LIGN171: Child Language Acquisition

http://ling.ucsd.edu/courses/lign171

Grammar and word order

Grammar

Includes morphology and syntax

Morphology

- Analysis of structure at the word level
- How are morphemes organized and structured into words?

Syntax

- Analysis of structure at the clause and sentence level
- How are words organized and structured into clauses and sentences?

Bound morphemes

- Are attached to words they modify
- Affixes
 - Suffix: at the end of a word
 - -s in dogs; -ed in walked
 - Prefix: at the beginning of a word
 - un- in *und*o; para- in *paramilitary*
 - Infix: in the middle of a word
 - -fucking- in abso-fucking-lutely
- Unbound morphemes
 - Are free standing in a sentence
 - Whole words
 - dog; go; dogs; the; that
 - I found a dog vs. I found the dog vs. I found the dogs

Languages differ

- Swedish
 - indefinite article unbound en hus "a house"
 - Definite article bound huset "the house"

"Dog bites man" vs. "Man bites dog"

Questions vs statements
 The girl who is on the swing is happy
 Is the girl who is on the swing _____ happy?

 A child needs to learn both word structure and clause structure
 And learn which is what
 Does a language encode a meaningful contrast in morphology or syntax?

Infant Speech Production

Stage	Typical Age	Description
Cooing	2-3 months	Interactional but non-linguistic vocalizations
Marginal Babbling	4-6 months	Transition between cooing and babbling
Canonical Babbling	7-12 months	Repeated syllable strings
Words	12+ months	Babbling and words initially co-exist
Two-word stage	18-24 months (1.5-2 years)	"mini-sentences" with simple semantic relationship
Telegraphic stage/early multiword stage	24-30 months (2-2.5 years)	"telegraphic" sentence structures of lexical (open-class) rather than functional morphemes
Later multiword stage	30+ months (2.5+ years)	Grammatical or functional structures (e.g., articles, agreement, et cetera) emerge

When Syntax Starts...

- Novel combinations (where we can be sure that the result is not being treated as a single word) appear sporadically as early as 14 months.
- At 18 months:
 - 11% of parents say that their child is often combining words
 - 46% say that s/he is sometimes combining words.
- By 25 months:
 - almost all children are sometimes combining words
 but about 20% are still not doing it so "often."

About 18 Months: The 2-word Stage

- Usually combinations of individual naming actions that might just as well have occurred alone.
 - Mommy hat (= "mommy's hat")
 - Hat mommy (="mommy is putting on a hat")
 - Shirt wet
 - Doggy bark
 - Ken water (for 'Ken is drinking water')
 - Hit doggy
- Some combinations with certain pronouns or prepositions begin to occur as well (e.g., *my turn, in there*, etc.)
- The more purely grammatical morphemes (e.g., -s, is, a, the) are typically absent.

About 24 Months: Telegraphic Stage

- More than two words are often combined, but speech still usually lacks most grammatical elements
- In the early multi-word stage, children who are asked to repeat sentences may simply leave out function words including pronouns.
 - "I can see a cow" repeated as "See cow"
 - "The doggy will bite" repeated as "Doggy bite" (Adam at 28M)
 - "Where does Daddy go?" repeated as "Daddy go?" (Daniel at 23M)

Spontaneous utterances also lack most grammatical elements

- Kathryn no like celery
- Baby doll ride truck
- Pig say oink
- Want lady get chocolate

(Kathryn at 22M) (Allison at 22M) (Claire at 25M) (Daniel at 23M)

(Eve at 25M)

Syntax – It's not All or Nothing

- About the age of 2, children first begin to use grammatical elements
 - finite auxiliaries
 - verbal tense and agreement affixes
 - nominative pronouns
 - complementizers
 - determiners

(is, was) (-ed, -s) (I, she) (that, where) (the, a)

 Telegraphic patterns alternate with adult or adult-like forms, sometimes in adjacent utterances:

- She's gone. Her gone school. (Domenico at 24M)
- He's kicking a ball. Her climbing up the ladder there. (Jem at 24M)
- I teasing Mummy. I'm teasing Mummy. (Holly at 24M)
- I having this. I'm having 'nana. (Olivia at 27M)
- I'm having this little one. Me'll have that. (Betty at 30M)
- Mummy haven't finished yet, has she? (Olivia at 36M)

Children know the correct forms before they *reliably* use them Tom Bever

- Tom: Where's Mommy?
- Child: Mommy goed to the store.
- Tom: Mommy goed to the store?
- Child: NO! (annoyed) Daddy, I say it that way, not you.

