LING-UA 1.001 Language  
Fall 2016, MW 11:00-12:15 

Anna Szabolcsi, 10 Washington Place, Rm. 405. Office hours by appointment M 12:30-2:00  
Shih-Yueh Jeff Lin, 10 Washington Place, Rm. 409. Office hours T 2:00-4:00  
WooJin Chung, 10 Washington Place, Rm. 603. Office hours M 4:00-6:00

Nature or nurture? Linguistics systematically addresses this puzzle, and its results in recent decades offer a uniquely interesting support for the answer “Both.” Language is a social phenomenon, but all human languages share elaborate and specific structural properties. Linguistics mediates between cognitive science and social science.

Analyzing data from English and many other languages, we introduce some fundamental properties of the structure and interpretation of words and sentences, and the sound system. Building on these foundations we discuss the brain representation, processing, and acquisition of language, universals of language, socially conditioned linguistic variation, and the nature of language change. The study of language change on a large scale and as an ongoing process demonstrates how socially conditioned linguistic variation makes it possible and inescapable for languages to change. The acquisition of language by generation after generation keeps change within the confines of universals.

• Goals, skills, study strategies, resources

Students will become familiar with the questions that the various subdisciplines pose about language and understand how the answers form a coherent whole; solve problem sets in morphology, syntax, semantics, and phonology; and learn detailed facts about the structure, psychology, history, and sociology of language.

Linguistics draws from Humanities, Social Sciences, and Sciences as well as Mathematics, and so the skills to be acquired and the study strategies to be used are quite varied, and they change from one part of the course to the next. Precision will be important throughout the course.

If part of the material is not clear to you, be sure to see us in office hours as soon as possible. We all are happy to help. You are also welcome to see us if you are interested in further aspects of the material, and if you are thinking of majoring in Linguistics, in a combined major, or in Language and Mind.


You can purchase hard copies of the two books in the NYU Bookstore or on the internet, or Kindle versions on the internet. The Kindle versions can be read on a PC or Mac. Your TA will be happy to help with the software.

Additional book chapters or articles, in Resources at NYU Classes; also required.

Lecture slides are typically posted at NYU Classes at least one day before each class period. Reading the slides in advance of the lecture will make following the lecture, participating in the discussion, and taking notes much easier.
### Preliminary calendar

The final exam week is Dec 18-23. CAS will determine the time of the exam.

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<th>W</th>
<th>Day</th>
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<th>Reading</th>
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<tr>
<td>1</td>
<td>9-7</td>
<td>Introduction: Discovering cross-linguistic data + Discussion of syllabus</td>
<td>FRH Ch 1 (=1-28)                                FRH Ch 2: 61-65</td>
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<tr>
<td>2</td>
<td>9-12</td>
<td>Morphology: Roots, affixes, morphological types</td>
<td>FRH Ch 2: 35-49                               FRH Ch 8: 378-379</td>
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<tr>
<td>2</td>
<td>9-14</td>
<td>Morphology: Constituent structure of words + brain imaging and give in gave</td>
<td>FRH Ch 2: 49-61                               Pylkkanen &amp; Marantz: Tracking time course ...</td>
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<td>3</td>
<td>9-19</td>
<td>Syntax I: Competence; The Code Talker Paradox</td>
<td>Baker Ch 1 + FRH Ch 3                             #1 morph.</td>
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<tr>
<td>3</td>
<td>9-21</td>
<td>Syntax II: Universal Grammar &amp; linguistic universals</td>
<td>Baker Ch 1-2</td>
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<td>9-26</td>
<td>Syntax III: Parameters</td>
<td>Friedman Ch 2-3</td>
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<td>4</td>
<td>9-28</td>
<td>Syntax IV: Constituent structure and categories</td>
<td>FRH Ch 3</td>
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<td>5</td>
<td>10-3</td>
<td>Syntax V: Movement rules</td>
<td>FRH Ch 3</td>
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<td>5</td>
<td>10-5</td>
<td>Structural ambiguity and syntactic processing</td>
<td>Traxler Sentence proc. 141-157                  #2 syntax</td>
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<td>10-10</td>
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<td>6</td>
<td>10-12</td>
<td>Semantics: Entailment, assertion, presupposition, compositionality</td>
<td>F00 Ch 7 Compositionality</td>
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<tr>
<td>7</td>
<td>10-17</td>
<td>Semantics: Adjectives, determiners, adverbs, monotonicity</td>
<td>F00 Ch 7 Compositionality</td>
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<td>10-19</td>
<td>The Mind: Language</td>
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<td>#3 semant.</td>
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<td>10-24</td>
<td>Midterm</td>
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<tr>
<td>9</td>
<td>10-26</td>
<td>Brain: Lateralization, Broca/Wernicke. Critical periods</td>
<td>FRH Ch 10 461-486</td>
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<td>9</td>
<td>10-31</td>
<td>Phonetics: Vocal tract, consonants, major phonetic classes</td>
<td>FRH Ch 5 (=189-218)</td>
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<tr>
<td>9</td>
<td>11-2</td>
<td>Phonetics: Vowels, syllables, tones, categorical perception</td>
<td>FRH Ch 5 (=189-218)</td>
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<tr>
<td>10</td>
<td>11-7</td>
<td>Phonology: Minimal pairs, distinctive features, phonemes</td>
<td>FRH Ch 6: 224-258 [skip 246-256]</td>
<td>#4 phonet.</td>
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<tr>
<td>10</td>
<td>11-9</td>
<td>Phonology: Coarticulation, assimilation, phonotactics. Allophones, allomorphs.</td>
<td>FRH Ch 6: 224-258 [skip 246-256]</td>
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<tr>
<td>11</td>
<td>11-14</td>
<td>History of English: periods, vocabulary, sound change, morphology, syntax</td>
<td>FRH Ch 8: 338-361</td>
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<td>11</td>
<td>11-15</td>
<td>Regional dialects, mainly American English</td>
<td>FRH Ch 7: 279-287</td>
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<td>12</td>
<td>11-21</td>
<td>Language families. Some typical changes across languages</td>
<td>FRH Ch 8: 361-384</td>
<td>#5 phonol.</td>
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<tr>
<td>12</td>
<td>11-23</td>
<td>-- Recess --</td>
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<tr>
<td>13</td>
<td>11-28</td>
<td>Variation, social mobility, and the process of change</td>
<td>FRH Ch 7: 287-301</td>
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<tr>
<td>14</td>
<td>12-5</td>
<td>Child language acquisition: Acquiring subsystems, production-comprehension gaps</td>
<td>FRH Ch 9: 394-424</td>
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<tr>
<td>14</td>
<td>12-7</td>
<td>Language acquisition and language change: Critical period, transmission &amp; diffusion, pidgins &amp; creoles</td>
<td>FRH Ch 10: 476-479</td>
<td>#6 essay</td>
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<tr>
<td>15</td>
<td>12-12</td>
<td>American Sign Language</td>
<td>FRH 15: 60, 117-118, 215</td>
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<tr>
<td>15</td>
<td>12-13</td>
<td>Silent Children, New Language (Nicaraguan SL)</td>
<td>Senghas: Children creating NSL</td>
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<tr>
<td>15</td>
<td>12-14</td>
<td>Overview</td>
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What do linguists do?

- Among other things, they discover facts and generalizations about new languages.
- Sometimes the linguist sets out to do fieldwork ...

Segment speech into discrete units, as in field work, language acquisition, ...

The following sentences are written without word boundaries, to imitate a stream of sounds. What units can you detect? (They may be phrases, words, or morphemes.)

1. hatvanfeketemalackavisit
2. abutusegerisik
3. hatvanbutusmalackavisit
4. egérhatvanmorog
5. iszikamalacka
6. afeketeeegervisit

Prepare a list of the segments paired with their meanings.

1. iskogenfinnsdetendamm 'In the forest there is a pond'
2. detfinnsenfiskidammen 'There is a fish in the pond'
3. enrävsitterienskog 'A fox sits in a forest'
4. rävenstariiskogen 'The fox stands in the forest'
5. ulvensitteriengrotta 'The wolf sits in a cave'
6. detsitterenrävienskog 'There sits a fox in a forest'
7. idammensitterfenfisk 'In the pond sits a fish'

Now translate the following into this language:

8. The fish sits in the pond.
9. There is a wolf in the forest.
Morphology I
Roots, stems, affixes

Fall 2016 Language, Szabolcsi
Week 2

Linguistic signs

Sign = meaning

Form

Sentences, phrases, and words are often complex signs: they have parts that are themselves signs.

Morphemes are minimal signs: their parts, the sounds, do not have meanings of their own.

(1) Dragon (s) (guard treasure)
   1 sentence, 2 phrases, 3 words, 4 morphemes

Roots, stems, affixes

Prefixes and suffixes (in some languages, infixes or circumfixes) attach to the root:

un quench able s
prefix root suffix suffix

A complex word consists of an affix plus a stem. The root is the smallest stem.

un quench able s stem = un quench able, affix = s
un quench able stem = quench able, affix = un
quench able stem = quench, affix = able
quench root

Types of morphemes

Roots/stems are open class morphemes: new instances can be easily created.

Affixes are closed class morphemes: they come from a fixed inventory [* marks ungrammaticality]:

He may have jimber-ed it (new stem, old affix)
but He may have *spill-ty it (old stem, new affix)

Derivational affixes create "new concepts".

Inflectional affixes add grammatical information, e.g.
number, person, case, tense, mood.

English has just a handful of inflectional morphemes:

-s He walks (3rd person singular agreement)
-ed He walked (past)
-ing He is walking (present participle)
-en He has eaten (past participle)
-s The dogs walk (plural of nouns)
-s Amira's book (genitive)
-er weirder (comparative)
-est weirdest (superlative)

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• How many morphemes “s” does English have?
Homonymous affixes

English has three distinct inflectional morphemes whose sound shape component is /s/, rather than one morpheme /s/ with three meanings.
A morpheme being a unity of form and meaning, three meanings make three morphemes.

The three /s/’s are homonyms (accidental form identity).

An inflectional morpheme may also accidentally have the same sound shape as some derivational morpheme.
E.g.,
-er in weirder (comparative, inflectional) and -er in mover (agent-forming, derivational).

Cross-linguistic variation

Cross-linguistic variation in morphological type

<table>
<thead>
<tr>
<th>analytic</th>
<th>---</th>
<th>synthetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td></td>
<td></td>
</tr>
<tr>
<td>analytic, but</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wo-men, ta-men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>l-plural, he/she-plural</td>
<td></td>
<td></td>
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<tr>
<td>'we', 'they'</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Latvian</th>
<th>Hungarian</th>
<th>English</th>
<th>Name of form</th>
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</thead>
<tbody>
<tr>
<td>dom-us</td>
<td>ház</td>
<td>[the] house [is big]</td>
<td>nominative singular</td>
</tr>
<tr>
<td>dom-um</td>
<td>ház-at</td>
<td>[I see the] house</td>
<td>accusative singular</td>
</tr>
<tr>
<td>dom-i</td>
<td>ház-ak</td>
<td>[the] house-s [are big]</td>
<td>nominative plural</td>
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<td>dom-os</td>
<td>ház-ak-at</td>
<td>[I see the] house-s</td>
<td>accusative plural</td>
</tr>
<tr>
<td>dom-m</td>
<td>ház-nak</td>
<td>[the] house’s</td>
<td>genitive singular</td>
</tr>
<tr>
<td>dom-orm</td>
<td>ház-nak</td>
<td>[the] houses’ [s]</td>
<td>genitive plural</td>
</tr>
<tr>
<td>dom-o</td>
<td>ház-tól</td>
<td>[from the] house</td>
<td>ablative singular</td>
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<tr>
<td>dom-is</td>
<td>ház-ak-tól</td>
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The two extremes

Chinese

ta chí fàn le
he eat meal past
‘He ate the meal’

Atsugewi, polysynthetic

verb st’aq’ ‘act on runny icky material’
directional suffix -cis ‘into fire’
instrumental prefix cu- ‘from a linear object, moving axially, acting on moving object’
inflational affix-set s-‘w-’ ‘1pers subject, 3rd pers object, factual mood’

Pronounce /s + i + w + cu + st’aq’ + cis + / => [sc’ust’aq’ t’a]

Literal: "I caused it that runny icky material move into fire by acting on it with a linear object moving axially"
Instantiated: ‘I prodded the guts into the fire with a stick’

But: allomorphs of a morpheme

One morpheme is said to have multiple sound shapes (multiple allomorphs) if the variation in form is predictable. We come back to some instances of allomorphy in the Phonology segment.

blames pronounced /blemz/  
bakes pronounced /beks/  
bench pronounced /bentʃ/  
sleep pronounced /slip/  
slept pronounced /slépt/
Milder synthetic languages

<table>
<thead>
<tr>
<th>Latin</th>
<th>Hungarian</th>
<th>English</th>
<th>name of form</th>
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<tr>
<td>fusional</td>
<td>agglutinating</td>
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</table>

Sing, sang, sung, song

Templatic (non-concatenative)

Arabic
root: KTB

kataba ‘he wrote’
kataba ‘he copied’
kutiba ‘it was written’
maktabun ‘office’
kitab ‘book’
kutub ‘books’
katib ‘writer’
kuttub ‘writers’

The constituent structure of words

The formation of words is governed by rules. The constituent structure of a word reflects the steps in which it is created. Each stage must be a possible word.

