2008・6・19

Psychology of Language Development

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Department of Educational Psychology

When did you start talking?

How did you learn to talk?

Developmental Transition of Utterances by Children(Maeda・Maeda, from 1996)

Word segmentation

More words

Longer sentences

1;0 ‘*nen ne*’ ネンネ(sleepy)

1;6 ‘*kete*’ ケテ（from akete=open）

1;7 ‘*totta*’ トッタ(got) ‘*kitty*’ キティ― (kitty doll) ‘*chan*’チャン (dear)

1;8 ‘*mochi*’ モチ (rice cake) ‘*tabeta*’ タベタ(ate) /
‘*kuchushita*’ クチュッシタ (socks) ‘*haku*’ ハク (put on)

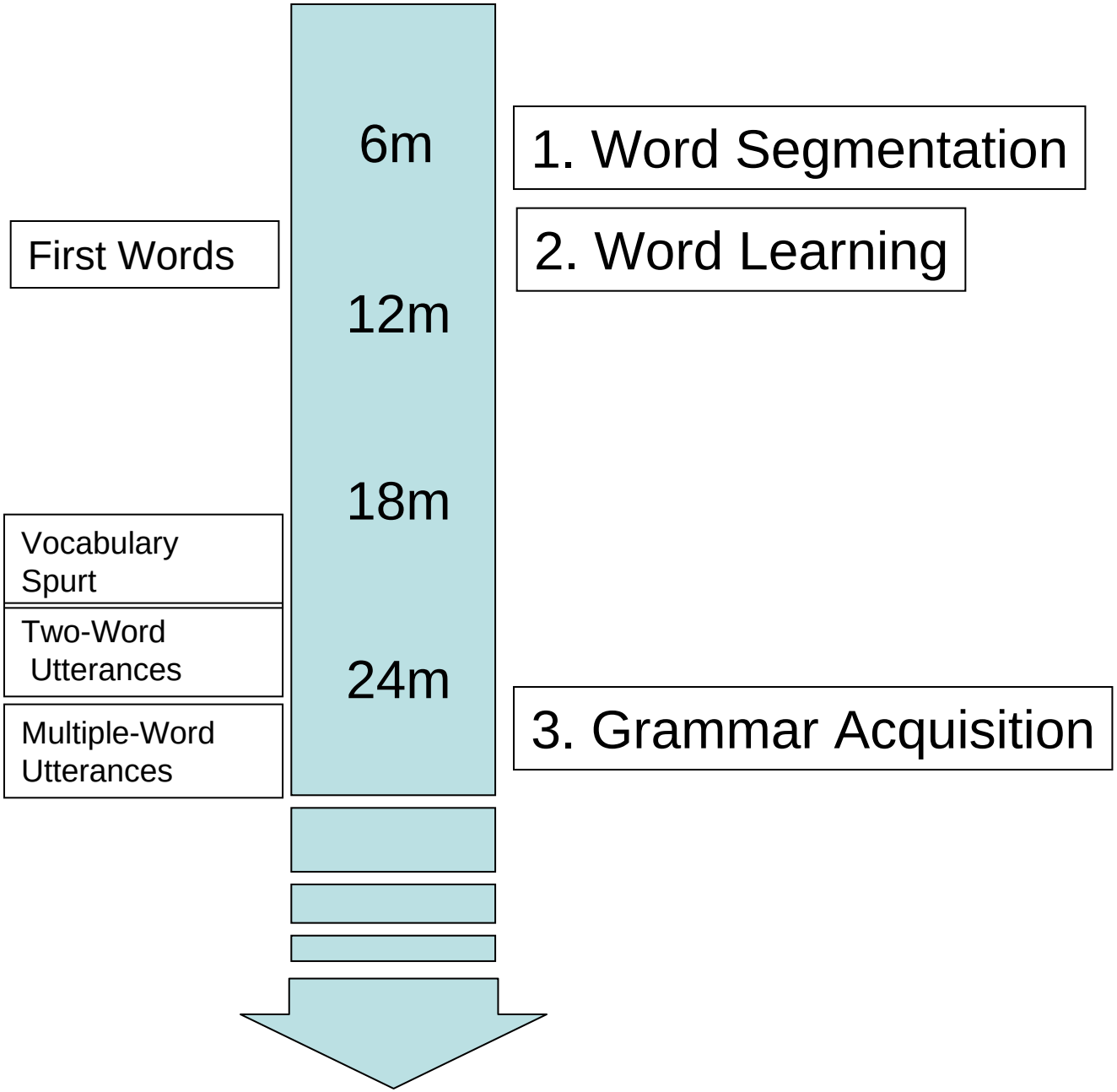
1;9 ‘*nana*’ ナナ(doggy name) ‘*mizu*’ ミズ(water) ‘*nonda*’ ノンダ (drank)