Dan Slobin

- Child: You readed some of it too...she readed all the rest.
- Dan: She read the whole thing to you, huh?
- Child: Nu-uh, you read some.
- Dan: Oh, that's right, yeah. I readed the beginning of it.
- Child: Readed? (annoyed surprise) Read!
- Dan: Oh yeah, read.
- Child: Will you stop that, Papa?



Who did what to whom?

Two strategies

Case marking: morphological cue
 <u>Der</u> Hund hat <u>den</u> Mann gebissen
 ("the dog bit the man")

<u>Der</u> Mann hat <u>den</u> Hund gebissen
("the man bit the dog")

Word order: syntactic cue

Configurational vs non-configurational languages

Non-configurational Languages

WarlpiriFree word order

Null anaphora

 Discontinuous syntactic expressions

- (3) Ngarrka-ngku ka wawirri panti- mi, man ERG AUX kangaroo spear NONPAST The man is spearing the kangaroo.
- (4) Wawirri ka panti-mi ngarrka-ngku.
- Panti-mi ka ngamka-ngku wawimi.
- (8) a. Ngarrka-ngku kapanti-rni. man ERG AUX spear NONPAST The man is spearing him/her/it.
 - Wawirri ka panti-mi, kangaroo AUX spear NONPAST He/she is spearing the kangarco.
 - c. Panti-mi ka. spear NONPAST AUX He/she is spearing him/her/it.
- (6) Wawimi kapi-ma-panti-mi yalumpu. kangaroo AUX spear NONPAST that I will spear that kangaroo. (Hale, 1983, p. 6)
- (7) Wawimi yalumpu kapi-ma-panti-mi. kangaroo that AUX spear NONPAST I will spear that kangaroo. (Hale, 1983, p. 6)

Configurational Languages

SVO (English) The man bit the dog SOV (Hindi) The man the dog bit VSO (Biblical Hebrew) Bit the man the dog VOS (Malagasy) Bit the dog the man OVS (Hixkaryana) The dog bit the man OSV (Urubu) The dog the man bit

Do infants detect word order differences?

Head-turn preference procedure
 Habituate to: "cats-would-jump-benches"
 Test with: "cats-jump-wood-benches"
 2 month old infants showed differential response – detected difference!

But do they recognize a difference in meaning?

Preferential Looking Technique

- Listen to an auditory stimulus
- See images of two events: one matches, one doesn't
- Does the infant look longer at the image that matches?
- If yes, the infant understood the sentence





Preferential Looking Technique

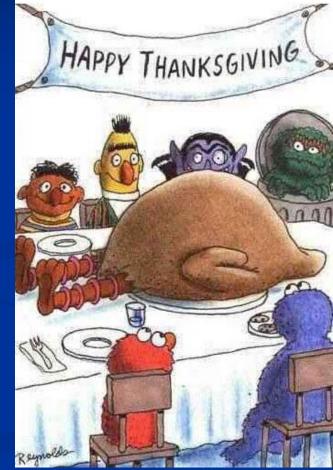
- Big Bird's tickling cookie monster. Find Big Bird tickling Cookie Monster.
- Image 1: Big Bird is tickling Cookie Monster
- Image 2: Cookie Monster is tickling Big Bird
- Infants knew the names of the characters
- Actions and characters identical – word order is cue to roles of each character



17 month old infants looked longer at matching image!

More complex syntax

- At age 2 (24-27 months)
- Tested verbs toddlers are unlikely to know
 - Transitive verb:
 - Big Bird is flexing Cookie Monster
 - Intransitive verb:
 - Big Bird is flexing with Cookie Monster
 - Image 1:
 - Big Bird pushes Cookie Monster up and down, making him flex
 - Image 2:
 - Big Bird and Cookie Monster flexing up and down next to each other
- Toddlers looked longer at matching image
- Recognition of grammar > production of grammar



Acquiring word order

Parameter setting

- "flipping a switch"
- Head initial language: VO (English)
- Head final language: OV (Hindi)
- Relatively little data needed to determine which option is found in target language
- Set of options provided by UG
- Pattern induction
 - Learn patterns based on specific examples
 - "data-driven" learning

Evidence?

Basic word order learned very rapidly for production and comprehension
When full sentences are produced, constituents are ordered accurately
Supports parameter setting models

But – evidence comes from tests using familiar verbs!

Alternative interpretation

- Understanding of word order is not truly general
- Modeled on basis of individual verbs, gradually expands as more verbs are learned

Give ("She gave me a toy")
 SVIO (general)
 [donor]-[give]-[recipient]-[gift] (specific)

Evidence for verb specific comprehension of word order?