The universally attested scenario is ((root + derivational affixes) + inflectional affixes). Once an inflectional affix is attached, no derivational affix can be added -- regardless whether these are prefixes or suffixes.

Some simple rules

The rule specifies the category of the input stem, and the category of the output stem:

- Verb + -able = Adjective
- un- + Adjective = Adjective
- re- + Verb = Verb
- un- + Verb = Verb

The input stem typically has to come from some special subclass. What does -able attach to?

Lovable, movable, ..............................................
but *goable, *emergeable, .................................

Unsustainable

(a) un sustainable
(b) un sustainable
**Unsustainable (a)**

(a) un sustain able

(i) sustain is a transitive verb, and -able attaches to such verbs to form adjectives, and indeed, sustainable is a good word; (ii) sustainable is an adjective, and there is an un suffix that forms adjectives from adjectives, witness: untidy.

The (a) derivation is correct.

**Unsustainable (b)**

(a) un sustain able

There is an un- prefix that attaches to verbs, but it only combines with verbs whose meaning involves, roughly, an action that changes the state of the entity it is directed at, e.g. untie. Sustain is not such a verb, and witness: *unsustain* is not a word.

Hence it cannot be a constituent of unsustainable. The (b) derivation is incorrect.

**Rereadable**

(a) re read able

(i) read is a transitive verb of the kind that the prefix re- combines with. Witness: reread is a good word. (ii) Reread is a transitive verb, and -able does form adjectives from such verbs.

On the other hand, although readable is a good word, it is an adjective, and re- does not attach to adjectives. Witness: *rehappy*. The word rereadable cannot have been formed with readable as an intermediate step.

So, (b) is correct, and (a) is incorrect.

**Unwrappable**

(a) un wrap able

This sculpture cannot be wrapped; some part or other always sticks out. It is unwrappable.

This present is easy to unwrap. It is readily unwrappable.

A word can be structurally ambiguous, i.e. formed in two different ways. The two structures may carry different meanings. If so, the word is also semantically ambiguous.
Starting Point

• What can brain data tell us about our knowledge of language

1. Introduce a technique for studying the neural activity behind language processing: **Magnetoencephalography** (MEG)
2. Show how MEG can help us sort out some tough morphology questions.

The Past Tense

• A Question
  – Is all morphology created equal?
  – E.g. The Past Tense:

  \[
  \begin{align*}
  \text{date} + [\text{PAST}] &= \text{date} + \text{ed} \\
  \text{give} + [\text{PAST}] &= \text{gave}
  \end{align*}
  \]

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  Bi-morphemic

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  \]

  ????

Priming

• A Question
  – Is all morphology created equal?
  – E.g. The Past Tense:

  • An Answer: No
    (Marslen-Wilson et al. 1993)

  – Proof: **priming**

  You recognize a word faster if you have seen it recently.
Priming

• A Question
  – Is all morphology created equal?
  – e.g. The Past Tense:
• An Answer: No (Marslen-Wilson et al. 1993)
  – Proof: priming conclusion
  “date” is recognized faster after subjects have seen “dated”
  “give” is not recognized faster after seeing “gave”

Inhibition

• But wait...
• phonologically similar words inhibit priming effects!
  gave give
date dated

Predictions

• If we can measure priming before interference has taken place, then give/gave and date/dated should have the same effect.

• Control Condition for comparison: boil vs. broil
  semantically and phonologically similar but not morphologically related.

Hypothesis

“gave” is bimorphemic, but we were fooled because it is so similar to “give”

(Stockall & Marantz 2006)
**Starting Point**

- We need...
  - Some neuroscience to tell us about brain processes and how they can be measured
  - Some ling. theory to tell us what kinds of representations and processes the brain needs to handle

**Measuring Brain Activity**

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<tr>
<th>Technique</th>
<th>Imaging Type</th>
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<td>fMRI</td>
<td>hemodynamic</td>
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<tr>
<td>PET</td>
<td></td>
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<tr>
<td>EEG</td>
<td>electromagnetic</td>
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<tr>
<td>MEG</td>
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**Functional Neuroimaging**

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- Measure blood flow in the brain
- Neurons that work hard require oxygen, thus more blood.
- Very high spatial resolution!

<table>
<thead>
<tr>
<th>Function</th>
<th>EEG / MEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure</td>
<td>electromagnetic</td>
</tr>
<tr>
<td>electric potentials directly from the scalp.</td>
<td>EEG</td>
</tr>
<tr>
<td>Electric signal distorted by the head – poor spatial resolution.</td>
<td>MEG</td>
</tr>
</tbody>
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<tr>
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<th>EEG / MEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>When large numbers of neurons fire together (“in synchrony”) they produce a signal detectable outside of the head.</td>
<td>EEG</td>
</tr>
<tr>
<td>Measure neural activity in real time.</td>
<td>MEG</td>
</tr>
</tbody>
</table>
EEG / MEG

- **MEG** Measure magnetic fields associated with electrical signals.
- Fields aren’t distorted by the skull, so spatial resolution is better.

MEG Cortical Activity

- We can measure:
  - the *timecourse* of activity
  - the *strength* of activity
  - the *distribution* of activity

- e.g. ~350ms after reading a word...
  - Peak of activity in the left temporal lobe
  - Changes depending on linguistic properties of stimulus!
  - Peak activity is quicker when the word is more frequent.
  - Hypothesis: Activity is associated with **lexical access**.

The Past Tense

- A Question
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  - e.g. The Past Tense:

<table>
<thead>
<tr>
<th>Date</th>
<th>[PAST]</th>
<th>Date+ed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give</td>
<td>[PAST]</td>
<td>Gave</td>
</tr>
</tbody>
</table>

Predictions

- If we can measure priming before interference has taken place, then *give/gave* and *date/dated* should have the same effect.

- Control Condition for comparison: *boil vs. broil*

  semantically and phonologically similar but not morphologically related.

(Stockall & Marantz 2006)
**Predictions**

- The “M350” measures lexical access prior to phonological competition (Pylkkänen et al. 2004)

<table>
<thead>
<tr>
<th>Prime M350</th>
</tr>
</thead>
<tbody>
<tr>
<td>give / gave</td>
</tr>
<tr>
<td>date / dated</td>
</tr>
<tr>
<td>boil / broil</td>
</tr>
</tbody>
</table>

**Results**

Faster M350 for
give after gave
= priming

Faster M350 for
date after dated
= priming

Faster M350 for
give after gave
= priming

No change in
M350 for broil
after boil
= no priming

**Results**

- gave primes give
  just like dated primes date

**Conclusion**

gave contains give

in other words: gave is **bimorphemic**

**Starting Point**

- We need... and conclusion...

  - Some neuroscience to tell us about brain processes and how they can be measured
  - Some ling. theory to tell us what kinds of representations and processes the brain needs to handle
Syntactic competence

The Code Talker paradox

Linguistic universals and Universal Grammar

Fall 2016 Language, Szabolcsi
Week 3

(a) Mark the ungrammatical sentences with an asterisk (*)

I watched his steps. I watched his five steps.
I watched his every step. I watched his all steps.
I watched his many steps. I watched his most steps.

It is likely that John has left. John is likely to have left.
It is probable that John has left. John is probable to have left.
I should have bought it. I shoulda bought it.
I should have more money. I shoulda more money.
I never got to school on time. I never gotta school on time.
I have got to leave. I've gotta leave.

(b) Is this sentence grammatical?
(from Chomsky, Syntactic Structures)

Colorless green ideas sleep furiously.

(c) Ambiguity

I went to the bank.

I met former producers and extras.

(c) Ambiguity

I went to the bank. lexical ambiguity
'I went to the financial institution'
'I went to the river bank'

I met former producers and extras. structural ambiguity
'I met former producers and I met extras'
'I met former producers and I met former extras'

(compare: \( 2x + y \)  compare: \( 2(x+y) = 2x + 2y \)
Is this a grammatical sentence?
Fat people eat accumulates.

Is this a grammatical sentence?
The old man the boat.

Yes!
Grammatical, temporarily ambiguous, eventually unambiguous garden-path sentences.

- Ambiguous sentences and garden-path sentences will provide a good testing ground for the study of how humans parse sentences in general.
- They identify what trips up the human parser, and how the parser recovers.

How do human languages compare?
The Code Talker Paradox (Baker)

- All healthy humans have syntactic competence in at least one language.
- Human languages are extremely different from each other. If they were not, we could easily figure out foreign languages, or codes based on them.
- Human languages must be extremely similar. If they were not, the same message could not be precisely conveyed in any one of them.

Navajo 1
At’ééd yicha. Yishcha (=yi+sh+cha)
girl crying
`The girl is crying’ `I am crying’

Ninááhiwiishdlaad. (=ni+náá+ho+hi+sh+l+daad)
`I am again plowing’

Navajo 2
Ashkii at’ééd yiyiiltsá. * Ashkii yiyiiltsá at’ééd.
boy girl saw boy saw girl
`The boy saw the girl’

Ashkii at’ééd biiltsá. * Ashkii biiltsá.
boy girl saw boy saw
`The girl saw the boy’

[Ashkii at’ééd biiltsá is a bit like The boy (by) the girl was seen, but omitting the girl doesn’t produce The boy was seen in Navajo.]
The irony

Ashkii at’éd yiyiiltá. Navajo
boy girl saw
'The boy saw the girl'

Hanako-ga Yuki-o mita. Japanese
Hanako-SU Yuki-OB saw
' Hanako saw Yuki'

SUbject (nominative), OObject (accusative)

Looking forward

• We will talk about similarities and differences in terms of a universal grammar with open parameters and specific instantiations with particular parameter settings, or, in terms of

• I-language (internal, intensionally-defined) and E-language (external, extensionally-defined).

Linguistic diversity – anything goes?

• Great diversity in the languages of North America before colonization
• Great diversity in possible linguistic structures (e.g. Warlbiri word orders)
• Linguistic universals
• Parameters as the atoms of linguistic diversity
• Languages as combinations of a finite number of parameters
• Parameters and regulating principles = universal grammar

Warlbiri (similarly in Hungarian, in Classical Latin poetry, in German, ...)

All mean, 'Small children are chasing the dog'

Kurdj-wita-jarra-ru ka-pala maliki wajilipi-nyi.
child small-2-SU aux-pres.2 dog chase-nonpast

Kurdj-jarra-ru ka-pala maliki wajilipi-nyi wita-jarra-ru.
child-2-SU aux-pr.2 dog chase-nonpast small-2-SU

Kicsiny gyerek-ek kerget-ik a kutyá-t.
small child-plur chase-plur the dog-OB

Gyerek-ek a kutyá-t kerget-ik kicsiny-ek.
child-plur the dog-OB chase-plur small-plur

Order in the madness, 1

Ashkii at’éd yiyiiltá. Navajo
boy girl saw
Taroo-ga Keiko-o mita. Japanese
'Taro saw Keiko'

'éé' biih máásdzá. Navajo
clothing into I-got-back
'I got back into my clothes'

John-ga Mary to kuruma da Kobe ni itta. Japanese
J-SU Mary with car by Kobe to went
'J went to Kobe by car with Mary'

1, cont’d

chidí bi-jáád Navajo
car its-leg (wheel)

John-no imooto- Japanese
John’s sister-

What similarity do you see in Navajo and Japanese?

