

Language Acquisition: Part II

Syntactic development

Theories of syntactic development

Mean Length of Utterance (MLU) - related to syntactic development

Measured in terms of morphemes - “walked” would be an MLU of 2. “No milk” would also be 2

Consistent pattern of growth of MLU with age
Individual differences in rate.

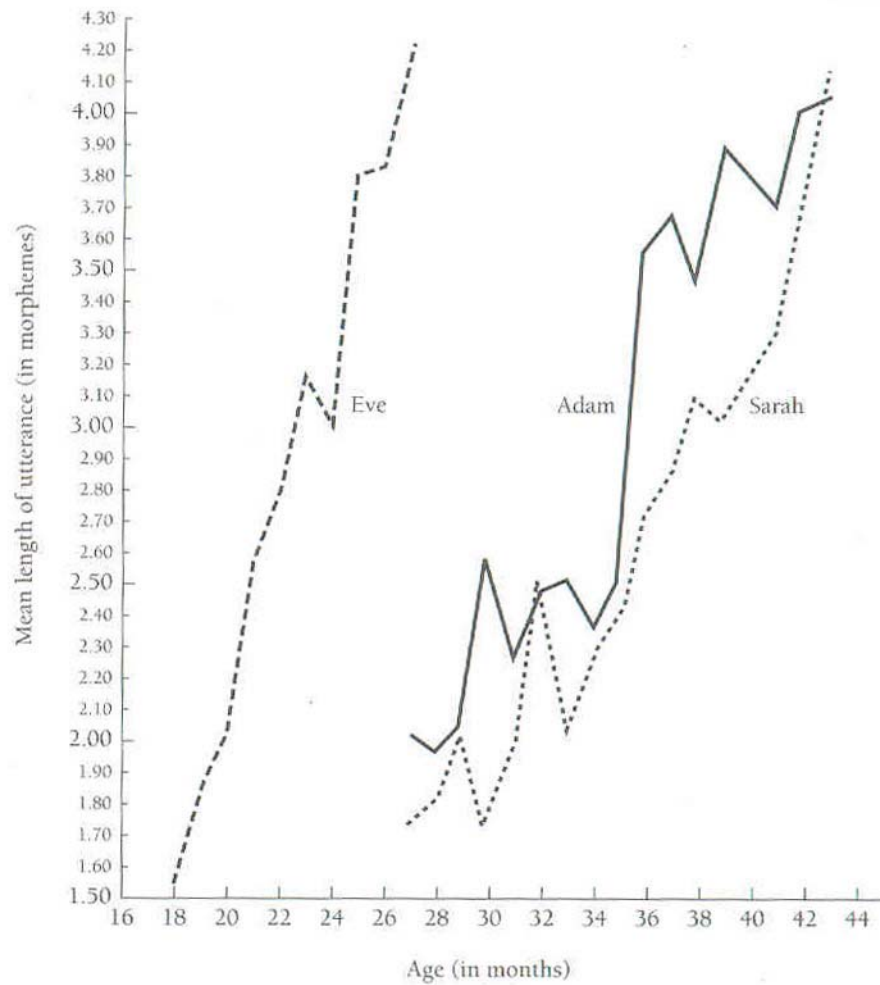


Figure 5.3 The relation of MLU to age for Adam, Eve, and Sarah

Source: Reprinted by permission of the publishers from *A First Language: The Early Stages*, by Roger Brown. Cambridge, Mass.: Harvard University Press. Copyright © 1973 by the President and Fellows of Harvard College.

Box 5.1 Examples of one child's two-word utterances

Possessives

| | | | |
|--------------|--------------|---------------|--------------|
| daddy coffee | Andrew book | daddy book | daddy eat |
| daddy shell | daddy car | mommy book | juice daddy |
| mommy shell | daddy chair | daddy bread | daddy juice |
| Andrew shoe | daddy cookie | Elliot cookie | Mommy butter |
| daddy hat | daddy tea | Elliot diaper | daddy butter |
| Elliot juice | mommy tea | Elliot boat | |
| mommy mouth | daddy door | | this Nina |

Property-indicating patterns

| | | | |
|-------------|----------------|---------------|-------------|
| big balloon | little shell | all wet . . . | red balloon |
| big hot | little ham | mommy . . . | blue stick |
| big shell | little water | all wet | |
| big juice | little light | daddy all wet | hurt Andrew |
| big pants | little wet | daddy all | hurt fly |
| big lion | little step | wet | hurt knee |
| big water | little boy | all wet ball | hurt plane |
| big light | little bird | shirt wet | hurt hand |
| big step | little tobacco | wet nose | |
| big jump | little banana | shoe wet | old cookie |
| big boy | little spilt | wet diaper | old apple |
| big bird | little hurt | | old cup |
| big tobacco | | hot sand | old stick |
| big banana | all wet . . . | hot fire | old egg |
| | water . . . | hot tea | |
| little hat | all wet | hot ball | |
| little duck | all wet pants | blue shirt | |

