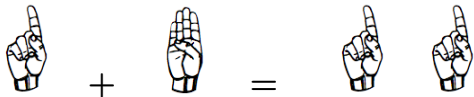
Assimilation in sign language

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

Assimilation in sign language

- ▶ Handshape assimilation in sign language:

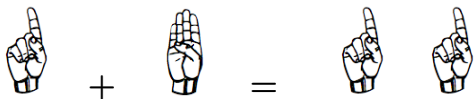
▶ RED + CHOP = TOMATO



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:

THINK + SELF = 'think for yourself'



+



=



[+index]
[-thumb]

+

[-index]
[+thumb]

=

[+index]
[+thumb]

[-index]
[+thumb]

Handshape assimilation

- ▶ Partial assimilation:

THINK + SELF = 'think for yourself'



+



=



[+index]
[-thumb]

+

[-index]
[+thumb]

=

[+index]
[+thumb]

[-index]
[+thumb]

- ▶ A new handshape is produced!
 - ▶ (Just like [n] + [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:

TIME + SAME = 'simultaneous'



+



=



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

+

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

=

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

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

To summarize:

In both spoken and sign language...

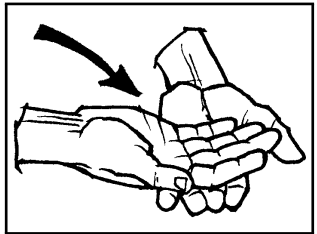
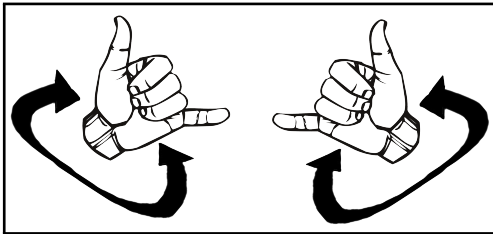
- ▶ Sets of units arranged along various dimensions.
 - ▶ E.g. place, manner, ...
- ▶ Articulatory pressure: “make things the same” applies across one dimension or another.

Section 3

Visible telocity

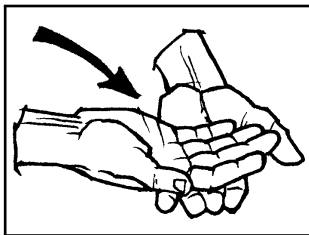
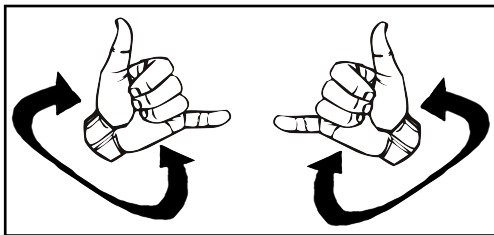
Let's play a game!

Match the sign with its meaning!

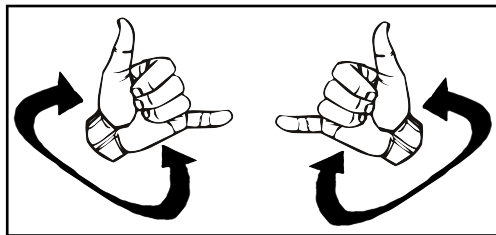


- a. decide
- b. ponder

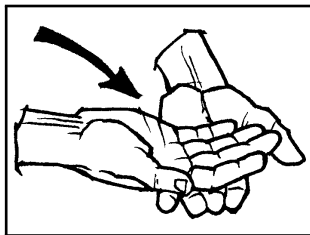
I have a confession to make...



I have a confession to make...



play



arrive

- ▶ Something in common?

play

arrive

vs.

ponder

decide

- ▶ Something in common?

play

arrive

vs.

ponder

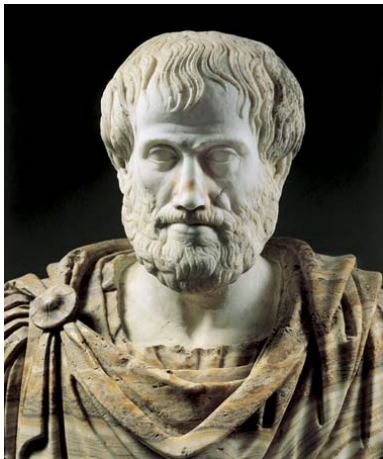
decide

- ▶ Yes!

- ▶ Something in common?

play		arrive
	vs.	
ponder		decide

- ▶ Yes!
- ▶ **Telicity**, an abstract semantic property relating to the temporal properties of an event.



(this guy)

"In all things which have a plurality of parts, and which are not a total aggregate but a whole of some sort distinct from the parts, there is some *telos* [cause]."

"It is clear that there is some difference between ends: some ends are *energeia* [energy], while others are products which are additional to the *energeia*."

-Aristotle

Two types of verbs

- ▶ Telic events : have a point of culmination
 - ▶ ‘John ate an apple in 30 seconds.’
 - ▶ ‘John painted a picture in five minutes.’
 - ▶ ‘John came to a decision in 30 minutes.’
 - ▶ ‘John arrived at the party in a split second.’
- ▶ Atelic events : happen over time
 - ▶ ‘John slept for 30 seconds’
 - ▶ ‘John waited for 30 seconds’
 - ▶ ‘John pondered the question for 30 seconds’
 - ▶ ‘John played with his friends for 30 minutes’

Visible telicity in sign language!

- ▶ **Ronnie Wilbur:**

Many sign languages systematically distinguish telicity in the phonological movement of a verb.

- ▶ Telic verbs stop sharply.
- ▶ Atelic verbs have a continuous movement

- ▶ **Strickland *et al.* 2015*:**

Even naive non-signers are sensitive to this connection (like y'all were).

- ▶ Surprising, robust connection between visual system and abstract conceptual space.