2;1 ‘～*chan*’ ～チャン(dear) (own name) ‘*mo*’ モ (too) ‘*nomu*’ (drink) ノム

2;3 ‘*gyunyu*’ ギューニュー(milk) ‘*nonderundayo*’ ノンデルンダヨ(drinking)
‘〇*chan*’ 〇チャン (dear) ‘wa’ ワ *(topic-marker)*

2;9 ‘*kaze*’ カゼ(cold) ‘*naotutara*’ ナオッタラ(recover)
‘*calupisu*’ カルピス(brand name of drink) ‘*nomareruno*’ ノマレルノ (allowed to drink?)

2;10 ‘*ah*’ アー (oh) ‘*oniichan*’ オニイチャン(elder brother) ‘*ga*’ ガ(subject-marker) ‘*ocha*’ オチャ (tea) ‘*o*’ ヲ(object-marker) ‘*nonda*’ ノンダ(drank) ‘*na*’ ナ (didn’t he)

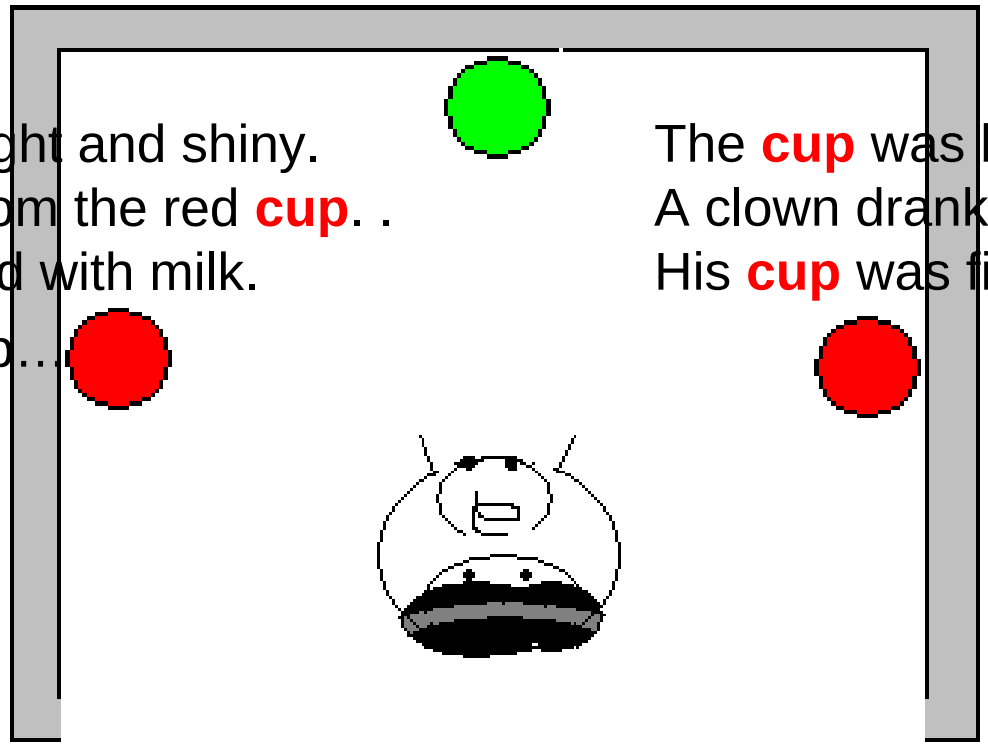

6m
12m
18m
24m
1. Word Segmentation
2. Word Learning
3. Grammar Acquisition
First Words
Vocabulary Spurt
Two-Word Utterances
Multiple-Word Utterances