What dissimilarity do you see in Navajo vs. Japanese?
Order in the madness, 2

Ozo mien Adesuwa. Edo
Ozo found Adesuwa. English

Ozo rhi nene ebe ne Adesuwa. Edo
Ozo gave the book to Adesuwa. English

Omo Ozo rre. Edo
child [of] Ozo come English

What similarities do you see in Edo and English?

Head-marking vs. dependent-marking

(verbs and possessed nouns are heads; subjects, objects, possessors are dependents – see next week)

Navajo, Mohawk | Japanese, Latin
--- | ---
head-marking | dependent-marking
BOY GIRL PFX-SAW | BOY-SU GIRL-OB SAW
CAR PFX-WHEEL | CAR-POS WHEEL

Sak Uwari shako-nuhwe’s. ‘J likes M’ Mohawk
Sak Uwari ruwa-nuhwe’s. ‘M likes J’ Mohawk
Sak rao-wise’ ‘J’s glass’ Mohawk

Linguistic universals

= the language typologist’s term for directly observable regularities

The hypothesis of universal grammar seeks to explain the existence and nature of such regularities.

• Linguistic universals take an implicative form: If a language has property P, then (always or overwhelmingly) it also has property Q.

Word order types

Many universals refer to the word order type of the language in the if-clause of the implication.

Word order types in neutral declarative sentences:
S for Subject, V for Verb, O for Object:

• SVO: English, French, Swahili, Hausa, Thai
• VSO: Tagalog, Irish, Classical Arabic, Biblical Hebrew
• SOV: Turkish, Japanese, Korean, Persian, Georgian, Telugu
• OVS, OSV, VOS: several South American Indian languages (much less frequent)

Examples of VSO and SOV

Lladdodd y ddraig y dyn. Welsh
killed the dragon the man
‘The dragon killed the man.’

Hanako-ga Yuki-o mita. Japanese
Hanako Yuki saw
‘Hanako saw Yuki.’
"Some universals of grammar with particular reference to the order of meaningful elements" (J. Greenberg, 1966)

Universal 1. In declarative sentences with [nouns as] subject and object, the dominant order is almost always one in which the subject precedes the object.
   e.g. The most common orders are SVO, VSO, and SOV.

Universal 2. In languages with prepositions, the genitive almost always follows the governing noun, while in languages with postpositions it almost always precedes.
   e.g., pour(Pre) la maison(N) de Marie(Gen); Marie(Gen) háza(N) mellett(Post)

Universal 3. Languages with dominant Verb-Subject-Object order are always prepositional.

Universal 4. With overwhelmingly greater than chance frequency, languages with normal Subject-Object-Verb order are postpositional.

Universal 27. If a language is exclusively suffixing, it is postpositional; if it is exclusively prefixing, it is prepositional.

Universal 28. If both the derivation and inflection follow the root, or they both precede the root, the derivation is always between the root and the inflection.
   e.g., treat-ment-s, *treat-s-ment; visual-ize-ed, *visual-ed-ize

Universal 41. If in a language the verb follows both the subject and the object as the dominant order, the language almost always has a case system.
   e.g., Hanako-ga 'Nominative', Hanako-o 'Accusative'

You may check out the full list at

https://en.wikipedia.org/wiki/Greenberg%27s_linguistic_universals
Syntax III
Parameters: null subjects, head directionality, question-word fronting
E-language and I-language

A new set of correlations


‘J will arrive’ ‘J will arrive’ ‘He will arrive’

It. Piove. Sono arrivati 3 uomini.

‘It is raining’ ‘There arrived three men’

Do we find a generalization concerning the contrasts between (French and English) versus (Italian)?

+/ - null subject languages

In some languages, tensed clauses (=not infinitives) must have a pronounced element in the subject position. (*Pleut.)
E.g. French, English, Edo

In some other languages, that is not needed. These are called “null subject languages”.
E.g. Italian, Spanish, Japanese (Piove.)

Vicissitudes of question formation

Qui veux-tu que Julie épouse __?
Who(m) did you say that Julie married __?
Chi credi che Giulia ha sposato __?

* Qui veux-tu que __ épouse Jean?
* Who did you say that __ married John?
Chi credi che __ ha sposato Gianni?

Qui veux-tu qui __ épouse Jean?
Who did you say that __ married John?

A possible explanatory benefit?

Can these be correlated with a known difference between these languages?
Italian is a null subject language.
French and English are not null subject languages.

A cluster of subject-related differences:
• In some languages, subjects can be “dropped”, can occur in post-verbal position, and can be moved to a higher clause without further ado.
• In others, all of these are impossible.

What is the generalization about questioning direct objects (of embedded sentences) in English, French, and Italian?
Unproblematic in all three languages.

What is the generalization about questioning subjects (of embedded sentences) in English, French, and Italian?
Unproblematic in Italian.
Bad in English and French if that / que is present in its usual form.

Can these be correlated with a known difference between these languages?
Parameters

A parameter is a single property, e.g.,

- “Do heads precede or follow their dependents in this language?”

**Head Directionality parameter**

- “Must tensed sentences have a pronounced element in the subject position in this language?”

**Null Subject parameter**

The value (=setting) of one parameter in language L may determine how various constructions work in L:

- L can “extract” the subject of an embedded clause without any change in that clause iff L is a null subject language.

---

E-English = a set of examples
I-English = the recipe

Two sets of examples may follow the same recipe:

- 3, 6, 12, 24, ... \( a_{n+1} = 2a_n \) start with \( a_1=3 \)
- 7, 14, 28, 56, ... \( a_{n+1} = 2a_n \) start with \( a_1=7 \)

The distinction btw E-language and I-language resolves the Code Talker paradox:

- E-languages are very different.
- I-languages are very similar.

---

**Head Directionality Parameter**

<table>
<thead>
<tr>
<th>Element A</th>
<th>Element B</th>
<th>English Relation</th>
<th>Japanese Relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verb</td>
<td>Direct object</td>
<td>A precedes B</td>
<td>A follows B</td>
</tr>
<tr>
<td>Verb</td>
<td>Preposition</td>
<td>A precedes B</td>
<td>A follows B</td>
</tr>
<tr>
<td>Verb</td>
<td>Embedded clause</td>
<td>A precedes B</td>
<td>A follows B</td>
</tr>
<tr>
<td>Preposition</td>
<td>Related noun</td>
<td>A precedes B</td>
<td>A follows B</td>
</tr>
<tr>
<td>Noun</td>
<td>Related pre/post</td>
<td>A precedes B</td>
<td>A follows B</td>
</tr>
<tr>
<td>Complementizer</td>
<td>Embedded clause</td>
<td>A precedes B</td>
<td>A follows B</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>Main verb</td>
<td>A precedes B</td>
<td>A follows B</td>
</tr>
</tbody>
</table>

---

**English style word order**

- All seven of the English word order generalizations are illustrated in this Edo sentence:
- "Ozo ma ta wee iren gha rhie efoto Uyi Ozo did-not say that he will put photo Uyi ye nene ekpetin. in the box ‘Ozo did not say that he will put a photo of Uyi in the box.’"

---

**Japanese style word order**

- Japanese:
  - John-ga sono tegami-o beddo no shita ni John-SU that letter-OB bed GEN down at mitsukemashita. find-Pol-Past

- Lakhota:
  - John wowapi k’uhe oyuke ki ohlate iyeye. John letter that bed the under found ‘John found that letter under the bed.’

---

**Other languages that are like English**

- Austro-Asiatic languages e.g. Thai and Khmer,
- Some of the Austronesian languages in the Pacific Islands (including Indonesian),
- Many of the Chinese languages,
- Most of the Niger-Congo languages of sub-Saharan Africa, and
- Some aboriginal languages of the Americas, e.g. the Zapotec languages of Mexico and the Salish languages of the Pacific Northwest.
Other languages that are like Japanese

- The Turkic languages,
- The Dravidian languages of South Asia,
- Many languages of New Guinea,
- Some languages of the Caucus Mountains,
- Some African languages such as Amharic (Ethiopia), the Basque language,
- The languages of Eskimos, and
- Quechua (the ancient Incan empire in South America).

Another parameter: question-word fronting

Question words in English are fronted:

John read Hamlet.

What did John read?

Question words in Korean

- In Korean, the question word stays in place:

  - John-I Hamlet-ul ilk-ess-e
  - John-SU Hamlet-OB read-Past-Decl
  - ‘John read Hamlet.’

  - John-I mweus-ul ilk-esse-ni?
  - John-SU what-OB read-Past-Q
  - ‘What did John read?’

Question words in Chinese

- Similarly, question words in Chinese also stay in place:

  - John du-le Hamlet. (約翰讀了哈姆雷特。)
  - John read-Past Hamlet
  - ‘John read Hamlet.’

  - John du-le sheme? (約翰讀了什麼？)
  - John read-Past what
  - ‘What did John read?’

Multiple question words in English sentences

- Where did you live?
- What did you do?
- Where did you do what?
- What did you do where?
- In which cities did you play which games?
- Which games did you play in which cities?
Hungarian

- Mit tettél a polcokra? *A polcokra tettél mit? ‘What did you put on the shelves?’
- Hova tetted a verseket? *A verseket tetted hova? ‘Where did you put poetry?’
- Mit hova tettél? *Mit tettél hova? ‘What where did you put?’
  = How did you distribute the books on the shelves?
  = How did you fill the shelves with books?

Question-word fronting parameter

- “Are question words fronted in this language?”
- English question word fronting: – Only one.
- Hungarian question word fronting: – All.
- Korean question word fronting: – None.

Looking forward

To operationalize these ideas, we will need some clear definitions.

Does English in fact have postpositions?
  He spoke to the boy about his behavior.
Is English in fact a null subject language?
  (Please) Call the doctor.

How do we tell?
  What are heads? What are dependents? Etc.
See the next two lectures.
Syntax IV
Technology for what Baker talks about

Constituent structure and categories
Specifiers – Heads – Complements
Structure-building rules

Fall 2016, Language, Szabolcs
Week 4/2

Sentence = Noun Phrase + Verb Phrase

Tests: interchange, coordinate

• Make honey and sting are interchangeable (preserving grammaticality, not exact meaning), and can be coordinated:
  Bees [[make honey] and/or [sting]]
  They are syntactically equivalent.
• When a longer string of words is syntactically equivalent to a shorter (minimal) one, the longer string forms a constituent, and bears the same category label as the shorter one.

Not constituents

* [Ice scares] [me]   * [Bees make] [honey]
* [Sue saw] [Pat]     * [They caught] [them]
The underlined portions cannot be systematically interchanged with minimal strings. They do not form constituents.
Noun Phrase = (Det) + Noun + (...) 

Prepositional Phrase, PP

Each phrasal category is named after its head, the component that determines its general behavior.

E.g. VP = (...) V (...) PP = (...) P (...) 
NP = (...) N (...)

Verb Phrase = Verb + (...)

Complementizer Phrase, CP 
(=subordinate/embedded clause)

Head vs. dependents (spec and comp)

Every phrase has a head.
Some phrases also contain specifiers, some don’t – it depends on what their heads are.
Some phrases also contain complements, some don’t – it depends on what their heads are.

