LSci 51/CogS 56L: Acquisition of Language

Lecture 14

Syntactic acquisition I

Adult knowledge:
The target state for syntax

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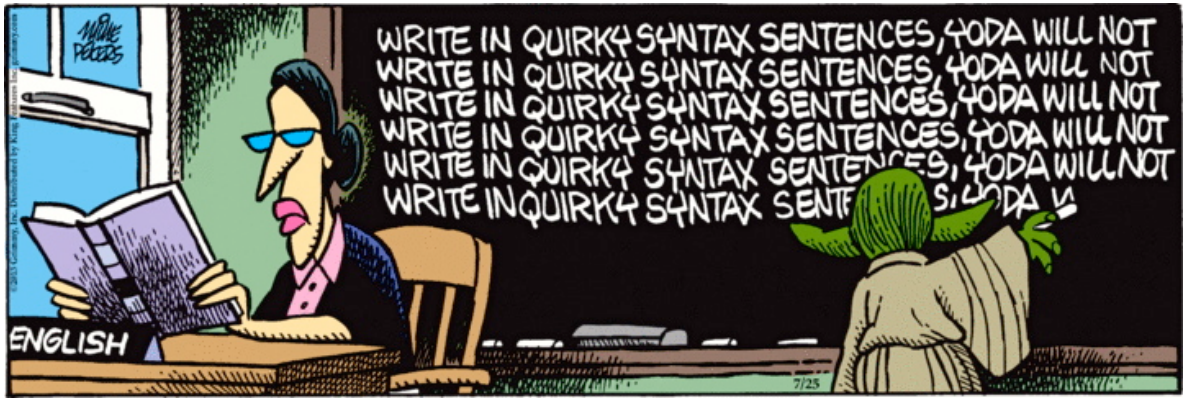

http://arnoldzwicky.org/category/syntax/word-order/

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Adult knowledge:
The target state for syntax

http://mimiandeunice.com/2011/09/23/sentenced-to-death/

Creativity of human language

Ability to combine signs with simple meanings to create

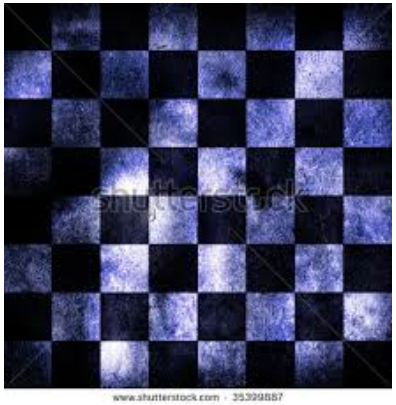
(1) Utterances with complex meanings

(2) Novel expressions

(3) *Infinitely* many

Sentences never heard before...

"Some tulips are starting to samba across the chessboard."



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Sentences of prodigious length…

"*Sir Didymus said...*"

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Sentences of prodigious length…

"*Sir Didymus said that he thought...*"

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Sentences of prodigious length…

"*Sir Didymus said that he thought that the odiferous leader of the goblins had it in mind...*"

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Sentences of prodigious length…

> "*Sir Didymus said that he thought that the odiferous leader of the goblins had it in mind to tell the unfortunate princess that the cries that she made during her kidnapping from the nearby kingdom that the goblins themselves thought was a general waste of countryside ...*"

Creativity of human language

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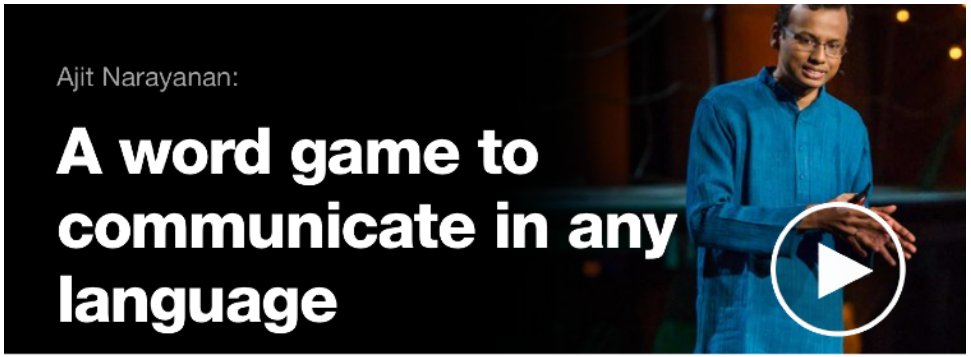


https://www.ted.com/talks/ajit_narayanan_a_word_game_to_communicate_in_any_language

"So there is another hidden abstraction here which children with autism find a lot of difficulty coping with, and that's the fact that **you can modify words and you can arrange them to have different meanings, to convey different ideas**. Now, this is what we call grammar. And grammar is incredibly powerful, because grammar is this one component of language which **takes this finite vocabulary that all of us have and allows us to convey an infinite amount of information, an infinite amount of ideas**. It's the way in which you can put things together in order to convey anything you want to."