1. Segmenting words from fluent speech

- Head-turn Preference Procedure (Jusczyk & Aslin, 1995)

The **cup** was bright and shiny.
A clown drank from the red **cup**. .
His **cup** was filled with milk.

cup cup cup cup…



The **cup** was bright and shiny.
A clown drank from the red **cup**. .
His **cup** was filled with milk.

dog dog dog…

1. Segmenting words from fluent speech

- Clues to word segmentation
  - Transitional Probability (Saffran et al.,1996)

「ミルクほしの？」 '*miluku hoshii no*?' (Want milk?)
「ミルクのむ？」 '*miluku nomu*?' (Drink milk?)
「ほらミルクよ」 '*hora miluku yo*' (Here is milk)

  - Stress（strongly pronounced syllable）
    - **English…doctor,kingdom(Jusczyk et al.,1999)**
    - **Japanese…ブ―ブ、*buh-bu* (car) くっく、*kuQku* (shoe)**
      あんよ、*aN-yo* (leg) (Hayashi・Mazuka,2007)
  - Frequent Words
    - **Own name (Bortfeld et al.,2005)**
    - **Functors … grammatical particles in Japanese?**

But…

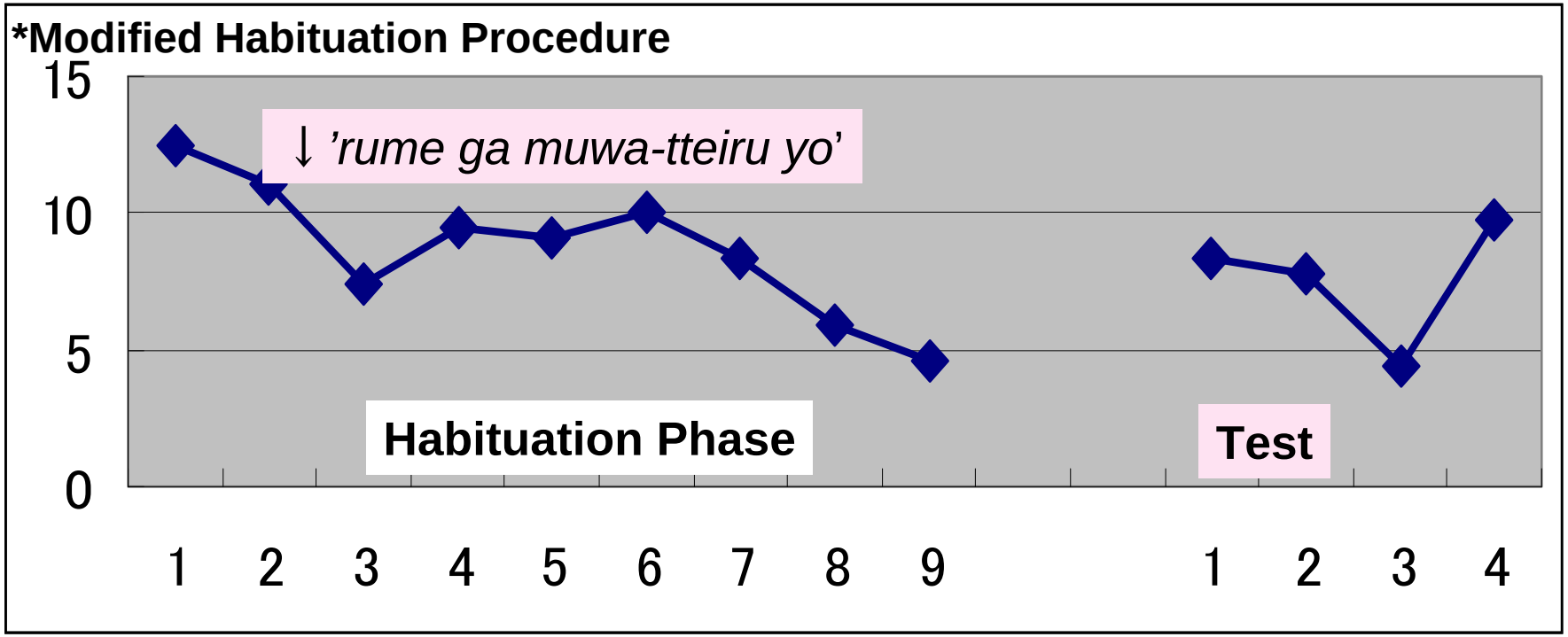
- Indeed, children must hear functors, or grammatical particles, in speech input very frequently