* NP NP NP * VP VP VP 
NP = (...) N (...) NP = (...) N (...) 
VP = (...) V (...) PP = (...) P (...)
Sentence, TP (Tense Phrase)

Precise version:

\[
\text{NP} \rightarrow \text{TP} \rightarrow T \rightarrow T' \rightarrow \text{VP}
\]

Tense Phrase

NP

the dog

T will drink water

Simplified version (when sufficient):

\[
\text{NP} \rightarrow \text{S} \rightarrow \text{VP}
\]

S is “headless”

NP

the dog

VP

drinks water

TP in detail, 1

\[
\text{NP} \rightarrow \text{TP} \rightarrow T \rightarrow T' \rightarrow \text{VP}
\]

NP

Spot

T will drink

V' NP

water

TP in detail, 2

\[
\text{NP} \rightarrow \text{TP} \rightarrow T \rightarrow T' \rightarrow \text{VP}
\]

NP

Spot

T [present] V drink

V' NP

water

Optional or obligatory?

- Sue ate opt? / obl? lunch
- Sue made opt? / obl? lunch
- Sue slept opt? / obl? on a boat
- Sue relied opt? / obl? on a boat
- Sue wears opt? / obl? boots to school
- Sue put opt? / obl? ice on the table
- the bees opt? / obl? in my yard
- the bees opt? / obl? that I bought

Recognize different notations

Obligatory

complement

Optional

complement or adjunct

\[
\begin{align*}
\text{VP} & \quad \text{VP} \\
\text{V} & \quad \text{V} \\
\text{NP} & \quad \text{NP} \\
\text{made lunch} & \quad \text{ate lunch} \\
\text{VP} & \quad \text{VP} \\
\text{relied on a boat} & \quad \text{slept on a boat} \\
\text{VP} & \quad \text{VP} \\
\text{relied on a boat} & \quad \text{slept on a boat}
\end{align*}
\]
Appendix: Structure-building rules

Phrase structure rules
(as in the textbook) and
Merge rules ("Grammatical Analysis" will probably use these)

Phrase structure rules

* S consists of NP and VP. 
  * S → NP VP

* NP may consist of just N, or Det N, or N PP, or Det N PP.
  * NP → (Det) N (PP)

* PP may consist of just P, or P NP, or P PP.
  * PP → P (NP) (PP)

* CP consists of C S.
  * CP → C S

* VP may consist of just V, or V NP, or V PP, or V NP PP,
  or V CP, or V NP CP, etc.
  * VP → V (NP) (PP) (CP)

Applying PS rules to grow a tree

**Diagram:**

```
S                    S → NP VP
  NP                  NP → Det N
    VP                VP → V NP
```

```
the dog drinks N     N → dog
```

Applying PS rules to grow a tree

**Diagram:**

```
S                    S → NP VP
  NP                  NP → Det N
    VP                VP → V NP
```

```
the dog drinks water N
```

Applying PS rules to grow a tree

**Diagram:**

```
S                    S → NP VP
  NP                  NP → Det N
    VP                VP → V NP
```

```
the dog drinks N     N → dog
```

Applying PS rules to grow a tree

**Diagram:**

```
S                    S → NP VP
  NP                  NP → Det N
    VP                VP → V NP
```

```
the dog drinks water N
```
PS rules work top-down. But the same facts about sentences can be expressed using **bottom-up merge rules**.

**Fact:**
NP may consist of just N, or D N, or N PP, or D N PP.

<table>
<thead>
<tr>
<th>PS rules</th>
<th>Merge rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>NP → N</td>
<td>+(N) = NP</td>
</tr>
<tr>
<td>NP → D N</td>
<td>+(D, N) = NP</td>
</tr>
<tr>
<td>NP → N PP</td>
<td>+(N, PP) = NP</td>
</tr>
<tr>
<td>NP → D N PP</td>
<td>+(D, N, PP) = NP</td>
</tr>
</tbody>
</table>

Applying Merge rules to grow a tree

```
NP
  D  N  V
  the dog drinks N
  water
```

Applying Merge rules to grow a tree

```
NP
  D  N  V  NP
  the dog drinks N
  water
```

Applying Merge rules to grow a tree

```
NP
  D  N  V  NP
  the dog drinks N
  water
```

Applying Merge rules to grow a tree

```
NP
  D  N  V  NP
  the dog drinks N
  water
```
Syntax V-VI

Structure-building rules and movement transformations
Structural ambiguity and sentence processing

Fall 2016, Language, Szabolcsi
Week 5

Movement transformations

The dog will drink water.
Will the dog drink water?

You know (that) Mary will read this book.
You know which book Mary will read.

Mary will read this book.
Which book will Mary read?

She will never do such a thing.
Never will she do such a thing.

Which book will Mary read?

Our system of rules has to enable which book to occur in the “first position” and will in the “second position”, AND prevent them from also occurring in their traditional positions, in the same sentence.

* Which book will Mary will read which book?

Add movement transformations to the set of structure-building (= PS or merge) rules.

Move = copying plus deletion

The dog will drink water.
Will the dog will drink water?

Move = copy and delete

You know (that) Mary will read this book.
You know which book Mary will read which book.

Mary will read this book.
Which book will Mary will read which book?

Never will she do such a thing.
Move = copy and delete

The dog will drink water.

Will the dog drink water?

You know (that) Mary will read this book.

You know which book Mary will read.

Mary will read this book.

Which book will Mary read?

She will never do such a thing.

Never will she do such a thing.

Movement represented in a tree structure

Movement represented in a tree structure

General assumptions

Movement rules operate on hierarchical structure, not on mere strings. They have a "structure preserving" character.

Movement rules move constituents:
- either full phrases (XP) or heads (X).
- Movement is to a higher position ("upwards").
- Movement typically fills a vacant specifier position (with a full phrase) or a vacant head position (with a head).
- Less frequently, movement rules adjoin full phrases to full phrases, or heads to heads.

Beatles Challenge

Given structures 1 and 2 below, derive the following, using small modifications of our movement rules.

“In the town where I was born, lived a man who sailed to sea, and he told us of his life in the land of submarines.”
Structural ambiguity and sentence processing

Structural ambiguity
• I hit the guy with my fist.
• I hit the guy with the big nose.
• I hit the guy with the stick.

What does each sentence mean?

Which is which?

Attachment ambiguity: a particular case of structural ambiguity that arises when a modifier (PP, CP, etc.) can be attached either directly under VP, or under an NP inside VP.

Which of these sentences are ambiguous, which aren’t? Why?

(a) John stole letters from children.
(b) John is afraid of people with loud voices.
(c) John sent people to AAA.
(d) John put books on shelves.

For this kind of attachment ambiguity to obtain, the V must have ...

and P must be such that ...
Sentence processing (parsing)

Experiments show that people use particular strategies in parsing sentences.

We look at one theory of what they do (Frazier & Rayner 2002; Traxler 2002, 2005; others).

Is this a grammatical sentence?

Fat people eat accumulates.

The old man the boat.

Ambiguous sentences and garden-path sentences provide a good testing ground for the study of how humans parse sentences in general.

They help researchers diagnose what trips up the human parser, and how the parser recovers.

Incremental processing strategy: Listeners and speakers make decisions about how to organize words into phrases before they have enough information to be certain to make the correct decision.

During the beginning of the sentence, listeners and readers treat the baby as the person that is being dressed

Listener/reader must backtrack = undo and revise the original structure
Lyn Frazier’s Garden Path theory
(every sentence can lead you down the garden path)

1st stage:
• Analyze the incoming sequence of words for categories.
• Build a syntactic structure, word by word, based on just categories, without regard to the particular words.

2nd stage:
• Compute meaning.
• If the meaning computed can be integrated with prior assumptions, the process ends and parser can move on.
• If not, send the signal back and try to find another parse.

What heuristics?

Late Closure
Do not postulate unnecessary structure. Continue to work on the same phrase or clause as long as possible.

Minimal Attachment
When more than one structure is consistent with the input, build the structure with the fewest nodes.

Main Assertion
Given a choice, build the structure where the new elements relate to the main assertion of the sentence.

Garden Path theory

• Serial (not parallel) processing.
• Parser values time, willing to rush to decisions.
• Goes for simplicity: simpler rules are faster to apply, and place lower demands on working memory.
• Parser deploys heuristics: basic rules that can be applied quickly and consistently at any point.
• Heuristics have advantages and drawbacks; overall time saving outweigh the drawbacks.

While Susan was dressing the baby...
Late Closure wants to make the baby part of the first clause.

The burglar blew up the safe with the rusty lock.
Minimal Attachment prefers fewer nodes:

[Node counting is tricky, but see the book’s representations for adjuncts.]

Sometimes different heuristics pull in different directions.

(a) The young woman delivered the bread that she baked to the store today.
(b) The young woman baked the bread that she delivered to the store today.

Listener must choose where to attach to the store.
The main assertion of the sentence involves the main verb.
MainAsr heuristic predicts that (a) is easier to parse than (b). But, Late Closure wants to attach to the store to the current, relative clause; predicts that (b) is easier than (a).
Garden Path theory says that (a) and (b) are equally easy, because the preferences cancel out. This has been confirmed.

It turns out that some further aspects of people’s parsing behavior are not fully compatible with Garden Path theory.
Many researchers favor so-called constraint-based versions, which
• can activate multiple syntactic structures simultaneously,
• rank different structures based on evidence,
• semantics, story context, visual context, etc. are also invoked.
Semantics

Entailment: assertion, presupposition
Compositionality
Adjectives, determiners, and adverbs
Upward/downward entailing expressions

Fall 2016, Language, Szabolcsi
week 6.2 -- 7.1

Sign = Form + Meaning

``A sign presents itself to the senses, and something distinct from itself to the mind’’
Augustine of Hippo, 354-430

What are some of the things people can do, based purely on linguistic semantic competence, i.e. based on knowing the meanings of expressions?

Some linguistic inferences

Alex is a blond taragotist
⇒ Alex is blond
⇒ Alex is a taragotist

Every happy Tasmanian dragon makes a warbling sound.
⇒ Every happy Tasmanian dragon makes a sound.

Igor is surprised that the empty set is a Boolean algebra.
⇒ The empty set is a Boolean algebra

Some other linguistic inferences

Mick is a former taragotist
⇒ Mick is former
⇒ Mick is a taragotist

No unhappy Tasmanian dragon makes a warbling sound
⇒ No unhappy Tasmanian dragon makes a sound

Rahul is certain that the empty set is a Boolean algebra
⇒ The empty set is a Boolean algebra

Not purely linguistic inferences

Triangle B is an equilateral triangle
⇒ Triangle B is not a right triangle

My soup has gone a bit cold
⇒ I’m asking you to please reheat my soup

Truth conditions, entailments

One important part of sentence meaning is truth conditions = How the world would be if the sentence were true.

The truth-conditional meaning of a sentence can be characterized with the set of all its entailments.

S_1 entails S_2 :
Whenever S_1 is true, S_2 is true as well.
(It cannot be that S_1 is true, but S_2 is false.)
Two kinds of entailment

(a) Bill regrets that he offended Joe.

(a) = ? => Bill regrets something.
(a) = ? => Bill offended Joe.

(b) Bill doesn’t regret that he offended Joe.

(b) = ? => Bill regrets something.
(b) = ? => Bill offended Joe.

(More presuppositions)

Lynn saw / didn’t see both policemen.
⇒ There were (just) two policemen.

Lynn denied / didn’t deny that she was Albanian.
⇒ Someone raised the issue of Lynn being Albanian.

Mick has quit / hasn’t quit playing the taragot.
⇒ Mick played the taragot.

Meaning

(An important part of) The meaning of a declarative sentence is its truth conditions:
how the world would be if the sentence were true.

The meaning of a sub-sentential expression (NP, VP, etc.) is its contribution to the truth conditions of the sentences in which it occurs.

Compositionality

The meaning of a complex expression is determined by the meanings of its constituents and how they are put together.

• Same constituents, put together differently:
  *Me leave??* v. *Leave me!*

• Similar constituents, contributing differently:
  *blond taragotist* v. *former taragotist*

How to

compose the meanings of some particular syntactic constructions from the meanings of their constituent parts?

```
Adj  N  NP  Adv  VP or S
   / \  / \  / \  /  /
  Det  N  Adv  VP or S
```

Basic set theory is helpful in defining how the meanings of complex expressions depend on the meanings of their constituent parts.

Set, subset: \[ \{a,b\} \subseteq \{a,b,c\} \]

The intersection of two sets:

\[ \{a,b,c\} \cap \{c,d,e\} = \{c\} \]

Adjectives, 1

Luiza is a blond first-grader.
⇒ Luiza is blond.
⇒ Luiza is a first-grader.

blond is an intersective (absolute) adjective.

