What counts as language?

- First pass:
  - Any symbolic communication system used by a human community that involves consistent agreed-upon rule-ordered patterns of vocabulary and grammatical structure.

  - Computer languages (C++, Java, HTML)?
  - Music?
  - Math?
  - Charades?
  - Sign language?

Design Features of Language (Hockett, 1966)

1. **Vocal Auditory Channels** - Spoken language is produced in the vocal tract and transmitted/heard as sound
2. **Broadcast Transmission and Directional Reception** - The audible sound of language is heard in all directions but listeners will interpret it as coming from one specific direction
3. **Rapid Fading** - Speech sounds fade quickly after being uttered.
4. **Interchangeability** - The speaker can send & receive the same message.
5. **Total Feedback** - Individuals can hear and internalize a message they have sent.
6. **Total Feedback** - Speech sounds can be linked to specific meanings.
7. **Arbitrariness** - There is no direct connection between the signal and its meaning.
8. **Discreteness** - Each unit of communication can be separated and unmistakable.
9. **Specialization** - Speech is produced for communication, not chiefly for some other function, such as echolocation.
10. **Displacement** - The ability to talk about things that are not physically present.
11. **Productivity** - Creating new messages by combining already-existing signs.
12. **Traditional Transmission** - The learning of language occurs in social groups.
13. **Duality of Patterning** - Meaningful signs (words) are made of -- and distinguished from one another by -- meaningless parts (sounds, letters)
14. **Prevarication** - The ability to make false statements (to lie).
15. ** Reflexiveness** - Language can be used to refer to (i.e., describe) itself.
16. **Learnability** - Speakers of one language can learn to speak another.

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Sign language fails these first three tests.

Arbitrariness

- Ar {\textit{ögren}} {\textit{ci}}
- Kuzu {\textit{bütün}}
7. **Arbitrariness** - There is no direct connection between the signal and its meaning.

**Iconicity**: some non-arbitrary connection between the signal and its meaning. (SCISSORS, FLUTE, HAMMER)

**Iconicity in spoken languages**: *onomatopoeia*
- English: “bang”, “drip drop”, “woof”
- Greek: “gkoup”, “plits plits”, “gav”
- Korean: “koong”, “toktok”, “meong”

**Iconicity in sign languages**: TREE
- American Sign Language
- Chinese Sign Language
- Danish Sign Language

**Arbitrariness across sign languages**: ASL vs. BSL
- WHAT = WHERE, MEANING = ORGANIZE, CORRECT = TALK

**Discreteness** - Each unit of communication can be separated and unmistakable.

- How many sounds in:
  - stop
  - oboe
  - six

- Words in all spoken languages are built out of these bits of sound, called **phonemes**.
Duality of Patterning

13. Duality of Patterning - Meaningful signs (words) are made of — and distinguished from one another by — meaningless parts (sounds, letters)

“hope” “wish” “desire” — similar meanings, but different sounds
“cat” “act” “tack” - words with the same sounds don’t share the same meaning.

Do signs that share phonological parameters share meaning?

Handshapes:
- RED, ETC, DREAM, UGLY
- CUTE, BACON, HURRICANE, FUNNY

Movements:
- CHAIR, IMPOSSIBLE, UMBRELLA, NAME.
- TEMPORARY, SUBWAY, NEW YORK, ERASE

Locations:
- ONION, ANNOYING, NEPHEW, LETTUCE.
- KEY, MEDICINE, BUTTER, RAKE

Orientations:
- BOOK, THING, BOAT, NEW
- PAPER, CHEESE, MOVIE, SCHOOL

So meaningless sub-lexical units combine to form signs—good.
Is there structure at any more complex level?

English: verb + “(at)ion” = noun
- locate + ion = location
- suspend + ion = suspension
- prepare + ation = preparation

ASL: verb + repeated movement = noun
- EAT + repeated movement = FOOD
- SIT + repeated movement = CHAIR
- CALL + repeated movement = PHONE

Sign language PASSES the duality of patterning test.

Learnability

16. Learnability - Speakers of one language can learn to speak another. Corollary: The system must be learnable by human infants!

Is sign language acquisition like spoken language acquisition?

Sign language PASSES the learnability test.

Traditional Transmission

How sign language acquired?
- parents??
- schools
- teachers
- peers

Because sign language is (1) not inborn, and (2) acquired in social groups from other humans, sign language PASSES the Traditional Transmission test.

What about the other 90%?

- Homesign
- Emerging sign languages
- Cochlear implants

Homesign

- How would we know if language were inborn?
  - Linguistic isolation: highly unethical but tragically common
- Deaf kids typically have nurturing families

- Without input, deaf children create communicative systems
  - Semanticity, Displacement, Productivity
  - Duality of Patterning, Discreteness, Arbitrariness
Can homesigners learn language later?

- **Critical period**
  - Learning a sign language
  - Learning to read/write

Rachel Mayberry,
UCSD Linguistics

Emerging Sign Languages

- What happens when a bunch of homesigners get together?

Emerging Sign Languages

- Each successive generation adds new linguistic structure.
  - Learners go beyond their input
- Language structure is not built from the bottom up, but from the center out.
- Challenges clear-cut distinctions between "Language" and not-language.

Cochlear Implants

- Convert acoustic energy (sound waves) into electrical signals, bypassing cochlea
- Sound like this:
  - [http://www.sens.com/helps/demo05/helps_d05a_demo_blank.htm](http://www.sens.com/helps/demo05/helps_d05a_demo_blank.htm)
- Adult-onset deafness is easily treated with a CI
- Imagine trying to learn a language from that noisy input.

Cochlear Implants

2-year-olds

Cooper (CI)
Kennedy (hearing)
Ava (BSL)

Cochlear Implants

Speech outcomes
6mos – 8yrs

Comprehension
Production
Learnability

16. Learnability - Speakers of one language can learn to speak another. Corollary: The system must be learnable by human infants!

Children with CIs need years of intensive speech therapy to acquire spoken language. Most have no other language to rely on.

Speech **FAILS** this test for deaf kids with cochlear implants. Acquisition of speech with CIs requires effortful instruction

Recap: what we’ve learned

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How does sign language stack up?

- Sign languages are full, natural human languages.
- Sign languages help us reconsider what human languages are truly like, and provide new insight into where they come from.
- Understanding the full communicative power of sign has important implications for medical and educational policy.
- E-mail me any time if you have more questions: matthall@ucsd.edu