- But, children's early production are likely to omit those grammatical elements…

「ワンワン　イタ」　　*wan wan* (doggy)　*ita* (there)
「パパ　カイシャ」　　*pa pa* (daddy)　　*kaisha* (office)
「クチュシタ　ハク」　*kutushita* (socks)　*haku* (put on)

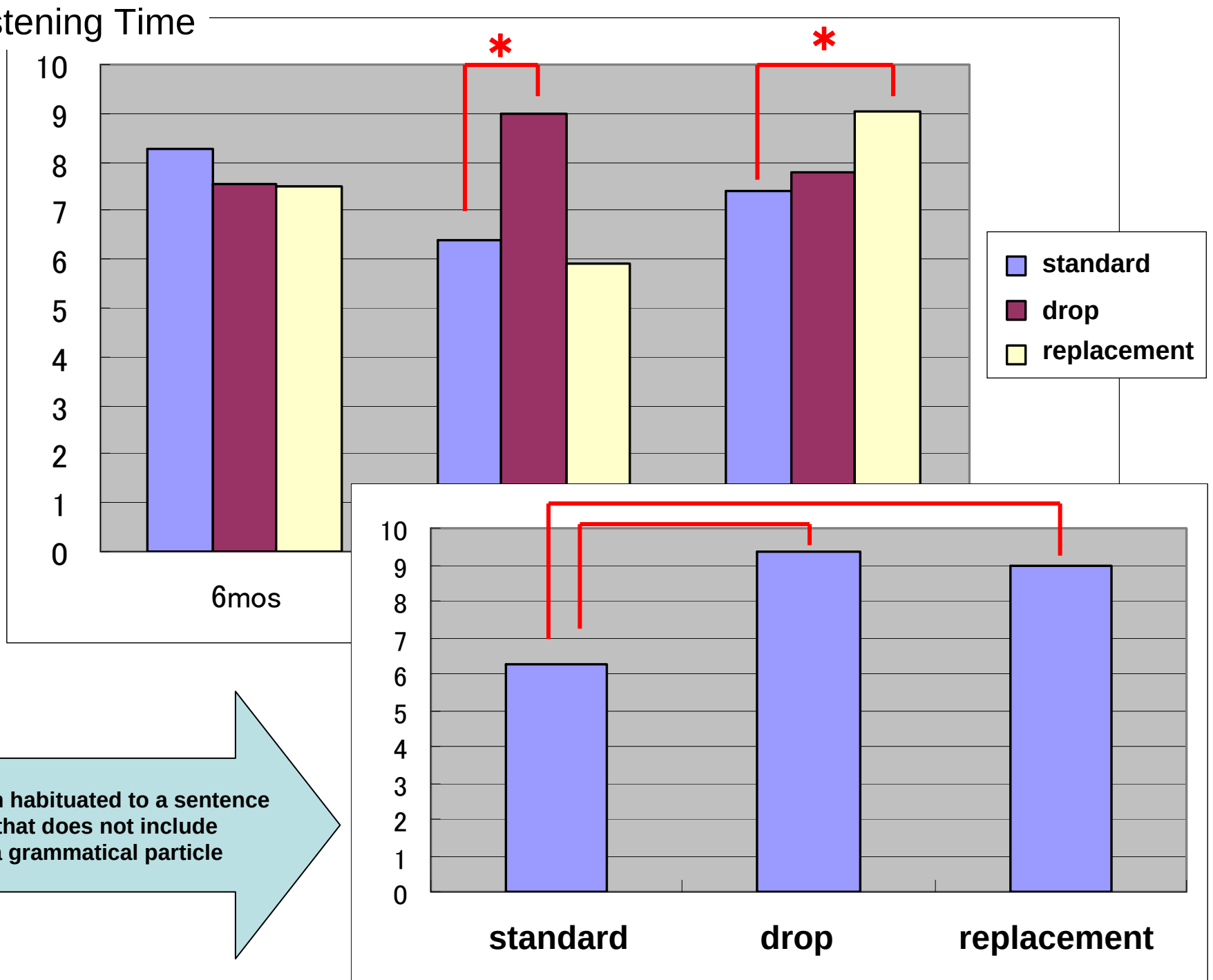
⇒　Are children really able to utilize grammatical particles to segment a word ? When do they recognize grammatical particles in the speech input?