Adjectives, 2

Luiza is a tall first-grader.
⇒ Luiza is a first-grader.
⇒ Luiza is tall.

Jessica is a tall Marine.
⇒ Jessica is a Marine.
⇒ Jessica is tall.

Jessica is a tall Marine, but Jessica is not a tall basketball-player.
⇒ Jessica is tall.

(tall) is a subsective (relative) adjective

Adjectives, 3

Mick is a former taragotist.
=/> Mick is a taragotist.
=/> Mick is former. [not even grammatical...]

Former is not even subsective
(it is an intensional adjective)

Quantificational determiners

Every boy left is true :
No boys left is true :
Most boys left is true :

Suppose the boys are x, y, and z. Where do they have to be, in each case?
Quantificational determiners

\[
\begin{align*}
&\text{Every boy left is true: } \text{boys} \subseteq \text{left} \quad \text{i.e. } \text{card}(1) = 0 \\
&\text{No boys left is true: } \text{card}(\text{boys} \cap \text{left}) \quad \text{i.e. } \text{card}(2) = 0 \\
&\text{Most boys left is true: } \text{card}(\text{boys} \cap \text{left}) > \\
&\quad \text{card}(\text{boys} \cap \text{not-left}) \quad \text{i.e. } \text{card}(2) > \text{card}(1)
\end{align*}
\]

Quantificational adverbs

When Sue was hungry, she was always grouchy.
When Sue was hungry, she was never grouchy.
When Sue was hungry, she was usually grouchy.

Quantificational adverbs

always \approx \textit{every},
never \approx \textit{no},
usually \approx \textit{most}

What sets do the adverbs compare?

Restrictor sets

The set of individuals in the N-set is the determiner’s restrictor set.
The set of events in the “when S1”-set is the adverb’s restrictor set.
The restrictor set is the largest set that needs to be considered when we check whether the sentence involving the determiner (or, adverb) is true.

Summary

How do adjectives, determiners, and adverbs contribute to sentence meanings?

- Noun-modifying adjectives can be intersective, subsective or intensional.
- Quantificational determiners compare two sets of individuals:
  those in the N-set and those in the VP-set.
- Quantificational adverbs compare two sets of events:
  those described in the when-clause and those described in the main clause.
A closer look at every N and no N

Every Tasmanian dragon makes a warbling sound.
⇒ Every Tasmanian dragon makes a sound.

No Tasmanian devil makes a warbling sound.
=? ⇒ No Tasmanian devil makes a sound.

(the things that) make a warbling sound are a subset of (the things that) make a sound

Every N is upward entailing:
allows inferences from the VP-set to its supersets

No N is downward entailing:
allows inferences from the VP-set to its subsets

Questions to ponder
• Are there NPs that are neither upward entailing (↑), nor downward entailing (↓)?
  NP make(s) a sound =/=⇒ and ≤/=⇒
  NP make(s) a warbling sound

• Are there linguistic constructions for which some of these three entailment patterns are particularly relevant?

How about these NPs?
  ↑  ↓  neither

no dragon
every dragon
seven dragons
between ten and twenty dragons
fewer than five dragons
only this dragon
most dragons
exactly twenty dragons
exactly one dragon
the dragon
neither dragon

How about these constructions?

_____ ever purred.
_____ is/are all that friendly.
_____ drank any more coffee.
_____ cared much about poetry.
_____ ..............................................
_____ ..............................................
https://www.brown.edu/Departments/CLPS/people/philip-lieberman

http://lcn.salk.edu/team_ub.html  Ursula Bellugi
http://www.nil.wustl.edu/labs/raichle/
Language in the brain
Lateralization, localization, plasticity, and critical age effects

Language, Fall 2016, Szabolcsi
Week 8.2

Cerebral cortex

The cortex is the gray matter forming the surface of the brain (cerebrum), cons. of neurons. Responsible for decision making and memory.

Under the cortex is the white matter of connecting fibers, housing subcortical gray matter centers (e.g. computational units).

Two hemispheres

The brain has two hemispheres, connected by the corpus callosum (2 million nerve fibers).

Contra-lateralization

The right hemisphere controls muscular activity, sight, and hearing in the left side of the body, and vice versa.

Evidence for lateralization

• Dichotic listening (everybody): linguistic stimuli more accurately reported when played into right ear (connecting to left hemisphere); non-linguistic sounds more accurately reported when played into left ear.

• Global damage to one hemisphere eliminates certain functions but leaves others intact.

Left hemisphere
language
analytic reasoning
temporal ordering
reading/writing
arithmetic

Right hemisphere
perception of non-linguistic sounds
music
visual and spatial skills
holistic reasoning
pattern recognition
More evidence for (contra-)lateralization

- Split-brain patients: when the corpus callosum is split, the two hemispheres cannot communicate. E.g., patient cannot name object placed in left hand if hidden from right visual field (because stimulus does not reach the left hemisphere).

(see next slide)

Patient knows what is in each hand, but can only name which of the objects?

More specific areas for language localization

Problems with the classic model

Broca’s area vs. Broca’s aphasia

- If you take a group of aphasics and test them on various tests of morpho-syntax, what damage is predictive of problems?
  - Left anterior lobe damage, not Broca’s. (Dronkers et al. 1994)

- Only 85 percent of patients with chronic Broca’s aphasia have lesions in Broca’s area.
- Only 50-60 percent of patients with lesions in Broca’s area have a persisting Broca’s aphasia. (Dronkers, Brain and Language, 2000)

Broca’s and Wernicke’s aphasias as lexical access problems

- Underactivation in Broca’s Aphasia.
  - Lexical access is general slow in BA. You fail some tests because you can’t even hear the word!

- Overactivation in Wernicke’s Aphasia.
  - Wernicke’s aphasics show semantic priming in many situations where healthy control subjects do not.

- Fluent rambling speech may be a consequence of an overactive lexicon.

- Today:
  - Relatively uncontroroversial that Wernicke’s area is involved in processing of word meaning.
Brain plasticity

- Changes in neural pathways and synapses due to changes in behavior, environment, neural processes, thinking, emotions, as well as changes resulting from bodily injury.
- One hemisphere takes over the functions of another. Young children re-acquire language after left hemispherectomy, whereas adults do not.
- However, adults also recover from brain damage to some extent.
- Brain plasticity decreases, but does not cease, with age.

Diminishing brain plasticity; critical age effects in first language acquisition

Humans not exposed to any language by age 6 or 7 do not become competent in any language when they are first exposed to that language at a later age. Roughly, they can learn words but not grammar.


Not only in humans

Acquisition of bird songs:
- some completely innate (cuckoo)
- some entirely learned (bullfinch)
- some partially innate, partially learned (chaffinch) and show critical age effects

Not only in language

“Different aspects of visual function have different critical periods. For example, spectral sensitivity has a very early, relatively short sensitive period, whereas binocular vision has a very long one... Different structures in the visual pathways also have different critical periods.” (Kiorpes 2004)

Why is there a critical period -- why does the ability to learn a language decline?

To maintain the language learning ability in the brain is costly.
The ability disappears at the age when it is no longer needed (evolutionarily speaking), and the brain’s resources are put to other uses.
In general, genes strengthen young organisms at the expense of old ones.

Why aren't babies born talking?

Pinker: The Language Instinct

If humans stayed in the womb for the proportion of their life cycle that we'd expect based on extrapolation from other primates, they'd be born at the age of 18 months - the time when babies start talking.
Enlarged brain size, structure, and metabolic activity are apparently needed for onset of speech.
• Segmentation
• Morphology
• Syntax, syntax
• Processing
• Semantics
• Mind, brain we are here
• Phonetics
• Phonology
• Language change, dialects, variation
• Language families
• Child language acquisition
• Sign languages
Articulatory Phonetics

Language, Fall 2016, Szabolcsi
Week 9

The vocal tract

Places of articulation
1 bilabial,
2 labiodental,
3 labiodental,
4 interdental,
5 (alveo)palatal,
6 velar,
7 uvular,
8 glottal

International Phonetic Alphabet (IPA)
for American English
1-to-1 correspondence btw sounds and symbols

Consonants (AmE)
voicing, place, manner of articulation

Action in the larynx

labials coronals [] not sibilants
Not in the AmE table (why? see next week)

- Aspirated stops: $t^h ip$, $k^h in$
- Flaps $[r]$: as in Spanish *pero* `but`
  AmE *Patty*
- Trills: alveolar as in Spanish *perro* `dog`
  uvular as in French *rouge* `red`

Broader categories span both consonants and vowels

**Consonants**: some impediment to the flow of air

**Vowels**: unimpeded flow of air

**Noncontinuants**:
total blockage of air in oral cavity (*stops, affricates*)

**Continuants**:
at most partial blockage (*all other consonants, and all vowels*)

**Obstruents**:
some obstruction of airflow (*oral stops, fricatives, affricates*)

**Sonorants**:
relatively free airflow: resonate (*vowels, nasal stops, liquids, glides*)

**Consonantal**:
  obstruents > nasals/liquids > glides > vowels and nasals

Another category that spans both vowels and consonants:

**Syllabic**

Can form the core of a syllable.

All vowels, and some liquids and nasals:

- *dazzle* [dæzəl]
- *bird* [bɑːrd] — really just [b syllabic r d]
- *rhythm* [rʌðəm]
- *button* [bʌtən]
  [Addition of ə is just a notation for syllabic cons.]

---

**Syllabification**

- **Nucleus Rule**: Create a Nucleus and syllable (σ) for every vowel (includes diphthongs).
- **Onset Rule**: Place as many consonants as possible in Onset positions.
- **Coda Rule**: Place the remaining segments in Coda positions
Vowels (AmE)
front/back, tongue height, lip rounding

Part of the Tongue Involved

More on AmE vowels

Diphthong: vowel + glide
bite [bait], bout [baʊt], boy [boʊ]

Tense vowels: tongue higher, sound longer, may occur at the end of English words
[i], [ɛ], [ʊ], [ɔ], [a]
diphthongized by some speakers

Lax vowels:
[i], [ɛ], [ʊ], [ɔ], [æ], [ʌ], [ə]

Prosodic (suprasegmental) features

Length, in both consonants and vowels:

Stress: dígest – digést.
Some languages have word stress on a fixed syllable.

Tone languages (Mandarin, Burmese, Serbian, Zapotec, Ewe, ...)
register tones: high, mid, low
contour tones: falling, rising
Tones may belong to a lexical item, or may be grammatical morphemes (present v. past tense).

CA English – Hungarian
Find some of the differences

Categorical perception

Experiment:
Synthesize a series of syllables, with small equal differences leading from pure [ba] to pure [da]:

[ba]=x1  x2  x3  x4  x5  x6  x7  x8=[da]

Present synthesized syllables to listeners in randomized sequence.
Speakers report hearing [ba] when presented with x1, x2, x3, or x4, and they report hearing [da] when presented with x5, x6, x7, or x8.
The sharp break between the syllables x4 and x5 is the phonetic category boundary.

