Language acquisition

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What is language acquisition?

Learning theories

Stages of language acquisition

Child errors

Language emergence

What you need to know

What is language acquisition?

Language acquisition is:

- broadly speaking, the process of humans learning a language:
  - **L1 acquisition**—We'll only talk about this one, so for us *language acquisition* = *L1 acquisition*.
  - **L2 acquisition**
- the subfield of linguistics that studies language acquisition

What is language acquisition?

Major questions that acquisitionists are trying to address:

- How do we go from pre-linguistic infants to linguistically proficient adults?
  - What are the development pathways? Do they differ across languages, across children?
  - What learning mechanisms/abilities do children rely on? Imitation? Analogy? Statistical Learning? Innate knowledge?
- What are the milestones of development in the different levels of language (phonetics, phonology, morphology, syntax, semantics, pragmatics)?
- How can we explain infant and child development?

What is language acquisition?

Language acquisition is species specific:

- Language cannot be taught to other species. Other apes can be taught individual words or signs, but they never attain the same level of productivity as humans.
- Humans are biologically equipped to learn language:
  - Young infants process speech sounds differentially from other sounds.
  - Any typically developing human child can acquire any human language.
  - The developmental milestones (e.g., babbling, first words, etc.) are uniform in our species, unaffected by the culture or the language learned.
  - Language acquisition is automatic (unlike acquisition of other skills, such as spelling, math, or riding a bike).
    - But! Unlike walking or vision, social transmission is required for language. We cannot acquire a language without being exposed to one.

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What learning mechanisms do children rely on to learn language?

The Imitation Hypothesis: learning via caregiver imitation

- “If we will observe how children learn languages we shall find that (…) people ordinarily show them the thing (…) and then repeat to them the name.” (John Locke, 1690)
- Language is seen as an entirely learned behavior, the child as a passive recipient, tabula rasa, an imitator.
- This hypothesis is thus **behaviorist** in nature.

Does this sound right to you? Why or why not?

Learning theories

Some support for this hypothesis:

- Children whose mothers are more responsive show more rapid language growth.
- Reinforcement and incremental shaping can dramatically improve language skills in atypical language populations.
- The input (the language data the child hears, primarily from caregivers) is critical in language acquisition. Why can we say this with certainty?

But!

Learning theories

The input children get is really bad:

- noisy
- incomplete:
  - finite set of output utterances
  - positive evidence only—no or very few ungrammatical utterances, so how do children come to know what's ungrammatical?

Poverty of the stimulus: given the relatively limited data available to children learning a language, language should be unlearnable.

Learning theories

Children produce constructions that are not in the input; these are innovative as the child's grammar creatively constructs them. This cannot be imitation. For example:

CHILD: *Want other one spoon, Daddy.*
ADULT: *You mean, you want the other spoon.*
CHILD: *Yes, I want other one spoon, please Daddy.*
ADULT: *Can you say "the other spoon"?*
CHILD: *Other… one… spoon.*
ADULT: *Say "other".*
CHILD: *Other.*
ADULT: *"Spoon".*
CHILD: *Spoon*.
ADULT: *"Other… spoon".*
CHILD: *Other… spoon. Now give me other one spoon.*

Learning theories

Maybe when parents correct their children, children learn?

CHILD: He bringed doggy.

ADULT: You mean he *brought* the doggy.

This doesn't happen very often at all.

CHILD: It doing dancing.

ADULT: Yes, it's dancing.

This is **recasting** (repeating what the child said, and if the child's utterance is ungrammatical, restating it correctly).

One study found that mothers recast only about 25% of ungrammatical utterances. Even better—grammatical ones are recast just as often.

Parents are more likely to correct the content than the form.

CHILD: Daddy come on Tuesday.

ADULT: No, he comes on *Wednesday*.

Learning theories

But even when adults do try to correct the form, it often fails.

CHILD: *Nobody don't like me.*
ADULT: *No, say "Nobody likes me".*
CHILD: *Nobody don't like me.*
ADULT: *No, say "Nobody likes me".*
CHILD: *Nobody don't like me.*
ADULT: *No, say "Nobody likes me".*
CHILD: *Nobody don't like me.*
[dialogue repeated five more times]
ADULT: *Now listen carefully, say "Nobody likes me".*
CHILD: *Oh! Nobody don't likes me.*

Learning theories

The Innateness Hypothesis (a.k.a **the Nativist Hypothesis**): the human species is genetically equipped with a **Universal Grammar**, the basic blueprint all human languages follow.