Japanese infants' recognition of the particle '*ga*' (Kajikawa & Haryu, 2008)



Test1 '*rume ki muwa-tteiru yo*' ('ga' replaced with a non-particle syllable)
Test2 '*rume muwa-tteiru yo*' ('ga' dropped)
Test3 '*rume ga muwa-tteiru yo*' (standard)
Test4 '*wapu ga rite-tteiru yo*' (control)

＊Order of Test1-3 was counterbalanced across infants


Listening Time
10
9
8
7
6
5
4
3
2
1
0
*
*
standard
drop
replacement
6mos
When habituated to a sentence
that does not include
a grammatical particle
10
9
8
7
6
5
4
3
2
1
0
standard
drop
replacement

1. Segmenting words from fluent speech

- Clues to word segmentation
  - -Transition Probability (Saffran et al.,1996)
  - -Stress（strongly pronounced syllable)

    English…doctor, kingdom(Jusczyk et al.,1999)

    Japanese…*buh-bu*,(car) *kuQku* (shoe) *aN-yo*(leg)

    (Hayashi・Mazuka,2007)

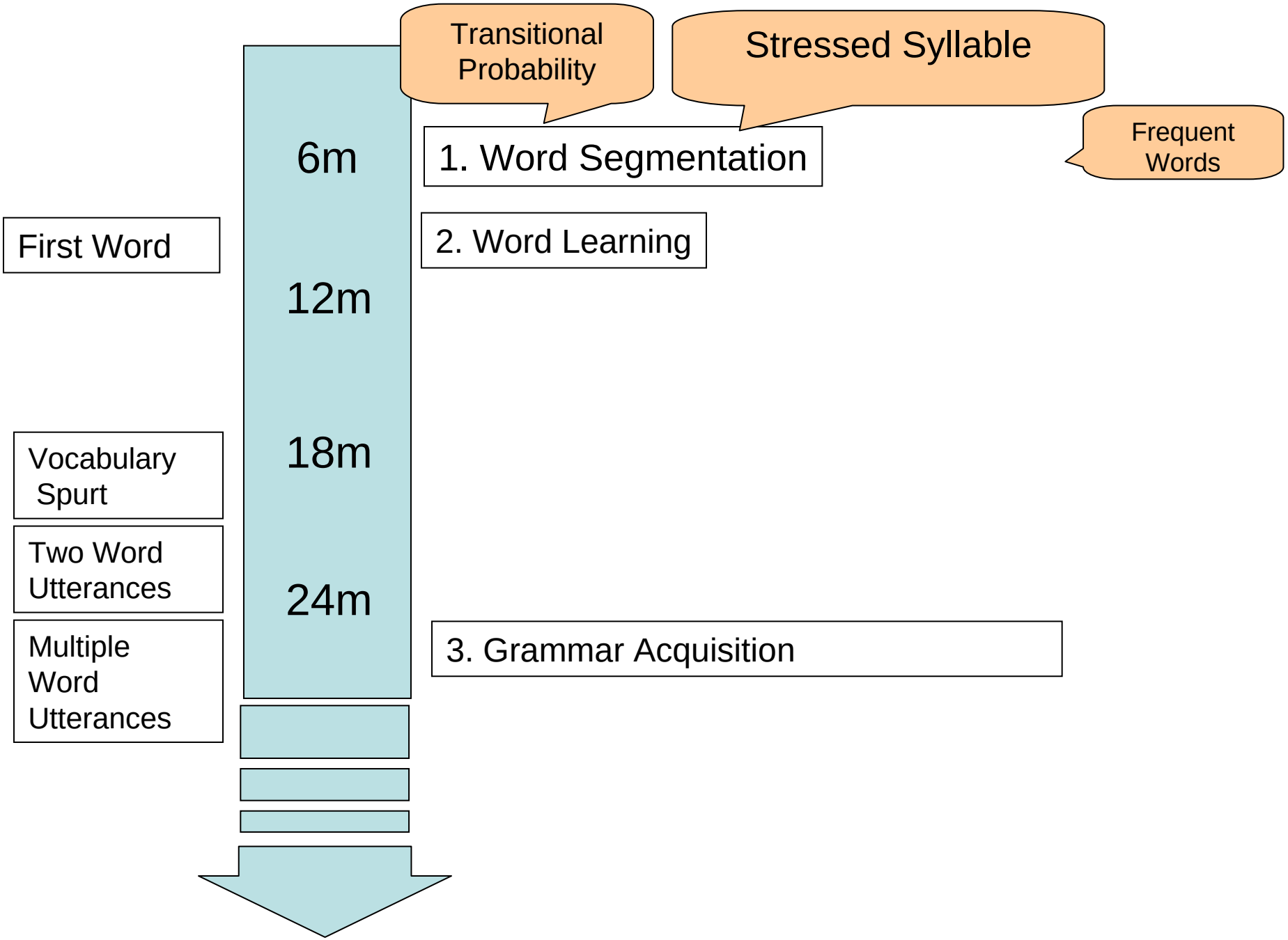
  - -Frequent Words

    Own name(Bortfeld et al.,2005)

Functors？ (Kajikawa & Haryu,2008)

At least, 15-mos recognize those elements in the speech input…

To be continued ….


Transitional Probability
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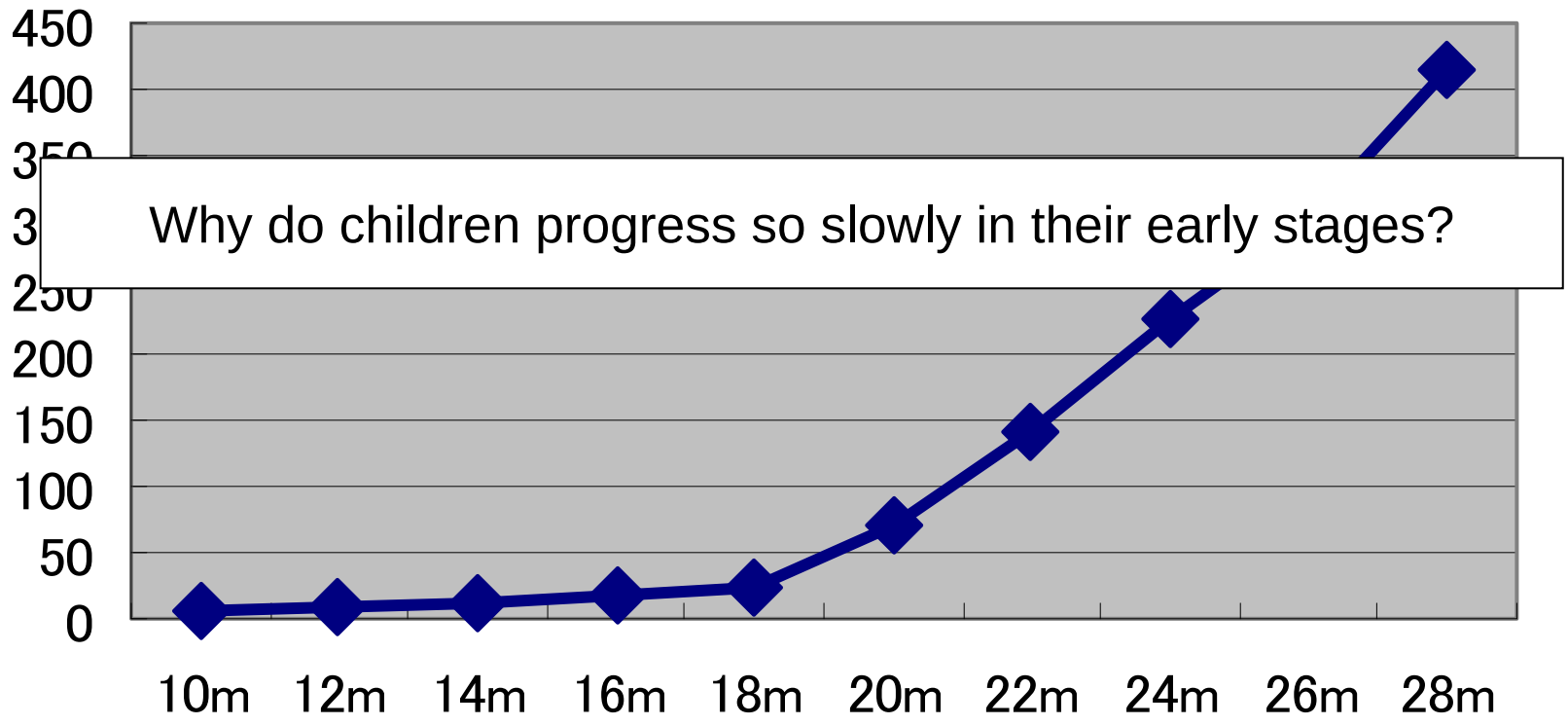
2. Word learning