This is how we perceive sounds.
Frame by frame, 1
Ken Stevens X-ray movie, *on top of his deck*

<table>
<thead>
<tr>
<th>slide #</th>
<th>sound(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>n t</td>
</tr>
<tr>
<td>26</td>
<td>c</td>
</tr>
<tr>
<td>30</td>
<td>p</td>
</tr>
<tr>
<td>33</td>
<td>v</td>
</tr>
<tr>
<td>36</td>
<td>z</td>
</tr>
<tr>
<td>40</td>
<td>d</td>
</tr>
<tr>
<td>42</td>
<td>e</td>
</tr>
<tr>
<td>51</td>
<td>k</td>
</tr>
</tbody>
</table>

(see Resources)

Frame by frame, 2
Ultrasound movie, *It ran a lot* (midsagittal)

<table>
<thead>
<tr>
<th>time stamp</th>
<th>sounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>:34:29</td>
<td>i</td>
</tr>
<tr>
<td>:34:76</td>
<td>r</td>
</tr>
<tr>
<td>:35:06</td>
<td>æ</td>
</tr>
<tr>
<td>:35:26</td>
<td>n</td>
</tr>
<tr>
<td>:35:49</td>
<td>a</td>
</tr>
<tr>
<td>:35:69</td>
<td>l</td>
</tr>
<tr>
<td>:35:84</td>
<td>t</td>
</tr>
</tbody>
</table>

(see Resources)

IPA Practice, 1
Following is a phonetic transcription of a verse in the poem "The Walrus and the Carpenter" by Lewis Carroll. The speaker who transcribed it may not have exactly the same pronunciation as you; there are many correct versions. However, there is one major error in each line that is an impossible pronunciation for any American English speaker. The error may consist of an extra symbol, a missing symbol, or a wrong symbol in the word. Note that the phonetic transcription that is given is a narrow transcription; aspiration is marked, as is the nasalization of vowels. This is to illustrate a detailed transcription. However, none of the errors involve aspiration or nasalization of vowels.

go to next page

IPA Practice, 2
10. Write the following broad phonetic transcriptions in regular English spelling.
   a. ʤə thəm hæz cəm
   b. ʤə wʌləs ʃed
   c. tʰu tʰɔlk əv məni ðɪŋz
   d. əv juz ãnd ðips
   e. ãnd ñilin wæx
   f. əv kʰæbɑɡəz ãnd kʰɪŋz
   g. ãnd wai ðə si ɪs boʊiŋ hat
   h. ãnd wəθə ɹhɪgz hæv wɪŋz

Corrected Word

IPA Practice, 1

IPA Practice, 2
Some features of speech sounds are crucial in distinguishing spoken words (signs). Such features are called \textit{distinctive}, or contrastive, or phonemic.

Languages differ as to what features are distinctive in them, but the universal inventory has less than 30.

The abstract mental representations of the speech sounds in a language are called \textit{phonemes}, e.g. /p/.

Phonological rules specify how phonemes are realized in different positions, in view of universal and language-particular constraints.

Phonological rules apply to natural classes of sounds.

The positional variants of a phoneme are called its \textit{allophones}. \([p]\) and \([ph]\) are allophones of /p/ in English.

The allophones of a phoneme are in complementary distribution.

Minimal pairs, 2

- \textbf{interdental - labiodental}: /θ/\textit{in} thin /f/\textit{in} fin
- \textbf{alveolar - palatal}: /ʃ/\textit{e} yellow /ʃ/\textit{o} she
- \textbf{voiced - voiceless}: /b/\textit{e}d bode /b/\textit{t} boat
- \textbf{high - mid}: /b/\textit{e}t beet /b/æt/ bat
- \textbf{mid - low}: /b/\textit{e}t/ bait /b/æt/ bat
- \textbf{front - back}: /b/\textit{e}t/ beet /b/ut/ boot

Non-distinctive features

Some \textbf{non-distinctive features} in English: in that environment, the sound \underline{must} be pronounced \underline{that} way.

- \textbf{aspirated – unaspirated (voiceless stops)}
  \([kh]l\) kill \([skl]l\) skill ~[k\textit{i}l] ~[sk\textit{h}l]\]
- \textbf{nasalized – non-nasalized (vowels)}
  \([\textit{b}\textit{n}]\) bin \([\textit{b}t]\) bit ~[\textit{b}\textit{n}] ~[\textit{b}\textit{t}]\]

There cannot be minimal pairs, precisely because these features do not minimally distinguish words.

Distinctive versus non-distinctive occurrences

The same feature may have both distinctive and non-distinctive occurrences in the same language

- \textbf{alveolar – velar (nasal)}

  - \textbf{distinctive /n/ – /ŋ/}
  - \textbf{non-distinctive [n] – [ŋ]}
The same feature may be **distinctive in one language but not in another, 1**

- central – lateral (liquid) distinctive in English /r/ – /l/ /raɪt/ – /laɪt/ right light
  not distinctive in Japanese
  not distinctive in English

The environments of the English sounds *p* and *b* overlap

The environments of the English sounds *p* and *ph* do not overlap

Two phonemes -- one phoneme

Phonological rules specify (“predict”) what allophone of the phoneme occurs in a given environment

---

Hindi aspirated – unaspirated stops

/phaːl/ `fruit’ /palaː/ `moment’ /baːl/ `strength’

/khaːl/ `wicked person’ /kaːl/ `yesterday’

/kapʰiː/ `ample’ /kapʰi/ `copy’

In **Hindi**, the sounds [p] and [ph] may occur in the same environment and make a difference (=they **contrast**). Hindi has both a /p/ **phoneme** and a /ph/ **phoneme**.

In **English**, the sounds [p] and [ph] never occur in the same environment (=don’t **contrast**). They are in **complementary distribution**. They are **allophones** of the same **phoneme** /p/.


**English aspiration rule**

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>Allophones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voiceless stop</td>
<td>unaspirated elsewhere</td>
</tr>
</tbody>
</table>

- Aspirated when in initial stressed syllable, ...

**English nasalization rule**

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>Allophones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vowel</td>
<td>non-nasalized elsewhere</td>
</tr>
</tbody>
</table>

- Nasalized before a nasal consonant in the same syllable

**Phonological rules apply to natural classes**

A natural class of sounds is characterized by a small number of features (one or two) that all and only the members of the class share.

- [b], [d], [g] form a natural class: voiced stops.
  - All three sounds are voiced stops, and all voiced stops are in this set.
- But [b] and [d] do not form a natural class.
  - It is true that both are voiced stops, but because [g] is not listed, we have to use further features to characterize the class that consists of just [b] and [d].

**Which of these sets form natural classes?**

- m, n, ŋ
- m, n
- m, n, ŋ, d
- s, z, f, v, ð, s, z, f, v, ð
- p, t, k, b, d, g, ?, f, v, ð, s, z, f, v, ð
- l, r

**Morpho-phonological rules**

The positional variants of a morpheme are called its allomorphs.

What are the different allomorphs of the plural morpheme in English?

<table>
<thead>
<tr>
<th>cats</th>
<th>churches</th>
<th>homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>packs</td>
<td>roses</td>
<td>beds</td>
</tr>
<tr>
<td>texts</td>
<td>judges</td>
<td>dogs</td>
</tr>
<tr>
<td>puffs</td>
<td>brushes</td>
<td>computers</td>
</tr>
<tr>
<td>months</td>
<td>taxes</td>
<td>shows</td>
</tr>
</tbody>
</table>

**The English plural rule**

- pl...after the sounds

State the above using features, in the “elsewhere” format:

<table>
<thead>
<tr>
<th>plural morpheme</th>
<th>elsewhere</th>
</tr>
</thead>
</table>

- The morpheme is named after the most general, “elsewhere” variant.
The English past tense rule

A smarter way to write these rules?

Do the plural and the past morphemes have three completely independent allomorphs?

Could you write rules that predict that
- churches and judges both end in [z] and not [s],
- spotted and prodded both end in [d] and not [t]?

Phonotactic constraints

Example restrictions on what can and cannot occur at the beginning or end of a word

*English*

The following sounds are not allowed word-initially:

[n] velar nasal as in sing [sɪŋ]

notice: [ŋo] is not a possible English word

[ʒ] voiced palatal fricative as in beige [beʒ]

notice: *genre* is borrowed from French

*Thai*

No fricatives are allowed word-finally.

When words are borrowed from English, the fricatives in word-final position are often substituted with voiceless stops.

bus [bʌt] life [laɪp]

Phonotactic constraints, 3

*English*:

Words may begin with a three-consonant cluster, but only certain clusters. Which ones?

<table>
<thead>
<tr>
<th>strip</th>
<th>scrabble</th>
<th>sprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>/stl.../</td>
<td>sclerotic</td>
<td>splint</td>
</tr>
<tr>
<td>stew</td>
<td>skew</td>
<td>spew</td>
</tr>
<tr>
<td>/stw.../</td>
<td>square</td>
<td>/spw.../</td>
</tr>
</tbody>
</table>

Phonotactic constraints, 4

*Spanish*:

Words cannot begin with a consonant cluster composed of /s/ + stop

escuela *scuela

A native speaker of Spanish would produce

school [askul]

sport [asport]
Phonologically interesting writing systems

Writing systems may have symbols for syllables (Japanese kana), phonemes (Hungarian alphabet), or phonetic features (Korean hangul).

Characters, or groups of characters, in an alphabet are signs of sounds; typically of phonemes, not allophones. (Why phonemes?)

Katakana (partial), for foreign words

Why does a syllabic writing system suit the Japanese language? Would it equally suit English?

Hangul

Hangul

[Diagram of Hangul characters and pronunciation symbols]

[Diagram of Hangul vowels with pronunciation and meanings]
Language Change Measured in Centuries.
The history of English.
American English dialects

Every component of language (phonology, morphology, syntax, semantics) changes over time.

Linguistic change does not affect scattered examples: it is regular and thorough-going.

Old English: 449 Anglo-Saxon invasion -- 1100 Norman conquest
Beowulf: Wolde guman findan þone þe him on sweofote sare geteode.
‘He wanted to find the man who harmed him while he slept’

Middle English: 1100—1500 [Great Vowel Shift]
Chaucer, Canterbury Tales:
Whan that Aprille with his shoures soote
The droghte of March hath perced to the roote…

Modern English: 1500 –Present
Hamilton: A man may fish with the worm that hath eat of a king, and eat of the fish that hath fed of that worm.

Some important changes in the history of English
The incorporation of French vocabulary after the Norman conquest;
The Great Vowel Shift;
The loss of inflectional morphology;
The change from SOV to SVO word order and in subject/verb inversion.

Some loan words from Scandinavian
anger, cake, call, egg, fellow gear, get, hit, husband, low, lump, raise, root, score, seat, skill, skin, take, their, they, thrust, ugly, window, wing

Some Old English words lost through cultural change
dolgbot compensation for wounding
eafor tenant’s obligation to king to convey goods
flytme blood-letting instrument
French loans in conjunction w/ native English:
cow – beef, calf – veal, sheep – mutton, pig – pork

Some other French loan words in English:
• Government, tax, revenue, royal, state, parliament, authority, prince, duke, slave, peasant
• Religion, prayer, sermon, chaplain, friar
• Judiciary: judge, defendant, jury, evidence, jail, verdict, crime
• Warfare: army, navy battle, soldier, enemy

Italian motto, artichoke, balcony, casino, mafia, malaria
Spanish comrade, tornado, cannibal, banana, guitar, vigilante, marijuana
German poodle, seminar, kindergarten, noodle
Dutch sloop, cole slaw, smuggle, gin, boom
Hindi thug, punch (drink), shampoo, chintz
Native Am. toboggan, opossum, chipmunk, Massachusetts, Missouri
Hungarian coach < Fr. coche < H. kocsi [mid 16th c., from Kocs, town in Hungary]

Semantic changes
ad-ripare ‘to reach embankment’ > to arrive
(riparia > river)
prae-textum ‘fabric cover’ > pretext
hlaf-weard ‘loaf guard’ > lord
hlaf-dige ‘loaf kneader’ > lady

Folk etymology in English
belfry < ME berfrey ‘bell tower’ (unrelated to bell)
bridegroom < ME bridegome (unrelated to groom)
muskrat < Alg. musquash (unrelated to musk or rat)
woodchuck < Alg. oitchek (unrelated to wood or chuck)

The Great Vowel Shift
(btw 1400 & 1600)

<table>
<thead>
<tr>
<th>Shift</th>
<th>Middle English</th>
<th>Modern English</th>
</tr>
</thead>
<tbody>
<tr>
<td>ad-ripare</td>
<td>[aː]</td>
<td>[aː]</td>
</tr>
<tr>
<td>prae-textum</td>
<td>[ˈpraɪtɛktəm]</td>
<td>[ˈpretekst]</td>
</tr>
<tr>
<td>hlaf-weard</td>
<td>[hˈlaːfwaːrd]</td>
<td>[ˈhlɔːfweːrd]</td>
</tr>
<tr>
<td>hlaf-dige</td>
<td>[hˈlaːfdʒ]</td>
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</tbody>
</table>

The Great Vowel Shift is a primary source of many spelling inconsistencies of English because our spelling system still reflects the way words were pronounced before the Great Vowel Shift.
Morphological change and syntactic change

- Morphological change
  Old English case affixes

<table>
<thead>
<tr>
<th>Table 7.30 Old English case affixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mancafone</td>
</tr>
<tr>
<td>Singular</td>
</tr>
<tr>
<td>Nominative</td>
</tr>
<tr>
<td>Accusative</td>
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<tr>
<td>Genitive</td>
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<tr>
<td>Dative</td>
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<td>Plural</td>
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<tr>
<td>Dative</td>
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</tbody>
</table>

- Loss of case affixes

<table>
<thead>
<tr>
<th>Table 7.31 The loss of case affixes through sound change (in English hound)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old English</td>
</tr>
<tr>
<td>Nominative</td>
</tr>
<tr>
<td>Accusative</td>
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<tr>
<td>Genitive</td>
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<td>Genitive</td>
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</tr>
</tbody>
</table>

- Inversion: Old/Middle E → Modern E

Speak they the truth?
During the 16th and 17th centuries the inversion rule changed to apply only to auxiliaries.
Old form:
They speak => Speak they?
They can speak => Can they speak?
New form:
They speak => Do they speak?
They can speak => Can they speak?
Regional dialects (American English)

The term dialect as used by linguists

A regionally, or socially, or ethnically distinctive variety of language, identified by a particular set of lexical items, grammatical structures, and a distinctive pronunciation.