Recurrence, number, disappearance

| | | | |
|--------------|-----------|--------------|----------------|
| more glass | two plane | two car | one daddy car |
| more boy | two stick | two diaper | |
| more raisins | two ducks | two tobacco | all gone big |
| more shovel | two spoon | two raisins | stick |
| more "O" | two fly | two daddy | all gone stick |
| | two shoe | door | all gone bee |
| other door | two bird | two daddy | all gone |
| other pin | two pipe | two mommy | stone . . . |
| other ball | two door | two squirrel | all gone |
| other hand | two cup | two bread | |

(continued)

Box 5.1 (continued)*Locatives*

| | | | |
|----------------------|---------|--------------------------|---------|
| sand ball | "ON" | hand eye | "IN/TO" |
| hand hair | "IN" | stone outside | "TO" |
| ball house | "IN/TO" | key door | "TO" |
| man car | "IN" | raisin cup | "IN/TO" |
| fly light | "ON" | dog house | "ON" |
| sand toe | "ON" | feet light | "TO" |
| sand water | "IN/TO" | | |
| sand eye | "IN" | in there . . . old apple | |
| daddy . . . hot ball | "TO" | in there . . . old apple | |
| ball daddy | "TO" | milk in there | |
| stick car | "IN" | down there car | |
| rock outside | "TO" | | |

Actor/action

| | | | |
|-------------|-------------|--------------|--------------|
| mommy sit | daddy work | boy walk | Andrew sleep |
| daddy sit | daddy sleep | man walk | daddy work |
| Andrew walk | daddy walk | Elliot sleep | stone daddy |

Other combinations

| | | |
|------------------|---------------|--------------|
| have it egg | eat fork | back eat |
| have it milk | bite top | up bed |
| have it fork | bite block | |
| | bounce ball | mommy girl |
| dirty face | broke pipe | daddy boy |
| dirty mouth | ride car | |
| dirty feet | walk car | orange juice |
| clean socks | ride daddy | apple juice |
| spilt bread | walk daddy | grape juice |
| spilt raisin | | drink water |
| | daddy window | butter honey |
| boom-boom tower | window byebye | sock shoe |
| boom-boom car | hat on | sit down |
| boom-boom coffee | socks on | lie down |
| boom-boom plane | out car | |
| boom-boom chair | out chair | |
| | back car | |
| eat dessert | back raisin | |

Source: From "Children's First Word Combinations," by M. D. S. Braine, 1976, *Monographs of the Society for Research in Child Development*, 41, Serial No. 164. Copyright © 1976 The Society for Research in Child Development, Inc. Reprinted by permission.

Telegraphic utterances

Omission of closed class (function words) and inflections -
Perceptual salience of open class? Stressed

In some other languages with richer inflectional systems -
more
evidence of early use of inflections. Semantic salience of
words and inflections could also be relevant

Comprehension of word order

Hirsh-Pasek and Golinkoff (1993) - 19 mo. old infants' comprehension of sentence like "Big Bird is tickling Cookie Monster" (preferential looking paradigm)

Two videos playing simultaneously - one correct, one showing Cookie Monster tickling Big Bird

Infants looked longer at correct video

Very early understanding of word order

Structure of early utterances:

pivot grammar

semantic bootstrapping

frozen utterances

Pivot grammar (Braine, 1963; Brown & Fraser, 1964):

Allgone shoe

My mommy

Push it

Allgone milk

My daddy

Close it

Pivot word + Open word

or

Open word + Pivot word

Problems -

- a. Ignores semantic relations - “mommy sock” in two contexts
- b. No clear relation to adult grammar

Semantic Bootstrapping (Pinker)

Innate knowledge of syntactic categories (N,V) and linking rules (agent -> subject)

Learning of meanings of some content words

Hears sentence:

“The girl pushed the boy.” (or “Tren-ba lok-po ven.”)

Maps girl or tren-ba (agent) to Subject, boy or lok-po (patient) to Object

Problem:

In English, expect child to have more difficulty mastering verbs where agent - subject mapping doesn't hold

Predicted:

Easy: push, kiss, trip

Hard: want, got (I want it, Mommy got bag)

Bowerman (1990), Lieven, Pine & Baldwin (1997) -
no difference

No initial structure - Frozen utterances

Pine & Lieven (1993), Lieven et al. (1997)

Children 12 mos to 3 yrs. First 400 multi-word utterances recorded by parents.

