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 *undo*; 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 <u>is</u> happy
  - <u>Is</u> 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" (Eve at 25M)
  - "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 (Kathryn at 22M)
  - Baby doll ride truck (Allison at 22M)
  - Pig say oink (Claire at 25M)
  - Want lady get chocolate (Daniel at 23M)

Syntax – It's not All or Nothing

- About the age of 2, children first begin to use grammatical elements
  - finite auxiliaries (*is, was*)
  - verbal tense and agreement affixes (*-ed, -s*)
  - nominative pronouns (*I, she*)
  - complementizers (*that, where*)
  - determiners (*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?

Syntax

Who did what to whom?

Two strategies

- Case marking: morphological cue
  - Der Hund hat den Mann gebissen
  - ("the dog bit the man")
  - Der Mann hat den Hund gebissen
  - ("the man bit the dog")
- Word order: syntactic cue
  - Configurational vs non-configurational languages

Non-configurational Languages

- Warlpiri
- Free word order
- Null anaphora
- Discontinuous syntactic expressions

(3) Ngarrka-ngku ka wawirri panti-rni.
man ERG-AUX kangaroo spear-NONPAST
The man is spearing the kangaroo.

(4) Wawirri ka panti-rni ngarrka-ngku.
(5) Panti-rni ka ngarrka-ngku wawirri.

(6) a. Ngarrka-ngku kapanti-rni.
man ERG-AUX spear-NONPAST
The man is spearing him/herself.
b. Wawirri ka panti-rni.
kangaroo AUX spear-NONPAST
He/she is spearing the kangaroo.
c. Panti-rni ka.
spear NONPAST AUX
He/she is spearing him/herself.

(6) Wawirri kapi-nya-panti-rni, yalumpa.
kangaroo AUX spear-NONPAST that
I will spear that kangaroo. (Hale, 1983, p. 6)

(7) Wawirri yalumpa kapi-nya-panti-rni.
kangaroo that AUX spear-NONPAST
I will spear that kangaroo. (Hale, 1983, p. 6)

Configurational Languages

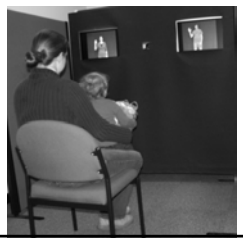
- SVO (English)
  - The man bit the dog
- SOV (Hindi)
  - The man the dog bit
- VSO (Biblical Hebrew)
  - Bit the man the dog
- VOS (Malagasy)
  - Bit the dog the man
- OVS (Hixkaryana)
  - The dog bit the man
- OSV (Urubu)
  - The dog the man bit

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?

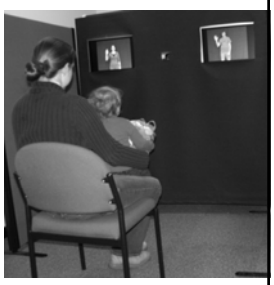
Preferential Looking Technique

- 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-by-verb 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 *docking* 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

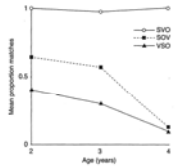


Figure 12.1 Mean proportion of children's sentences matching the order modeled at each age in each condition. All mistakes in the SOV and VSO conditions were corrections to SVO order.

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)