An account that won't work

"You just string words together in an order that makes sense"

In other words...

"***Syntax*** is determined by ***Meaning***"

(The way words are put together is determined solely by what they mean)

Syntax is more than meaning

Nonsense sentences with clear syntax

Colorless green ideas sleep furiously. (Chomsky)
A verb crumpled the ocean.
I gave the question a goblin-shimmying egg.

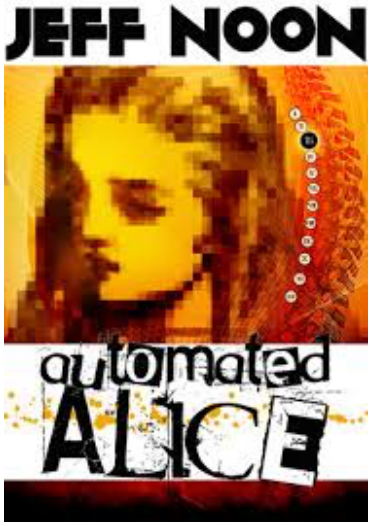
…which are incomprehensible when the syntax is nonsense

*Furiously sleep ideas green colorless.
*Ocean the crumpled verb a.
*The question I an egg goblin-shimmying gave.

Syntax is more than meaning

More nonsense sentences with clear syntax

From “Automated Alice” by Jeff Noon:



Oh spoons may dangle from a cow
With laughter ten feet tall;
But all I want to know is how
It makes no sense at all.
Oh shirts may sing
to books who pout
In rather rigid lines;
But all I want to turn about
Is how the world unwinds.

Syntax is more than meaning

Famous nonsense sentences with clear syntax

‘Twas brillig and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogroves,
And the mome raths outgrabe

Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!
Beware the Jubjub bird, and shun
The frumious Bandersnatch!”

- Lewis Carroll, *Jabberwocky*

https://www.ted.com/talks/lewis_carroll_jabberwocky_one_of_literature_s_best_bits_of_nonsense?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare

Syntax is more than meaning

And these same nonsense sentences with nonsense syntax are incomprehensible…

‘Toves slithy the and brillig ‘twas
wabe the in gimble and gyre did...

Syntax is more than meaning

Ungrammatical sentences that make perfect sense

Jareth put the cape on.
Jareth put on the cape.

Jareth put it on.
*Jareth put on it.

Syntax is more than meaning

Ungrammatical sentences that make perfect sense

Sarah gave a ring to the Wiseman.
Sarah gave him a ring.

Sarah donated a ring to the Wiseman.
*Sarah donated him a ring.

Syntax is more than meaning

Ungrammatical sentences that make perfect sense

Jareth made Hoggle leave.
Jareth let Hoggle leave.
Jareth saw Hoggle leave.
*Jareth wanted Hoggle leave.

*Jareth made Hoggle to leave.
*Jareth let Hoggle to leave.
*Jareth saw Hoggle to leave.
Jareth wanted Hoggle to leave.

Syntax is more than meaning

Ungrammatical sentences that make perfect sense

Hoggle poked at the wall.
Hoggle hit at the wall.
*Hoggle touched at the wall.

*Hoggle poked the stick against the wall.
Hoggle hit the stick against the wall.
*Hoggle touched the stick against the wall.

Syntax is more than meaning

Ungrammatical utterances that *should* make perfect sense

This kitty was bought as a present for someone.

Lily thinks this kitty is pretty.

☹

Who does Lily think the kitty for is pretty?

Syntax is more than meaning

Cross-linguistic variation

If syntax was entirely determined by meaning, then we should not expect to find syntactic differences between languages of the world….but we do see variation.

English:	Sarah	sees	that book.
Korean:	Sarah	ku chayk	poata.
	Sarah	that book	see

Syntax is more than meaning

Cross-linguistic variation

If syntax was entirely determined by meaning, then we should not expect to find syntactic differences between languages of the world….but we do see variation.

English:
Baso put the money in the cupboard.