Boundaries

An isogloss is a line on a map or a dialect map that shows the geographical boundary of a particular linguistic feature.

A dialect boundary is a bundle of isoglosses.

I.e. a significant number of linguistic features are different on the two sides of the dialect boundary.

Dialect? Language?

The separation of groups of speakers leads to dialectal differentiation in their language, possibly developing into different languages.

Dialect? Language?

“A language is a dialect with an army and navy” (Max Weinreich).

Mutually intelligible “languages”: ......

Not mutually intelligible “dialects”: ......
ANAE

*Atlas of North American English* [ANAE], 2006
by William Labov, Sharon Ash, and Charles Boberg

ANAE surveys the regional dialects of the U.S. and Canada on the basis of their pronunciations, sound systems, and sound changes active in the 1990s.

Dialectal differences in North American English

**Lexical**
e.g. *pop* vs. *soda* vs. *coke*, *pail* vs. *bucket*

**Morphological**
e.g. *A*-prefixing in Appalachian English

‘*a*-hunting we will go’
Same source as *on fire* > *afire*; *on live* > *alive.*

**Syntactic**
e.g. Negative Concord in Southern American English

*People didn’t like nothing.*
*Nobody liked nothing.*
*I don’t never buy nothing.*

Dialectal differences, cont.

**Syntactic**
In certain varieties of Southern American English, subject/auxiliary inversion:

*Didn’t nobody see the film.*
*Nobody didn’t see the film.*

**Phonological**

* the vowels in *cot* and *caught* (most noticeably, from the Great Plains westward, the two words are not distinct)
* the vowels in *merry, marry and Mary* (in the American West, Inland North, and Midland, these words are not distinct)
* the vowels in *pin* and *pen* (in Southern American English, and Midland, these two words are not distinct)
Prefixing in Appalachian English, 1

Appalachian English puts a prefix *a-* before certain words that end in *-ing*: *‘a-hunting we will go’.*

The woman was a-coming down the stairs.
Sam was a-following the trail.
Sally got sick a-swimming in that pool.
* The man likes a-sailing.
* Sally got sick from a-swimming in that pool.
* The man was a-recalling what happened that night.

Prefixing in Appalachian English, 2

Appalachian English puts a prefix *a-* before certain words that end in *-ing*: *‘a-hunting we will go’.*

The woman was a-coming down the stairs.
Sam was a-following the trail.
Sally got sick a-swimming in that pool.
* The man likes a-sailing.
* Sally got sick from a-swimming in that pool.
* The man was a-recalling what happened that night.

Syntactic conditions: not with *-ing* participles that function as nouns or adjectives; not when following a preposition.

Phonological: not when first syllable is unstressed: *a-recalling.*

African American English (AAE), 1

Phonology
Post-vocalic r-deletion, l-deletion
Consonant cluster reducing *t, d*-deletion
Neutralization of *ɛ* and *ɪ* before nasals
Diphthong reduction
Interdental fricatives become alveolar
Etc.
All these features are characteristic of various other American/British English dialects, especially of Southern US regional dialects.

African American English (AAE), 2

Syntax
Negative concord: *He don’t know nothing.*
Deletion of *be* where SAE can contract:
*He’s happy.* – *He happy.*
Episodic *is/∅* v. habitual be:
*John ∅ happy now – John be always happy.*
Dummy *there => it:*
It’s a fly messing with me.
‘There’s a fly messing with me’
NegConcord and *‘there’* are also present in other US dialects.
Episodic v. habitual in SAE verbs: *is dancing* v. *dancer.*

Dialect and sound change:
Northern Cities Shift
Takes place around the region surrounding the Great Lakes. Characteristic of Chicago, Detroit, Cleveland, and Buffalo.
The shift is an ongoing change in progress throughout the Great Lakes cities.
Some speakers only exhibit the first two stages.
Some other may be more advanced and exhibit all 6 stages.
None, however, has only the last few stages without the preceding stages.
Language families. Proving that two languages are related

Language, Fall 2016, Szabolcsi
Week 12

How language families arise

Group 1 splits up.
The languages of
Group 1a and Group 1b develop separately and ultimately diverge.

Largest families by number of languages

- **Ethnologue**

  - Niger–Congo (1,531 languages)
  - Austronesian (1,257 languages)
  - Trans–New Guinea (477 languages)
  - Sino-Tibetan (449 languages)
  - Indo-European (439 languages)
  - Afro-Asiatic (374 languages)
  - Nilo-Saharan (205 languages)
  - Pama–Nyungan (178 languages)
  - Oto-Manguean (177 languages)
  - Austroasiatic (169 languages)
  - Tai–Kadai (92 languages)
  - Dravidian (85 languages)
  - Tupian (76 languages)
But, some more distantly related languages are more similar to each other.

We’ll come back to this problem!

Proof of language relatedness

Systematic sound correspondences in those vocabulary items that plausibly come from the shared historical period.

Is identity of morphological or syntactic type a proof of historical relatedness?

NO.
The ca. 5000 human languages belong to a small number of broad morpho-syntactic types (as we have seen).
Languages easily change morpho-syntactic type (English SOV > SVO).
[E.g. earlier assumption of a Uralic-Altaic family including Samoyedic, Finnish, Hungarian, Turkish, Korean, Japanese, etc. was an illusion due to the shared agglutinating and SOV typological characteristics.]

Basic vocabulary

Numbers
Pronouns (I, you, this, here, thus, where,...)
Flora and fauna to be found in the relevant area
Body parts, kinship terms
Seasons, weather terms, sun, moon, natural phenomena (wind, ...)
Simple foods and artifacts, horse-keeping, etc.
The verb BE
Verbs of physical action and sensation
Basic adjectives

Example: Hungarian is a Finno-Ugric language

Finn. /kumpua/  
Finn. /kunta/  
Finn. /lintu/  
Finn. /kota/  
Finn. /kaetae/  
Hung. /hab/ ’foam’
Hung. /had/ ’clan’
Hung. /lu:d/ ’goose’
Hung. /ha:z/ ’house’
Hung. /ke:z/ ’hand’

What about Hung. /harang/ ’bell’, /kerest/ ’cross’?

What systematic correspondences between Finnish and Hungarian do you find?
Can you read this store sign from the island of Karpathos?

Two sound changes in the history of Greek:
• \( [b] > [v], [d] > [\theta] \)
  letters B and \( \Delta \) no longer signify [b] and [d]
• \([mp] > [b], [nt] > [d] \); spelling is conservative, so МΠ, ΝΣ signify [b] and [d]
• New loanwords need to be transliterated:

Any similarity ...
• between the changes that led from the Finno-Ugric proto-language (which is more similar to Finnish) to Hungarian,
• and the changes that took place in the history of Greek?

Grimm’s Law
• One of the most important sound changes in the history of Indo-European languages.
The beginnings of comparative linguistics, and the scientists that influenced it

- Linguistics in India: inspired by need to preserve orally transmitted Sanskrit texts from the Vedic period. **Pāṇini** (पाणिनि), Sanskrit grammarian, 6th century BCE

**William Jones** (1746-1794)
1786 Sanskrit, Greek, and Latin sprung from a common source which no longer exists

**George Cuvier** (1769-1832)
naturalist and zoologist
- 1796 African and Indian elephants and mammoth are three different species.
- First proof that a species can become extinct.
- Reconstruction of fossilized animals based on the principle of correlation of parts.

**The Old Grammarians:**
comparative linguistics

- Prove relationship between different contemporary languages
- Reconstruct the proto-language that they are descendants of
- Linguistic change is systematic but has exceptions: a tendency

**Franz Bopp** (1791-1867)
1816 On the Conjugation System of Sanskrit in Comparison with That of Greek, Latin, Persian and Germanic

[conjugation = verbal inflection]
reconstruction → principles of comp. ling.

**Jacob Grimm** (1785-1863)
built on the work of R. Rask
1819 Germanic Grammar
rigorously adheres to laws of sound change
The Neogrammarians

“Neogrammarian” does not well convey the humorously-meant ‘young upstart’ flavor of the original Junggrammatiker, and the confidence with which they set about revising old results was as infuriating for some contemporaries as it was inspiring for others.

Karl Brugmann (1849-1919), Hermann Paul (1846-1921), Karl Verner (1846-1896), among others

1878 Neogrammarian Manifesto
- sound changes are exceptionless
- social, psychological factors in change
- the only scientific view of language is the historical one

Structuralism

Ferdinand de Saussure (1857-1913)

1878 On the Original System of Vowels in Indo-European Languages, a masterpiece of historical linguistics
1906 Course in General Linguistics, the foundational piece of modern synchronic linguistics
Language change, close-up
1. Socially conditioned linguistic variation.
2. Critical period effects: consequences for language acquisition and language change.

Some Questions
We have studied linguistic change on a large scale.

How come the constant change of languages does not disrupt communication?

What types of language change exist?

Why doesn’t change wipe out the “human language” characteristics and result in qualitatively new kinds of languages?

Linguistic Variation, Socio-Economic Mobility, and the Process of Language Change

• People do not just use broadly speaking prestigious or stigmatized language varieties. The picture is more fine-grained.
• A well-chosen sociolinguistic variable tracks very fine-grained differences in affiliation, status, and aspirations.

A sociolinguistic variable is ...
• a linguistic phenomenon (sound, morpheme, construction, etc.) whose use exhibits variation that correlates with social factors. E.g. [in]—[in], post-vocalic /r/.
• Variables may be associated with prestige or stigma, group affiliation, socio-economic status, or social aspirations.
• A good variable to study is one that is frequent, easily quantifiable, not consciously monitored by speakers, and an integral part of larger structures.

Style (Labov), register

Styles:
careful (attention to speech) and casual (no attention)

Registers:
formal and informal
(defined with reference to speech situations: church, family, etc.)

Labov, Prestige and socio-economic mobility
New York City /r/

Pronunciation of [r] in coda position (often referred to as “post-vocalic r”) was a prestige variant in NYC after WWII: fourth, floor

Methodological questions
• The Observer’s Paradox: the means used to gather the data interferes with the data.
• Goal: to collect spontaneous and unmonitored speech, which is the most systematic.
• The sociolinguistic interview versus rapid and anonymous observation.
• Measuring prestige.
“Post-vocalic /r/” in British English and NYC English

road
trill
car
defer
lyrics
daring
cart
marsh

In terms of syllable structure, a “post-vocalic /r/” is one in coda position.

