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Language Acquisition

LINGUISTICS 101
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Language Acquisition

- Grammar: A system in an individual's mind/brain that enables them to combine sounds and words into an infinite number of utterances.
- How does this system get there?

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The Problem

How is it that all of us converge on basically the same grammar, with little or no explicit instruction?

- (1) Everyone guessed that the Democrats would win the election.
- (2) Everyone guessed \emptyset the Democrats would win the election.
- (3) Which election did everyone guess that the Democrats would win —?
- (4) Which election did everyone guess \emptyset the Democrats would win —?

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The Problem

How is it that all of us converge on basically the same grammar, with little or no explicit instruction?

- (5) Which party did everyone guess \emptyset — would win the election?
- (6) * Which party did everyone guess that — would win the election?

The Problem

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- If *that* is generally optional, why do our grammars disallow it just when the subject is questioned?
- How did we learn that?

Instruction?

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- Grammar must be built by listening to utterances around us.
- Problem: no one says ungrammatical things.
- Principle: if we don't hear something, we assume it is ungrammatical?

Generalization from Data?

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- Suppose we hear sentences with and without *that*, and we hear object questions with and without *that*.
- But we only hear subject questions without *that*.
- How do we conclude that having *that* is ungrammatical?

Missing Input

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- We cannot conclude that something that is missing in the utterances around us is ungrammatical.
- Most people have never heard sentences like the following, but they are judged by most speakers to be perfectly grammatical:
 - (10) Which colleague did John slander — because he despised —?
 - (11) This book is too interesting to put — down without having finished —.
 - (12) * John was killed — by a tree falling on —.

Missing Input: Overgeneralization

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- Stage: *overregularization errors*:
 - **goed, *holded*
 - **foots, *feets*
- But adults don't say **goed* or **foots*.
- So why shouldn't we have concluded that wh-questioning a subject with *that*, even though we never hear it, is grammatical?

Another Example

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- (13) When did you tell me the Republicans stopped the recount?
 A1: Yesterday.
 A2: In 2000.
- (14) When did you tell me how the Republicans stopped the recount?
 A1: Yesterday.
 A2: * In 2000.

The Problem

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- Even very young children all have the same judgement as adults: the lower construal is impossible.
- How did we all come to have a grammar that precludes this?
- *No one taught us*.
- Absence of a sentence \neq ungrammatical.
- Here, the sentences *do* occur, it is just that one interpretation is ruled out; so the problem is even more difficult.

One More Example

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Context 1: 10 students in the class

- (15) The professor assigned one problem to every student.

Context 2: 10 problems

- (16) The professor assigned one student every problem.

The Innateness Hypothesis

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- Noam Chomsky, reviving ideas going back to Descartes, Plato:
- The capacity for language is innate; we are programmed to learn language in the course of normal development.
- *Much of the grammar is built in.*
- Then, we don't need evidence to arrive at grammars with characteristics like those listed above;
- We're born with grammars with those characteristics.

The Innateness Hypothesis

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- Only language-particular things (words, sound systems, morphology) need to be learned.
- Good candidates for things that come built in:
 - Grammatical principles that are invariant from language to language;
 - Grammatical principles that cannot be inferred from the data.

Innateness Accounts For:

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- The speed of acquisition;
- The ease of acquisition;
- Surprising uniformity in adult grammars;
- Universal principles across languages;
- Problem of lack of evidence, not enough evidence;
- No negative evidence (absence of ungrammatical utterances).

Birdsong

Correlate in the biological world: Birdsong

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- *Cuckoos* will sing a fully developed song even if they never hear another cuckoo sing (completely innate).
- *Bullfinches* will learn any song they are exposed to, even songs of other species (completely learned).
- *Chaffinches*: calls and songs vary depending on geographical area.
- Young birds exhibit a basic version of the song shortly after hatching (innate);
- Later undergoes further learning to acquire the final "dialect."

Birdsong

Correlate in the biological world: Birdsong

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- Siblings will acquire different dialects if they settle in different areas (dialectal features must be learned).
- Fully developed song acquired in several stages.
- Critical period in acquisition.
- Correlate: innate core, exact realization dependent on learning.