Selayarese (spoken in Indonesia):

Lataroi	doe	injo	ri	lamari	injo	i Baso.
put	money	the	in	cupboard	the	Baso

So…what does determine how you string words together?

Answer: Syntax!

(That is, our knowledge of the possible *forms* of sentences in our language.)

~~"***Syntax*** is determined by ***Meaning***"~~

~~(The way words are put together is determined solely by what they mean)~~

Early production:
From one word to many

[Extra]

The one-word stage

https://www.youtube.com/watch?v=zmghbKNiI1k&feature=youtu.be

0:42-2:03: The one-word stage & the focus on new information

Beyond single word speech

Unanalyzed combinations: most children have transitional forms that combine multiple words, but which the child doesn't realize are multiple words

Ex: "Iwant" (I want), "Idunno" (I don't know)

[Extra]

The two-word stage

https://www.youtube.com/watch?v=zmghbKNiI1k&feature=youtu.be

2:57-3:54: The two-word stage

Beyond two words

Even when children produce multiword utterances, they still produce single word utterances.

Point: children's development is measured by the *maximum* number of words they produce in a given utterance.

Beyond two words

When children start to put 3 words together, many of these utterances are combinations of the relational meanings expressed in the two word stage.

"I watching cars" = "I watching" + "watching cars"

"Put it table" = "Put it" + "it table"

Beyond two words

Early sentences tend to be imperatives (commands), as well as affirmative, declarative statements. Questions and negations come later, possibly because they're longer and/or their syntactic forms seem more complex.

Imperative:

"Dance with them!"

Affirmative, declarative:

"I dance with them."

Question: "Can I dance with them?"

Negation: "I don't dance with them."

Telegraphic speech

More morphemes come out…but only the morphemes that convey more information seem to.

These more-contentful items tend to be "content" morphemes (ex: nouns, verbs, adjectives) rather than "function" morphemes (ex: determiners (the, a, …), prepositions (to, by, from, …), auxiliary verbs (am, are, was, …), bound morphemes (-s plural marker, …))

[Extra]

Telegraphic speech

https://www.youtube.com/watch?v=zmghbKNiI1k&feature=youtu.be

5:34-6:22: Telegraphic speech

Telegraphic speech examples

Intended:

"I have to go to the castle to rescue my baby brother!"

Telegraphic:

"I go castle rescue baby brother!

Intended:

"The air is sweet and fragrant – and none may pass without my permission!"

Telegraphic:

"Air sweet fragrant – none pass without permission!"

Telegraphic speech

https://www.youtube.com/watch?v=zmghbKNiI1k&feature=youtu.be

6:22-7:38: Few errors & comprehension better than production

Early syntactic knowledge

Just because children don't use certain morphemes in their own speech doesn't mean they don't understand that adults use them and they should use them, too.

Shipley, Smith, & Gleitman (1969): children who are telegraphic speakers prefer to respond to full commands like "Throw me the ball" over their own telegraphic versions ("Throw ball")

Gerken & McIntosh (1993): children are particular about which functional morphemes occur where - they can tell the difference between "Find the dog for me" and "Find was dog for me"

Early syntactic knowledge

Children have knowledge of syntactic constructions even before they can produce all the words themselves – and what was previously thought to be telegraphic speech might just be a severe form of “baby accent”.

Dye 2011: 2- and 3-year-old French children have phonetic placeholders for auxiliary words (like “am” and “are”), and use them as they would use the actual words.

“The continuum ranged from target or near-target forms down to barely audible forms (some of which required identification through spectral analysis) or even puffs of air.”

Early syntactic knowledge

An example of how much production can underestimate children's underlying knowledge:

From a 2-year-old who previously said only 4 words (mama, dad, yaya = "doll", wawa = "dog"):

"You know, Dad, what I like about going to the doctor's office is getting to play with all of the toys in the waiting room."
(contributed by Jim Morgan)

Early syntactic knowledge

Children have early knowledge of what word order signals.

Geffen & Mintz 2014: 12-month-olds can distinguish between declaratives like “You remembered the popcorn” and yes/no questions like “Did you remember the popcorn?” on the basis of word order alone.

Testing true comprehension

https://www.youtube.com/watch?v=zmghbKNiI1k&feature=youtu.be

2:03-2:57: Experiments with children

Getting around the clever strategies

Using indirect methods like the preferential looking paradigm, we can test children's comprehension of multiword combinations even when they can only produce one-word utterances themselves

Preferential looking paradigm

http://www.thelingspace.com/episode-16
https://www.youtube.com/watch?v=3-A9TnuSVa8
5:48 - 6:57

Early syntactic knowledge

Hirsh-Pasek & Golinkoff (1991): 13- to 15-month-olds can comprehend improbable sentences with relational properties like

"She's kissing the keys."