- The child interacts with the data, and actively builds their grammar. The child is **not** a tabula rasa.
- This hypothesis, proposed by Noam Chomsky, thus rejects behaviorism.

Learning theories

It is common for the proponents of the Innateness Hypothesis to also posit the existence of a **critical period** in language acquisition, i.e., the window of opportunity during childhood for acquiring a native language.

There is no consensus on when the critical period ends; also, it's more of a gradient notion (the more you go on without any linguistic input, the lower the level of linguistic competence you can attain).

Can you think of any evidence supporting the existence of a critical period in language acquisition?

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Acquiring sounds

- From birth: reflexive crying & vegetative sounds
- 6–12 weeks: cooing & laughter
- 16–30 weeks: vocal play (consonant-like sounds and vowels combined), onset of babbling
- 6–10 months: canonical babbling (true syllables)
- 10 months and older: variegated babbling, inventory expansion, emergence of protowords

Stages of language acquisition

The babbling stage (6–10 months)

- https://youtu.be/_JmA2ClUvUY
- Why do infants go [bɑbɑ], [wɑwɑ], [gugu], etc.? Why not [ʤɑɹʤɑɹ]? (No infant goes [ʤɑɹʤɑɹ].)
  - CV syllables are universally preferred.
  - Babies' tongues are too big for their mouths, and they have no fine motor skills.
  - Stops form 85% of the language input.
  - The 12 most frequent consonants in the world's languages ([p, t, k, s, b, d, g, h, m, n, w, j]) make up 95% of the consonants infants use at this stage.

Stages of language acquisition

The sounds produced at the earlier stages of sound acquisition:

- are the same for all (hearing) babies in all languages
- consist of phonemes and syllable patterns that are most common across languages, and
- include sounds that do not occur in the language of the household (for example, Arabic doesn't have [p], but babies born in an Arabic-speaking environment would produce [p])

Does this support or contradict the Innateness Hypothesis?

Hypothesis: children know what possible sounds of human language are before they figure out which of those their native language uses.

Stages of language acquisition

How do we test this hypothesis? We can't just ask babies for judgements. Instead:

- **Naturalistic approach**: observe and record children's spontaneous utterances
- **Experimental approach**: design tasks to elicit a particular kind of linguistic behavior or a behavioral response to linguistic stimuli

Stages of language acquisition

High Amplitude Sucking (HAS) method:

- Used with infants up to 6 months old.
- Each suck on the pacifier generates a sound.
- Test:
  - The infant sucks to hear the input (e.g., [ba]) until it gets bored and stops sucking.
  - The experimenter plays new input (e.g., [ba] or [pa]) to see if the infant starts sucking again (no longer bored, recognizes it as new, wants to hear more) or not (still bored, doesn't make the distinction).

HAS data: infants make the distinctions not used in their language until they are 6–10 months.

Stages of language acquisition

But why do babies babble?

- By the time a baby turns 3 months old, its larynx has descended into the throat, opening up the cavity behind the tongue and allowing it to move.
- By listening to themselves babble, babies learn how moving their muscles changes the sounds.
- Knowing how to produce each sound is a prerequisite for duplicating the speech of their parents.

Stages of language acquisition

Acquiring words

Holophrastic stage (1–2 years): children start producing single word that appears to express thoughts usually expressed by a sentence (*mama*, *cookie*, *juice*, *bye*).

But they haven't perfected their phonology yet! These are common processes:

- Syllable deletion:
  - Helicopter [ɛlkat]
  - Kangaroo [wu]
- Cluster reduction:
  - Stop [tɑp]
  - From [fʌm]
- Substitution:
  - This [dɪt]
  - Spoon [bud]