Large proportion of initial multiword utterances (mean = 60%) occurred in stereotyped form:

Either words hadn't occurred individually before combination or one word had occurred but not in that position in the utterance

Tomasello (1992; 2000)

Examined his daughter's use of verbs, age 15-24 mos.

From diary data

Findings:

1. Of 162 verbs, half used in only one construction type (e.g., Mommy break, Daddy break, but not break cup)
2. Verbs with similar meanings varied substantially in no. of construction types used
3. Uneven use of morphological marking - some verbs used with past tense, some with present progressive (ing), few with both
4. Current use of verb predicted by past. Introduced one small change in particular verb.

Verb Island Hypothesis:

Children learn verb-specific constructions. Verb + slot for noun. Which slot depends on which verb.

More general claim:

Learning is based on acquisition of particular examples. Later, child will abstract from many examples what the patterns are. Then, any new verb that seems to fit pattern will inherit remaining characteristics.

Acquisition of the Negative

Three stages:

1. Negative added to sentence - outside (1 - 2 yrs)

No go movies

No sit down

No mommy do it

2. Negative inside sentence - use negative and contractions like single words (“don’t” not composed of. do + not) (2 - 3.5)

I no like it.

Don’t go

I no want book.

Negatives (cont.)

3. Different auxiliaries used - approach adult forms (3.5-4.0)

You can't have this.

I don't have money.

I'm not sad now.

Slow acquisition (takes 2 yrs to see full development)

Questions

Similar pattern

1. Wh- word at beginning

What that? Where Daddy go?

2. Start including auxiliary, but don't invert

Where you are going?

What she is playing?

3. Adult form

How can he be a doctor?

Why did they talk?

Again long period of acquisition

Later Syntactic Development (Carol Chomsky, 1969)

1. Passives - complete understanding and correct usage may be delayed until 7-8 yrs of age

John was pushed by Mary. (action verbs come in earlier)

Mary was remembered by Jim. (“experiencer” verbs difficult)

2. “eager/easy”

John was eager to please

John was easy to please

Who is doing the pleasing? Who is pleased?

3. John promised Bill to wash the car.

John told Bill to wash the car.

Who will wash the car?

Theories of the acquisition of grammar

1. Behaviorist approach

**2. Information processing approach
connectionist**

3. Nativist approach

Behaviorist approach

1. Stimulus-response, reinforcement
2. Imitation

Problems?

1. No punishment or reward for grammar
2. Lack of imitation
3. Complexity of structure requires hierarchical model of syntax - not chain of associations
4. Productivity, creativity - ability to create sentences never heard

Information processing approach

1. Symbolic/formal approach

Children induce rules -

You are going to the store.

Are you going to the store?

Mike didn't want the candy

Didn't Mike want the candy?

Sarah bought the book.

Did Sarah buy the book?

Hypothesize that question is formed by moving auxiliary to front.

Then what to do when no auxiliary?

Another hypothesis needed.

Problems:

1. How do children know what to pay attention to? Slobin's operating principles

A. Pay attention to ends of words

B. Phonological forms can be systematically modified

C. Pay attention to order of words and morphemes.

Etc.

Problems?

1. Kind of induction seems quite difficult for 2 -4 yr olds

Even adults can't state rules

2. “unconscious” rule induction doesn't really solve the problem

Connectionist Approach

Network representing input-output and interconnections

Initially random weights, weights adjusted by experience

Past-tense learning (McClelland & Rumelhart):

Input present (go), output past (went)