- Toddlers can enact a transitive sentence with a verb tickle but not hug
- Verb specific formulas predict good performance on tests of production and comprehension with familiar verbs
- Parameter setting models also make this prediction
- Good performance with familiar verbs does not distinguish these two accounts

Unfamiliar verbs...

If children use and comprehend word order correctly with novel verbs, then they may have a general understanding of order, rather than a specific one

Inspired by wug test (Berko, 1958)

How do children do with novel verbs?

Akhtar and Tomasello, 1997

What do children do when told:

Make Big Bird dack Cookie Monster (agent verb patient)

Children taught novel verbs

- Without linguistic cues:
 - "This is called dacking"
- With linguistic cues:
 - "Big Bird's tamming Cookie Monster"
- "Make Big Bird dack Cookie Monster"
 - Children younger than 3
 - With no linguistic cues: chance performance
 - With linguistic cues: accurate performance
 - Suggests verb-specific word order knowledge

Parameters vs Patterns

Present English speaking children with novel verbs in non-English orders

There are no languages in which some verbs follow one word order and other verbs follow another (also consistent with parameter account)

Parameter setting –

- Very young children will use a single word order with all transitive verbs
- Pattern induction
 - Very young children may acquire order on a verb-byverb basis

Methods

Participants

- 12 children aged 2;1 3;1
- 12 children aged 3;2 3;11
- 12 children aged 4;0 4;9
- Equal numbers of boys and girls
- All participants taught 3 novel verbs
 - One verb in sentence-medial position (SVO)

Elmo dacking the car

- One verb in sentence-final position (SOV)
 - Elmo the car gapping
- One verb in sentence-initial position (VSO)
 - Tamming Elmo the car

Novel Verbs

- Gapping
 - A puppet springs a toy off a platform connected to a metal coil
- Tamming
 - A puppet puts a toy on prop which when hit caused the toy to be catapulted
- Dacking
 - A puppet knocks a toy down a curved chute

Predictions

After training with puppets/toys, children given opportunity to perform the action
Asked "What's going to happen now?" or "What happened?"

Parameter setting –

- Even youngest children will not use SOV or VSO orders – either ignore verbs or correct to SVO
- Pattern Induction
 - May show verb-dependent order, at least at youngest ages

Data Coding

 Examine frequency of sentences containing novel verbs (spontaneous or elicited) and both an agent and a patient

 Class sentences as either matching or mismatching order modeled for child
 If *tamming* is modeled in SVO, does child use it in SVO sentence?

Older children used more novel verbs than younger children, so use proportions to control for this difference

Results

SVO

 All children matched order correctly

SOV

- Two younger groups equally likely to use SOV as correct to SVO
- Older children corrected to SVO

VSO

- Two younger groups equally likely to use VSO as correct to SVO
- Older children corrected to SVO

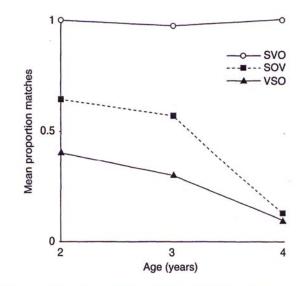


Figure 12.1 Mean proportion of children's sentences matching the order modeled at each age in each condition. All mistakes in the SOV and VSO conditions were corrections to SVO order.

Control for compliance: if a child used a non-SVO order – just cooperating? Expose them to a familiar verb in wrong order – do they use it wrong or not?

Summary

 Younger children were willing to use ungrammatical structures with novel verbs
 "Tigger the fork dacking"
 These are not imitative!

Control condition:

- All children corrected to SVO with familiar verbs
- Only 3 children occasionally matched experimenter's ungrammatical use of unfamiliar verb
- Possibly some cooperation, but not enough to explain results

Individuals vs averages

On average – children equally likely to correct to SVO as use non-SVO order

True for every child? Or averaging artifact (i.e., some children have parameter set, some don't)

Some of both –

- Some children matched only, and didn't correct
- Some children corrected only, didn't match
- Some children did both

Parameters or patterns?

- Even the youngest children produced SVO orders for verbs they had only heard in non-SVO sentences
 - Not consistent with strong version of pattern induction hypothesis
- 2 year olds; 3 year olds sometimes used non-SVO orders
- 4 year olds almost never did (corrected weird orders to make them like English
- Acquisition of word order is a gradual process

Parameters or patterns?

Parameters –

- Maybe learning word order is not just like flipping a switch, as process is gradual
 - Maybe discrete changes not perfectly reflected in child's use of language?

Patterns –

- Knowledge not framed around individual verbs, since some novel verbs are corrected to order they were never learned in
 - Maybe children know more about verbs generally than they were expected to?
 - Maybe animacy cue? (inanimate items occur post-verbally)