Stages of language acquisition

Bonus cross-modal puzzle

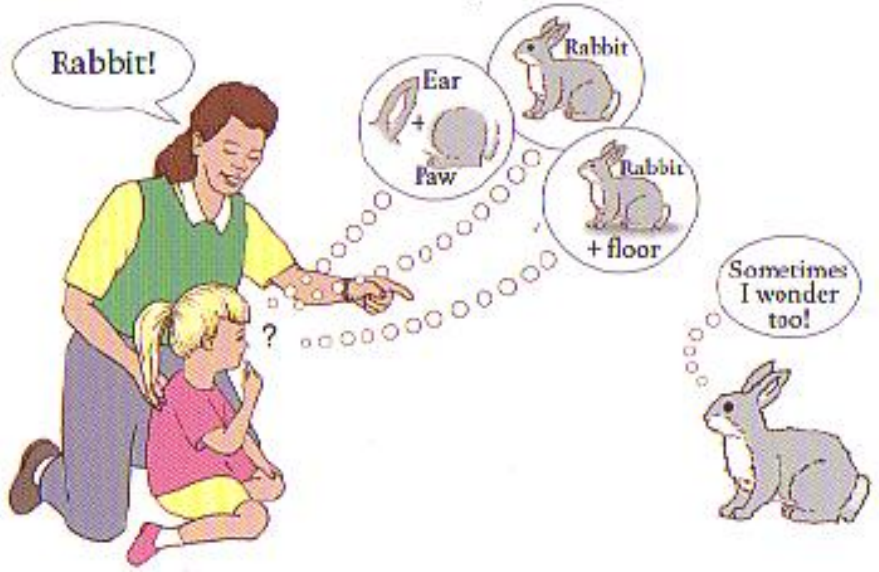
Children acquiring a sign language go through the same stages as with spoken language (given an early input). However, on average, children start using their first signs (6–8 months) earlier than words (~11 months). Why would there be such a difference?

Stages of language acquisition

At the holophrastic stage, children realize that sounds are related to meanings.

And they have some biases in learning new meanings!

- **Type assumption**: new words refer to a type of thing, not a particular thing.
- **Whole object assumption**: new words refer to whole objects, not just their substance, color, or parts.



Stages of language acquisition

How do we know about these biases? From experiments! E.g.:

- Layout: pewter tongs, plastic tongs, pewter cup, and plastic cup
- Group 1:
  - The experimenter points at the pewter tongs and says, ‘See the biff. That’s a biff. Can you give me another biff?’
  - The child picks out the plastic tongs.
- Group 2:
  - The experimenter points at the pewter cup and says, ‘See the biff. That’s a biff. Can you give me another biff?’
  - Child picks out the pewter tongs.

How would you interpret the results of this experiment?

Stages of language acquisition

Some common errors in vocabulary development:

- **Overextension**: broadening a word's meaning to a more general one
  - *doggy* for dogs, cats, rabbits, all medium-sized animals
  - *quackquack* for all birds
  - *Bob* for all men in helmets
  - *daddy* for all men
- **Underextension**: using the word too restrictively
  - *doggy* for labradors and beagles, but not for chihuahuas
  - *flower* for roses only

After the child acquires their first 75–100 words, the overextended meanings start to narrow until they correspond to those of the other speakers of the language.

Stages of language acquisition

Acquiring syntax

2-word stage (2–2.5 years): first collocations

- *no mama, no milk, no pee, mommy sock, mommy juice*

Telegraphic stage (2.5–3 years): sentences consisting almost entirely of content morphemes, as functional morphemes are still missing (e.g., in English: omitted subjects, determiners, subject-verb agreement, etc.)

- *Salt all shut. Milk all gone. Kitty down there.*

Complex syntax (3 years +): utterances of increasing length and syntactic complexity (functional elements, coordination and subordination, etc.)

- *Where that ball that I got? I let it go 'cos it hurted me. Tell me what it's called.*

Stages of language acquisition

Comprehension-production asymmetry

Children understand more than they produce, in all domains and at all developmental stages.

- At 18 months, typically infants produce only about 50 words, but they understand over 250.
- Toddlers who consistently produce [su] for ‘shoe’ know that the adult target is [ʃu].
- Children who produce no or almost no instances of long distance questions (*Where did Billy say that he fell?*) nonetheless interpret them in an adult-like way.

Once again, the evidence comes from experiments:
https://youtu.be/EFlxiflDk_o?t=5m27s