Hirsh-Pasek & Golinkoff (1991): 16- to 18-month-olds can tell the difference between complex questions like

"Where is Cookie Monster washing Big Bird?" and

"Where is Big Bird washing Cookie Monster?"

Children understand more about structural relationships than they let on with their production!

Early syntactic knowledge

Perkins & Lidz 2021: 18-month-olds can comprehend dependencies between displaced elements and where those elements are understood, like *wh*-words in utterances.

"Which dog should the cat hug ___which dog?"

This is before children are regularly producing full sentences of their own.

Early syntactic knowledge

"Which dog should the cat hug ___which dog?"

"By 18 months, knowledge of *wh*-movement dependencies appears to be in place, and we have seen that by 19 months, children use this knowledge to guide their online parsing decisions, allowing a fronted *wh*-phrase to serve as the predicted argument of a known transitive verb." - Lidz 2022

Jeffrey Lidz

The relationship between developing processing and developing knowledge

"Which dog should the cat hug ___which dog?"

"…it appears that as children's knowledge of grammar grows, new knowledge is immediately incorporated into mechanisms of sentence perception and understanding…We do not both learn a grammar and how to parse. Instead, parsing and grammar develop in tandem…"
- Lidz 2022

Jeffrey Lidz

Why we may not always realize how much children know

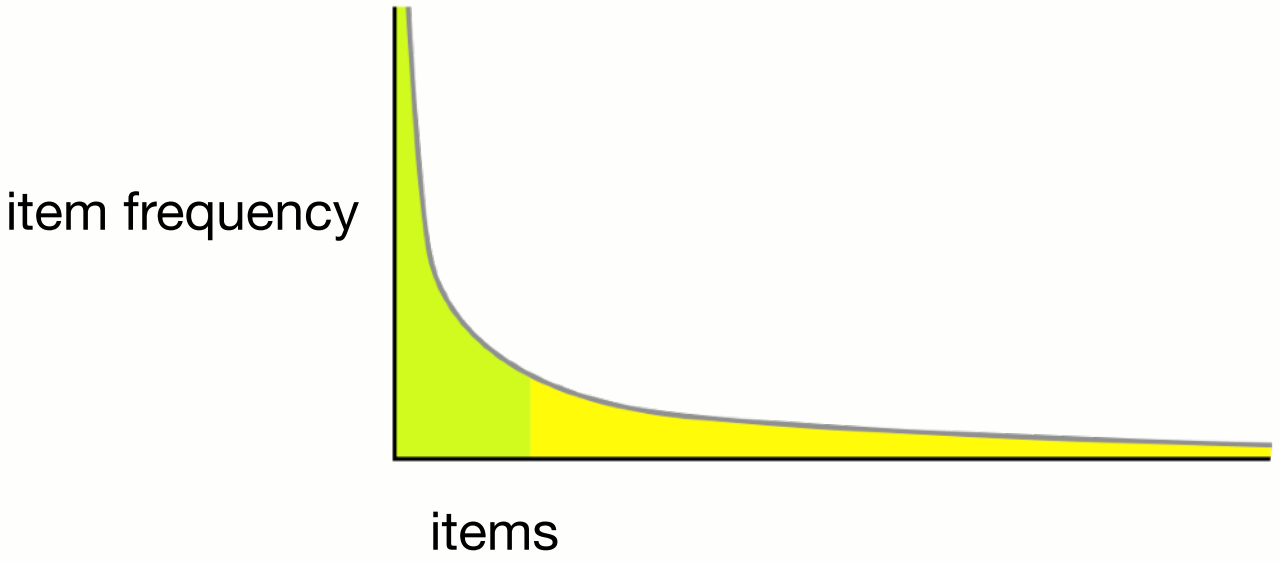
[Extra]