Walk-walked

Tease- teased

Pick -picked

Sing - sung

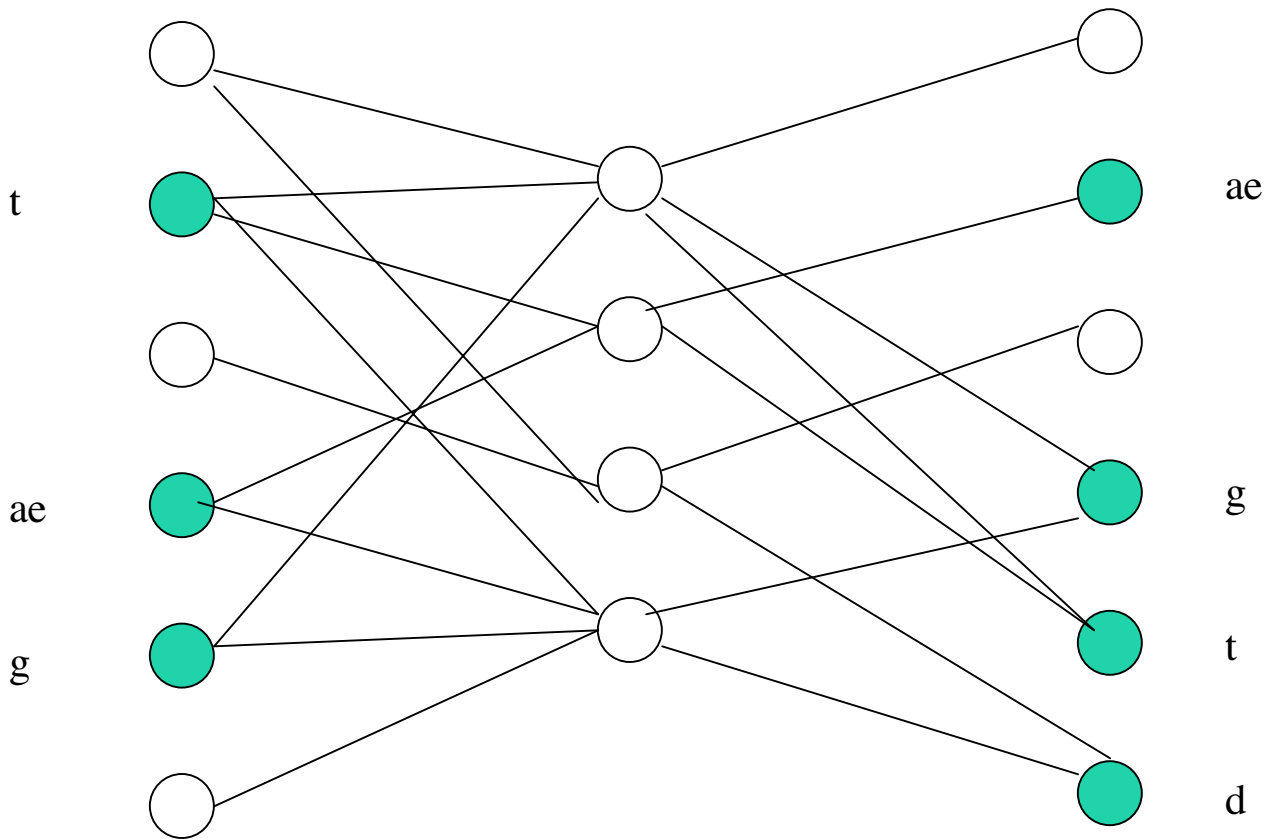
Format rule: past tense = present + /d/

memorize exceptions

Input Phonology

Hidden Units

Output Phonology



System can learn input - output connections
for large set of regular and irregular verbs

Can generalize fairly well to new verbs
Sensitive to sub-regularities:

Sing-sang

Ring-rang

Fring - ?

How to extend to word order, grammatical structure?

Recurrent networks - Elman auto-associative network

One node become associated with next (like chaining), but chaining in terms word class (det - N) (N-V), etc not particular words

Problems -

1. Both work when given extensive training in particular domain
2. Need feedback from environment to adjust weights (internally generated?)
3. Grammatical doesn't generalize to new structures

Nativist approach

Innate system - Universal Grammar

Parameters are set by exposure to one's own language

E.g. Whether word order or inflections are important for signalling grammatical roles

Susan disliked Mary

Mary-pa Susan-bo disliked

2. Draws on specialized cognitive system different from that involved in non-language processes

3. Critical period may be postulated

Evidence in favor?

1. Pidgin/Creole (Bickerton, 1983)

Pidgin spoken when two language communities come in contact

Lack of grammatical structure productivity

Children of pidgin speakers develop Creole - which is a fully grammatical language

Pidgin - no fixed word order, no embedded clauses, sometimes missing verb

Creole - has all these features as in standard languages

2. Home-sign (Goldin-Meadow, 1982)

Two deaf children in a home with hearing parents create complete sign language, though not taught one

3. Williams syndrome children - genetic disorder

Language abilities seem to be much better than their non-language abilities. Thus, language can't depend on general cognitive capabilities - has to be specialized system.

Converse - children with poor acquisition of language (SLI children) with good non-language abilities

4. Lack of negative -

Positive evidence of what is correct grammatically not enough to induce grammatical rules

Negative evidence needed, but not provided.

Therefore system has to be innately set so that rules don't have to be induced.

Problems with nativist approach

A. Why does language learning take so long, if just waiting for input to set parameters? (up to 10 yrs??)

B. Brain specialization could be due to nature of input - auditory/sequential gives left hemisphere specialization

C. Dissociations not as clear as sometimes claimed - Williams syndrome spatial abilities better than might expect Only mild problem with spatial prepositions, picture/word matching good. Grammatical abilities impaired

D. Difficulty in specifying what principles and parameters are - assume default and then show languages with default easier to learn

Not very successful approach so far