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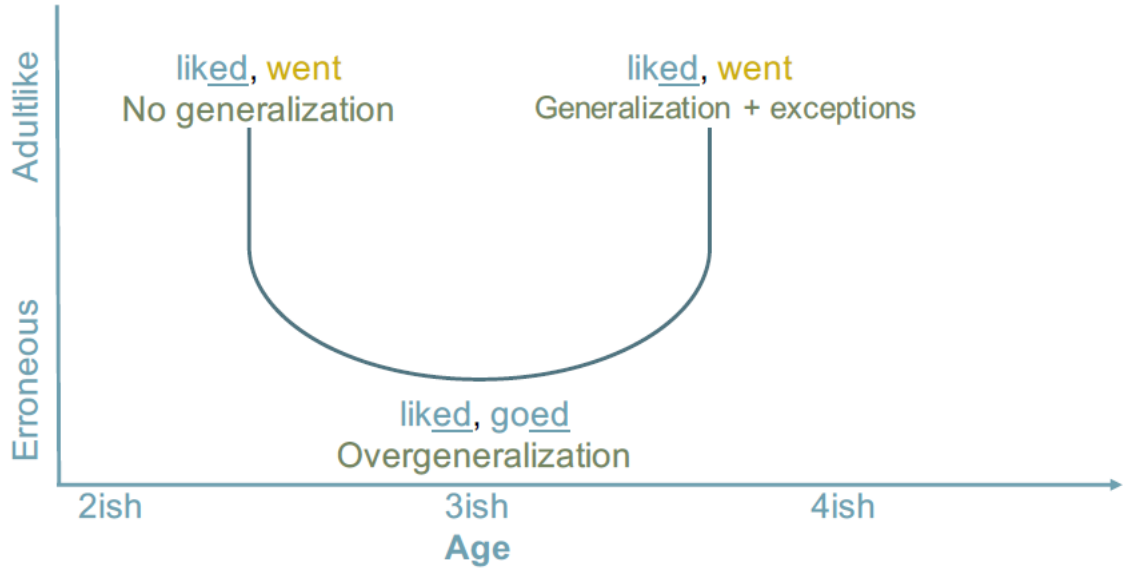
There are two classes of errors made by children in production:

- Errors of **omission**: omission of obligatory morphemes, particularly of function words; word order is preserved; very common early on with gradual resolution.
  - *Daddy go* [= Daddy go**es**]
  - *Want play with teddy* [= **I** want **to** play with **the** teddy]
- Errors of **commission**: erroneous modification or addition; less common than one might expect.
  - *Him eat* [**He** eats]
  - *brang* [**brought**]
  - *I'll play behind dinner* [= I'll play **after** dinner]
- Errors of **overgeneralization** (when a rule is applied to its exceptions) are a subtype of errors of commission.
  - *goed* [**went**]
  - singed [**sang**]

Child errors

The development of regular rules, like regular plurals or regular past tense marking, follows a pattern of **U-shaped development**:

1. Initially children learn by rote, both regular and exceptional forms. E.g., they don't know that *liked* is bimorphemic.
2. Performance on exceptions drops when children have learned and generalized a past tense rule across verbs, applying it to exceptions.
3. Children learn exceptions to the rule.



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So, the Innateness Hypothesis says that children aren't born as tabula rasa but are biologically predisposed for language.

One of the strongest pieces of evidence supporting that claim is that children not only innovate within the language they are acquiring, they create new languages!

Language emergence

Nicaraguan Sign Language (Idioma de Señas de Nicaragua)

- Before 1970s: No schools for Deaf, no sign language in Nicaragua. Deaf children and adults were isolated from one another, usually interacting almost exclusively with hearing people via **home sign** systems and gesture.
- Late 1970s: The first school for Deaf children opens in Managua. The first generation of Deaf children (age 10 and higher) arrives and starts creating a **pidgin**-like system based on their home sign systems and gesture.
- Younger children (age 4–5) continued to join the school. They regularized the pidgin of the first generation, made it more complex: Idioma de Señas de Nicaragua, a fully expressive language with its own grammar, was born.
- 1986: Judy Kegl and other linguists arrived in Nicaragua and documented the communication systems used by the first and the second generations.
- A video, if we have time: https://youtu.be/GTb9uVVx20Y

Take away: children are predisposed to grammaticalize and impose systematic structure on linguistic elements.

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Key notions: language acquisition, L1 vs. L2 acquisition, the Imitation Hypothesis, behaviorism, poverty of the stimulus, recasting, the Innateness/Nativist Hypothesis, Universal Grammar, critical period, stages of language acquisition (babbling, holophrastic, telegraphic, etc.), naturalistic vs. experimental approach, type assumption and whole object assumption, overextension and underextension, comprehension-production asymmetry, types of child errors (omission, commission, overgeneralization), U-shaped development, home sign, pidgin

Answers to the following questions:

- What is the gist of the two main learning hypotheses we discussed? Which one seems more plausible? Why?
- What are the major stages of language acquisition (their approximate onsets and characteristic features)?
- What does the story of how Nicaraguan Sign Language emerged tell us about language?