https://www.youtube.com/watch?v=zmghbKNiI1k&feature=youtu.be

7:38-9:16: Processing constraints

Children's input: Data distributions

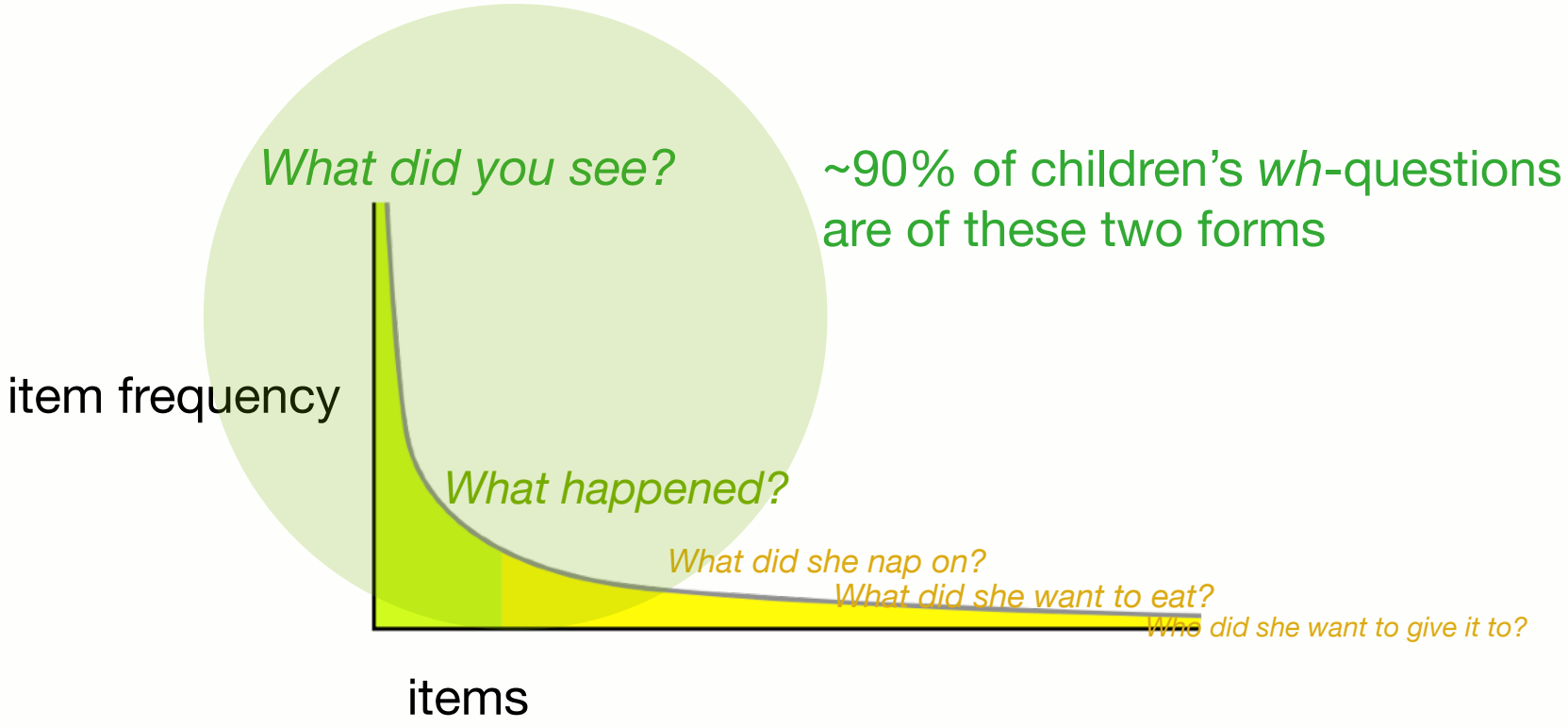
One reason why figuring out syntax is hard: Language has a Zipfian (power-law) distribution. Relatively few items are used very frequently while most items occur rarely, with many occurring only once even in very large data samples.



Children's input: Data distributions

Zipfian (power-law) distribution for English *wh*-question forms.

Pearl & Sprouse 2013



~90% of children's *wh*-questions are of these two forms

Children's input: Data distributions

Zipfian (power-law) distribution for English *wh*-question forms.

"To attain full linguistic competence, the child learner must overcome the Zipfian distribution and draw generalizations about language on the basis of few and narrow types of linguistic expressions." – Yang 2010

Basic point: The distribution of natural language data really makes the child's job hard, since the child must extract patterns and build a system despite not encountering most of the forms in the language very often.

Recap

The structure of language (syntax) involves more than simply the meaning of the words/morphemes. It involves rules about how the morphemes themselves are allowed to go together.

Children progress from single word utterances to multiword utterances, learning to combine items in their lexicon in a productive manner to express the meanings they want.

Children seem to have acquired a very complex system of grammar at a very young age, though it's not necessarily the complete adult system.

Children's input has a distribution that makes acquisition harder, because many things are encountered only rarely (if at all).

Questions?

You should be able to do up through question 5 on the review questions, and up through question 2 on HW5.