Alternatives: Analogy

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- Children say **foots* on analogy with vast majority of English nouns with -s plurals.
- Maybe children can produce and understand novel utterances on analogy with ones they have heard.
- Analogies quickly break down:
 - John ate a sandwich. John ate.
 - John grew tomatoes. John grew.
- There's nothing to analogize ungrammatical sentences to.

Alternatives: Imitation

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- Common theory: children imitate their parents.
- Obviously can't be true:
 - Children and adults produce and understand utterances they've never heard.
 - Children say things adults never say: **goed*, **foots*.
- Explicit instruction?
 - Rarely given, and usually ignored.

What Do Children Do?

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- So children do not acquire language by imitation, explicit instruction, or (entirely) by analogy. What do they do?
- Learn words (what they mean, how to use them).
- Learn rules (construct a grammar).
- (Rules are all subconscious.)

Problems in Word Learning

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- I see a rabbit running by, and someone points and says “rabbit.”
- How do I know it doesn’t mean *ears, fur, legs, there goes a rabbit, look at that funny creature*, or any number of other things?
- And this is one of the easiest types of word: concrete nouns.

Problems in Word Learning

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- *like, bother, want, through.*
 - I like dogs. **Me** gusta el perro.
 - Dogs bother **me**.
- NP in psychological state—no uniform position.
- No events or actions in the world to correlate with the use of these verbs.

Stages of Development

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- All human children learn a language.
- Any human child will learn any language it is exposed to.
- All human children learn all languages at basically the same rate.
- *There are stages in acquisition, and they seem to be universal.*

Stages of Development

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- Prelinguistic
- Linguistic
 1. Babbling
 2. Single-Word
 3. Two-Word
 4. Telegraphic

The Prelinguistic Stage

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- Cries, whimpers, cooing noises are stimulus-controlled responses to hunger, discomfort, etc.
- Not language; language is not locked to stimulus.
- The newborn mind is not a blank slate: it appears to be biased to perceive information in certain ways.

High-Amplitude Sucking

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- One thing newborns do very well is suck.
- Can give them a nipple to suck that measures rate of sucking.
- Then, can measure changes in sucking rate to determine what child is attending to.
- Habituation: baby hears or sees the same thing over and over, becomes habituated to it (sucking rate decreases to a certain level).
- Give them a new stimulus: baby gets excited, sucking rate increases.
- Now can test whether babies perceive two things to be different things (sucking rate increases) or the same thing (sucking does not increase).

Phonological Perception

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- Categorical perception:
 - [p] vs. [b]
 - [p] vs. something midway between [p] and [b]
- Babies ignore nonlinguistic differences: an [i] is an [i] whether spoken by a male voice or a female voice.

Phonological Perception

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- Babies can distinguish between all possible language contrasts.
 - Japanese infants distinguish [l] and [r], when their parents can't.
 - English infants distinguish Hindi retroflex [ɭ] from alveolar [t], while UD undergrads cannot.
- Ability lost before the age of 1 year.
- Children older than 12 months: narrowed from “all possible contrasts” to “contrasts in the language I'm learning.”

Prelinguistic to Linguistic

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- Babies are born ready to attend to language;
- Prelinguistic: figured out what phonemic contrasts are relevant in the language they're hearing, and rewired their brains to ignore irrelevant ones.

Babbling

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- Around six months, infants begin to produce a large variety of sounds.
- Not a prerequisite for language: babies prevented from babbling by physical problems still acquire language normally when problem is corrected.
- Babbling noises drawn from set of possible human sounds;
- Intonation contours begin to resemble those used in baby's language environment.

Babbling

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- Vocalizations produced by deaf babies qualitatively different: unsystematic, nonrepetitive, and random.
- Instead, deaf babies babble with their hands, using motions present in sign languages.
- Babbling may be the first stage of language acquisition, where babies try to uncover the units of language.

The Single-Word Stage

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- By 12 months: use a few words.
- **Holophrastic** sentences: one word to express a whole sentence.
 - “up” to mean “pick me up”
 - “dog” (naming)
 - “no” (imperative or assertive)
 - “uh-oh” (after an accident)

Single-Word Stage: Phonology

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- Simplification: mostly monosyllabic CV utterances.
 - “up” [bʌ?]/[mʌ?]
 - “dog” [da]
 - “(what’s) that” [dæ]
- Sounds that occur frequently in the world’s languages are the first to be used: [b,m,d,k]
- Sounds that are infrequent are used last: [θ]
- Studies: perception is much better than production.

