Language Acquisition: Part II

Syntactic development

Theories of syntactic development

Language and cognition

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.

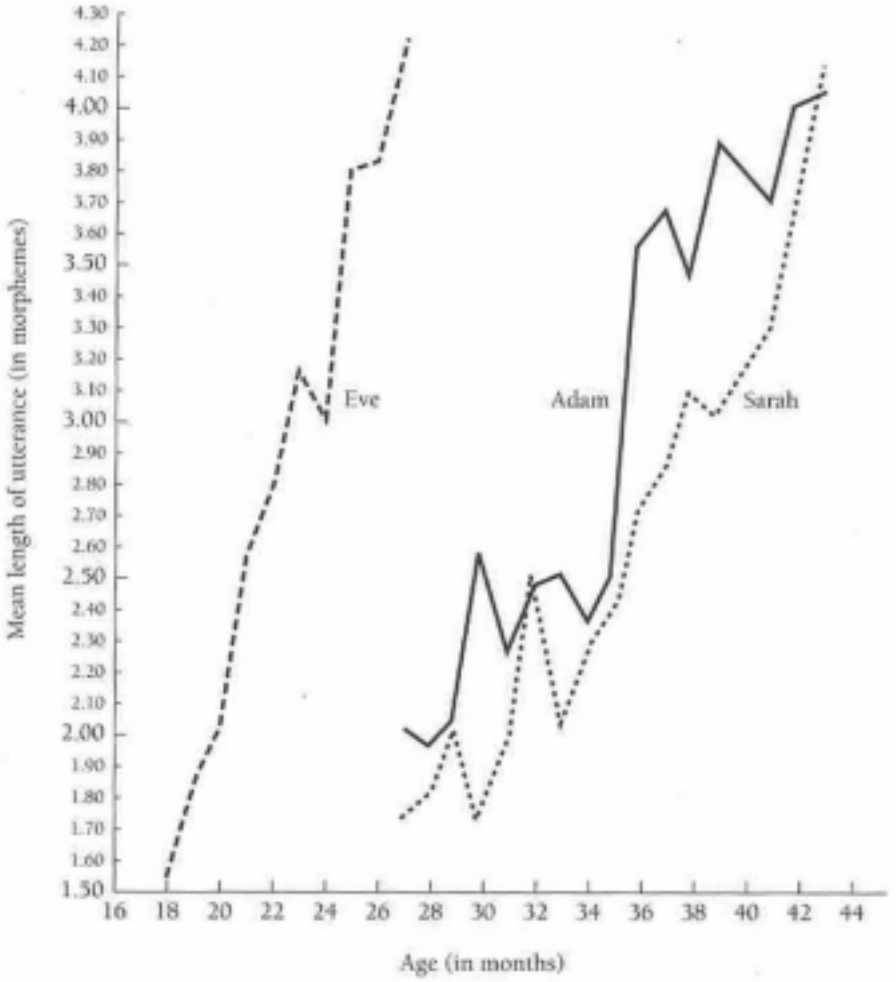

Figure 5.3 The relation of MLU to age for Adam, Eve, and Sarah

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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 appple	
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 Golinkkoff (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

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 untill 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

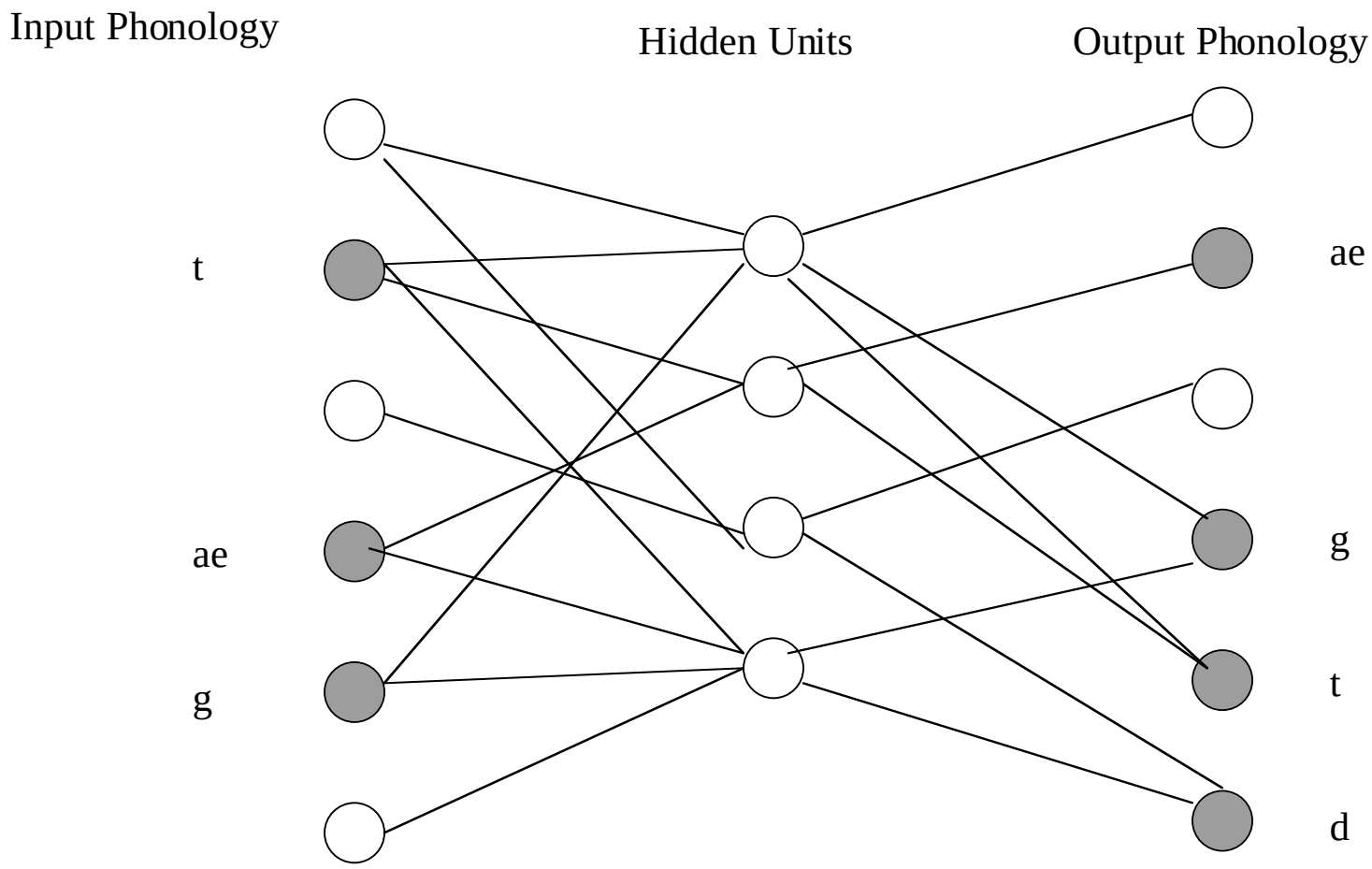
Network representing input-output and interconnections

Intially 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
t
ae
g
ae
g
t
d

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

Conclusions about basis of acquisition?