Department store elicitation technique

“Excuse me, where are the women’s shoes?”
“Fourth floor.”
(elicits casual pronunciation)

followed by,
“Excuse me?”
“Fourth (floor).”
(elicits emphatic, careful pronunciation)

Introduction v. spread of the new form

• Highest status group (upper-middle-class, UMC) introduces the new [r]-pronouncing norm in casual speech.
• The second-highest group (lower-middle-class, LMC) outdoes the highest in careful speech: “hypercorrection”.
• UMC develops use of [r] early in life:
younger Saks people are more r-ful in casual speech.
• LMC learns it late in life:
older Macy’s people are more r-ful in careful speech.

LMC speakers “hear themselves” saying more r’s than they really do, and stigmatize r-less pronunciation by others.
Upward mobility of LMC fuels the spread of the r-dialect.

Apparent time study of change

Compares the speech of speakers from different age groups, different social classes, and different sexes within the same speech community.
Inferences and predictions about ongoing change are made by comparing the differences between the speech of these groups.
For example, when older speakers use a variant less frequently than younger speakers, it is possible that there is change in progress.
The hypercorrect behavior of the lower middle class is an apparent-time indicator of change in progress.
Labov also found women to be using more post-vocalic r than men. Women generally lead changes.

Real time study of change
(with same or different sets of speakers):

A real-time comparison between scores for post-vocalic-r in New York City department stores in 1962 and 1986. Comparing figures, we see that the percentage of post-vocalic-r increases in all three stores. Confirms that there is indeed change in progress.
When there is no change: stable variation

Language change is usually preceded and/or accompanied by a prolonged period of variations, but linguistic variation does not necessarily lead to language change.

One example of stable variation: the sociolinguistic variable (ing) in words like singing or fishing.

Two variants: the more stigmatized [n], and the more prestigious [ŋ]

See next slide.

Linguistic constraints on (ing)
The variant [n] occurs most frequently in progressives and participles, and less frequently in adjectives, even less so in gerunds and nouns:

<table>
<thead>
<tr>
<th>Most [n]</th>
<th>Next</th>
<th>Least [ŋ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressives and participles</td>
<td>Adjectives</td>
<td>Gerunds</td>
</tr>
<tr>
<td>E.g. She is playing, a flying fish</td>
<td>Walking is healthy,</td>
<td></td>
</tr>
</tbody>
</table>

This variation has been quite stable since Early Middle English. Old English had an alveolar -inde, -ende for marking verbal progressives, and a velar -inge, -ynge for marking verbal nouns, i.e. gerunds.

Recap: Critical age effects in individual language acquisition

Humans who are not exposed to any language by age 6 or 7 cannot become competent in any language.

Roughly, they can learn words but not grammar.

Curtiss et al., The Linguistic Development of Genie (1974)
http://www.jstor.org/stable/412222

Recap: Not only in humans

Acquisition of bird songs:
- some completely innate (cuckoo)
- some entirely learned (bullfinch)
- some partially innate, partially learned (chaffinch) and show critical age effects

Further consequences

Critical age effects have consequences for the whole speech community.

The types of language change that have been well-known since the 19th century, as well as some differences between pidgins and creoles are rooted in how humans, subject to critical age effects, acquire language.
Language families and languages in contact

Group 1 splits up. The languages of Group 1a develop separately and ultimately diverge. Group 1b interact.

Linguistic interference

Two models of language relatedness

Family tree theory
August Schleicher 1821-1868

Wave theory
Johannes Schmidt 1843-1901

Models of language change and language acquisition

Transmission
Change spreads from one generation to another, with successive cohorts and generations of children advancing the change.

Diffusion
Change spreads from one dialect group to another (social dialects, regional dialects), through language contacts between adults.

Transmission and diffusion (Labov, 2007)

• A contrast is observed between the transmission of change within languages and diffusion of change across languages. Diffusion is often confined to pronunciation and vocabulary, and to a set of lexical items.

• The contrast is the result of two different kinds of language learning.

• Transmission is the product of the acquisition of language by young children.

• The limitations on diffusion are due to the fact that most language contact is among adults. Adults do not learn and reproduce linguistic forms, rules and constraints with the accuracy and speed that children display.
Pidgins and Creoles

- **Pidgins** are makeshift languages arising in contact situations where people without a shared language have to communicate (commercial contact, plantations with slaves, etc.).
- Lexical items come from the language of the dominant group, called the lexifier language / superstrate language (Swahili, Malay, English, or French, for many pidgins).
  - Few functional elements (auxiliaries, determiners, prepositions, inflectional morphology);
  - Unstable word order;
  - Ambiguities often resolved only by context.

Creoles

- **Creoles** are pidgins that have become the native language of a community.
- In D. Bickerton’s view, they are “filtered through the minds” of the children who acquired the pidgin as their first language.
- We are not claiming that all Creoles arise in this way, rather, that some Creoles have.
  - Creoles have a structure familiar from “traditional” human languages, although they also share certain grammatical features.
  - They are as unambiguous and functional as other languages.

Creoles have inflectional morphology

**Inflectional morpheme –im (South Pacific)**

<table>
<thead>
<tr>
<th>bik</th>
<th>big</th>
<th>bikim</th>
<th>to make something big</th>
</tr>
</thead>
<tbody>
<tr>
<td>daun</td>
<td>down</td>
<td>daunim</td>
<td>to lower something down</td>
</tr>
<tr>
<td>nogut</td>
<td>no good</td>
<td>nogutim</td>
<td>to spoil, damage</td>
</tr>
</tbody>
</table>

Mauritian Creole

*Alle çace to lacorde, ...*  
*go fetch 2.SG.POSS rope*

*Baleine amarre lacorde dans so laquée...*  
*whale tie rope in 3.SG.POSS tail*

*Lacorde là vine raide...*  
*rope SP become stiff*

*Lacorde péte éne coup!*  
*rope snap one time*

‘Go fetch your rope... Whale ties the rope to its tail... The rope stiffens... The rope suddenly snaps!’

Creoles

*Padi dem; kontri; una əl we de na Rom.*  
*Mek una əl kak una yes. A kam ber Siza, a no kam prez am.*

**WILLIAM SHAKESPEARE, Julius Caesar,**  
*translated to Krio by Thomas Decker*

Friends, Romans, countrymen, lend me your ears;  
I came to bury Caesar, not to praise him.

Week 14

Child language acquisition.

Week 15

American Sign Language  
(guest lecture).  
Nicaraguan Sign Language: transition from a pidgin to a creole  
(video)
Two fundamental questions

What accounts for the pervasive similarities in the grammars of human languages whose speech communities have not been in significant contact?

What accounts for the ease, rapidity, and uniformity of first language acquisition, in the face of the poverty of stimulus?

Recap: Chomsky’s hypothesis

• The human language faculty
  - enables humans to acquire and represent language;
  - delimits what linguistic structures humans can acquire and represent in an effortless manner;
  - therefore delimits the kind of linguistic conventions that a community of humans can develop and successfully hand down to new generations.

• “Universal grammar”
  - part of all humans’ biological endowment;
  - reflected in all natural languages.

Chomsky’s hypothesis, 2

• Further fact: The differences are also systematic.
  The differences between human languages are not random differences in conventions that universal grammar tolerates.

• Universal grammar has parameters; parameters can take different pre-defined values.

In the course of language acquisition, the child figures out the values of the parameters in the language spoken in the environment.

Production lags behind pattern detection and comprehension

Way before they start to speak, infants detect “algebraic patterns,” infants identify phonemes, despite the lack of invariance, infants correctly track syntactic distinctions.

At early stages of speaking, toddlers overextend word meanings and morphological rules in production, but not in comprehension.
Uniform stages in development

• Descent of the larynx
  • Babbling
    Large variety of sounds, including ones never heard in environment;
    Learn to maintain right sounds and suppress others;
    Deaf children in signing families babble with hands.
• Holophrastic (one-word) stage
  One word stands for whole situations or class of objects;
  Expresses intention to do things, emotions, naming;
  Uses basic level terms;
  Already comprehends subject/object distinction.
• Two-word stage
  allgone sock, byebye boat, baby down

Uniform stages, 2

• Telegraphic stage
  No inflection (in English), but correct word order
  Cat stand up table
  What that?
  He play little house
  First inflectional elements: -ing, on/in, plural -s
  Stages in the acquisition of negation:
  No Fraser drink all tea
  That no fish school
  He can’t catch you
  I don’t want no food
  I don’t want any food
• Almost done, around 3 yrs

Do 7-month old babies detect the kind of rules that underlie adult grammar?


“I have been conducting a series of studies in which I present babies with sentences from a made-up language, and then ask what the babies can learn about that made-up language [using an experimental technique based on non-nutritive sucking].

In one set of studies, I asked whether seven-month-old babies could acquire simple quasi-linguistic rules.

7-month old, 2

For two minutes, babies heard sentences like
  la ta la and ga na ga.
I then asked whether those babies could tell the difference between new sentences like
  wo fe wo (same structure as those they have already heard) and
  wo fe fe (different structure).
It turned out that the seven-month-old babies could in fact tell the difference, suggesting that the ability to learn and generalize abstract algebraic rules is present quite early in life.”

Acquiring the sound system

Do infants distinguish phonemes?

Word learning, morphological learning

Infants younger than 15 months can learn syllable-object pairings in as little as 9 presentations, and can do this even without an active social training setting.
(Schafer & Plunkett, 1998)
Two heuristics

- Whole Object principle
- Mutual Exclusivity principle

Whole Object Principle

Quine’s *gavagai* argument

Mutual Exclusivity (Markman & Wachtel 1988)

Child assumes a one-to-one correspondence between words and meanings. -- Experiments:
Children shown pewter tongs, plastic tongs, pewter cups, and plastic cups.

Experiment 1
Experimenter points out pewter tongs and says, This is a “biff”. Asks child for “another biff”.
Child brings (plastic) tongs.

Experiment 2 (not the same child)
Experimenter points out a pewter cup and calls it a “biff”. Asks child for “another biff”.
Child brings pewter (tongs).

Why?

In Exp 2, child already has the household word “cup,” and assumes that “biff” refers to another property (the stuff) of the object.
Semantic overextensions

doggie dogs
other furry things, e.g. woolly blankets
other four-legged things, e.g. horses

Production—comprehension gap:
Overextensions occur in production,
but very rarely in comprehension.

Morphological overextensions
Learning presents a U-shaped curve

1 imitation: some correct forms but no productive knowledge
2 overextension: lots of mistakes, but a rule is getting established
3 perfection: correct forms, internalized rule

1 imitation: some correct forms but no productive knowledge
2 overextension: lots of mistakes, but a rule is getting established
3 perfection: correct forms, internalized rule

But corpus studies by Marcus et al. suggest that morphological overextensions, while conspicuous, are not very numerous. May indicate memory retrieval problems, instead of imperfect knowledge of a rule.

Parallels with comprehension v. production in second language learning
Acquisition of syntax

Cross-linguistic differences
Children only produce uninflected bare verb stems in languages where such uninflected verbs are grammatical (in possibly different contexts). Uninflected verbs don’t occur in Turkish, and Turkish children don’t produce such verbs.

Child English
Mommy throw ball   ‘Mommy threw/is throwing the ball’

Adult English
Please throw the ball; I saw him throw the ball.

Child Turkish (age 2;0)
Sev- mi- eceg- im onu daha
love-negation-future-1sg 3sg-acc anymore
‘I don’t love him/her anymore’

Language acquisition as parameter setting based on positive evidence

The null subject parameter
Abiamo visto Gianni Italian is a null subject language
We saw John English is not a null subject lg.

The “head precedes/follows complement” parameter
Hanako-ga Yuki-o mita Japanese is comp→head (SOV)
Hanako Yuki saw
Hanako saw Yuki. English is head→comp (SVO)

The Subset Principle in acquisition/parameter setting
The child starts out assuming the most restrictive option that Universal Grammar makes available, and adopts a less restrictive one only on the basis of positive evidence.

(A less restrictive rule allows for more structures.)
Guest lecture by Jonathan Lamberton

Jonathan Lamberton, Mayor Bill de Blasio's sign-language interpreter, makes the sign for "storm." Credit: Damon Winter/The New York Times

*Silent Children, New Language* (BBC video, 1997)

http://bufvc.ac.uk/dvdfind/index.php/title/19563