The Telegraphic Stage

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- There is no 3-word stage; when they get beyond two words, utterances can be 3, 4, 5, or more words long.
- First utterances longer than 2 words are all missing function words, like telegrams:
 - What that?
 - He play little tune.
 - Andrew want that.
 - No sit there.

The Two-Word Stage

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- Around 2 years old, children start to put words together.
 - Mommy sock
 - allgone sticky
 - more wet
- No morphological markers
- Two words can have any number of grammatical relations (subject-object, possessive, locative, conjunction)

The Telegraphic Stage

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- Telegraphic utterances conform to word order of language being learned (SVO in English, SOV in Japanese).
- Inflection and function words come in in different stages.
- Studies of grammaticality judgements and understanding of grammatical principles have shown that very young children understand the same grammatical principles as adults.

Errors from Other Languages

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- Children also make errors that are grammatical in other languages:
- “What do you think what’s in here?” (=What do you think is in here?)
- This is grammatical in many languages, like German and Passamaquoddy:
 - (1) **Keqsey** Pil kt-iy-oq **keq** ketuw-aqosoma-sk?
 what Bill 2-say.to-3/2 what Fut-cook.for-3/2
 ‘What did Bill tell you he was going to cook for you?’

Universal Grammar

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- *Universal Grammar*: What’s innate.
- Particular grammars are learned from language input; all of them conform to principles of UG.
- UG makes things available that are not allowed by particular grammars.
- English grammar disallows “What do you think what’s in here?”, but UG allows it.
- Hence, a child that makes this “error” just hasn’t excluded it from her English-particular grammar yet.

Non-Occurring Errors

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- Certain errors never occur.
- Hypothesis: they would violate UG.
- That is, they would violate built-in grammatical principles that do not need to be learned.
- Examples:
 - Lower construal of *when* in *When did you tell me how the Republicans stopped the recount?*
 - Moving the *first* auxiliary in subject-aux inversion.
- Children build grammars; and grammars are always within the range of possibilities made available by UG.

Recovering from Errors

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- How do children recover from errors and converge on the correct grammar?
- **goed, foots*
- Observation: *went, feet*
- Errors in word meanings: children often overextend word meanings, e.g., *dog* for all animals;
- Not clear how they narrow down reference to just that of the adult usage.

Recovering from Errors

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- How about other errors?
- *Most conceivable errors do not occur, hence are not a problem.*
- “What did you say what’s in here?”?
- These are harder: there is no negative evidence to show that these are actually ungrammatical.

Critical Age

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- Learning a language as an adult is very hard (and errors differ qualitatively from children’s errors).
- *Critical age* in language acquisition.
- Chaffinches: if not exposed to chaffinch song within 10 months, do not acquire it.

Evidence for a Critical Period

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- Children raised in extreme isolation, e.g. “feral children.”
- Example: Genie.
- Syntax and morphology never developed.
- Lots of words, but telegraphic (“Genie full stomach”).

Evidence for a Critical Period

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- Deaf children born to hearing parents often receive delayed language exposure (parents do not know sign language).
- Early and late learners of sign language do not differ in vocabular size or knowledge of word-order constraints (very regular in ASL);
- But they do differ in production and comprehension of morphologically complex signs.

Language Disorders

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- Developmental disorders: the genetic basis of language, modularity.
- Dyslexia: a developmental disorder that seems to affect the perception of certain acoustic attributes; it also causes difficulties in learning to read.
- Hereditary.

Language Disorders

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- **Specific Language Impairment (SLI)**
- SLI is also genetic (runs in families).
- Acquired impairments (e.g., brain damage) also show that language can be affected to the exclusion of other systems.

Double Dissociation

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- The converse situation also occurs:
- Mental retardation with intact language abilities.
- Laura and Christopher:
- Severely impaired cognitive abilities (IQs around 40, 65);
- Cannot perform numerical calculations, cannot perform basic tasks;
- But appear to have intact language abilities.
- Christopher seems to have super ability: has learned around 20 different languages.