- Number of productive words

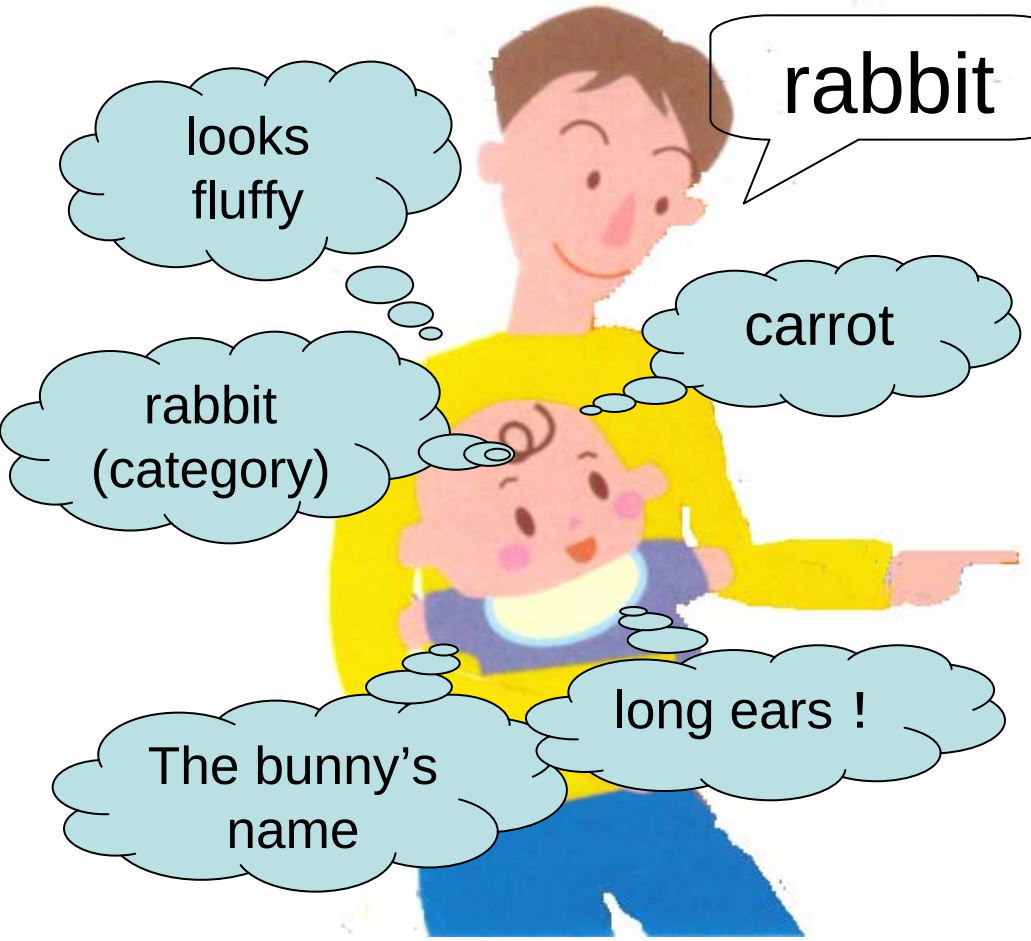


Why do children progress so slowly in their early stages?

Ogura（2000）

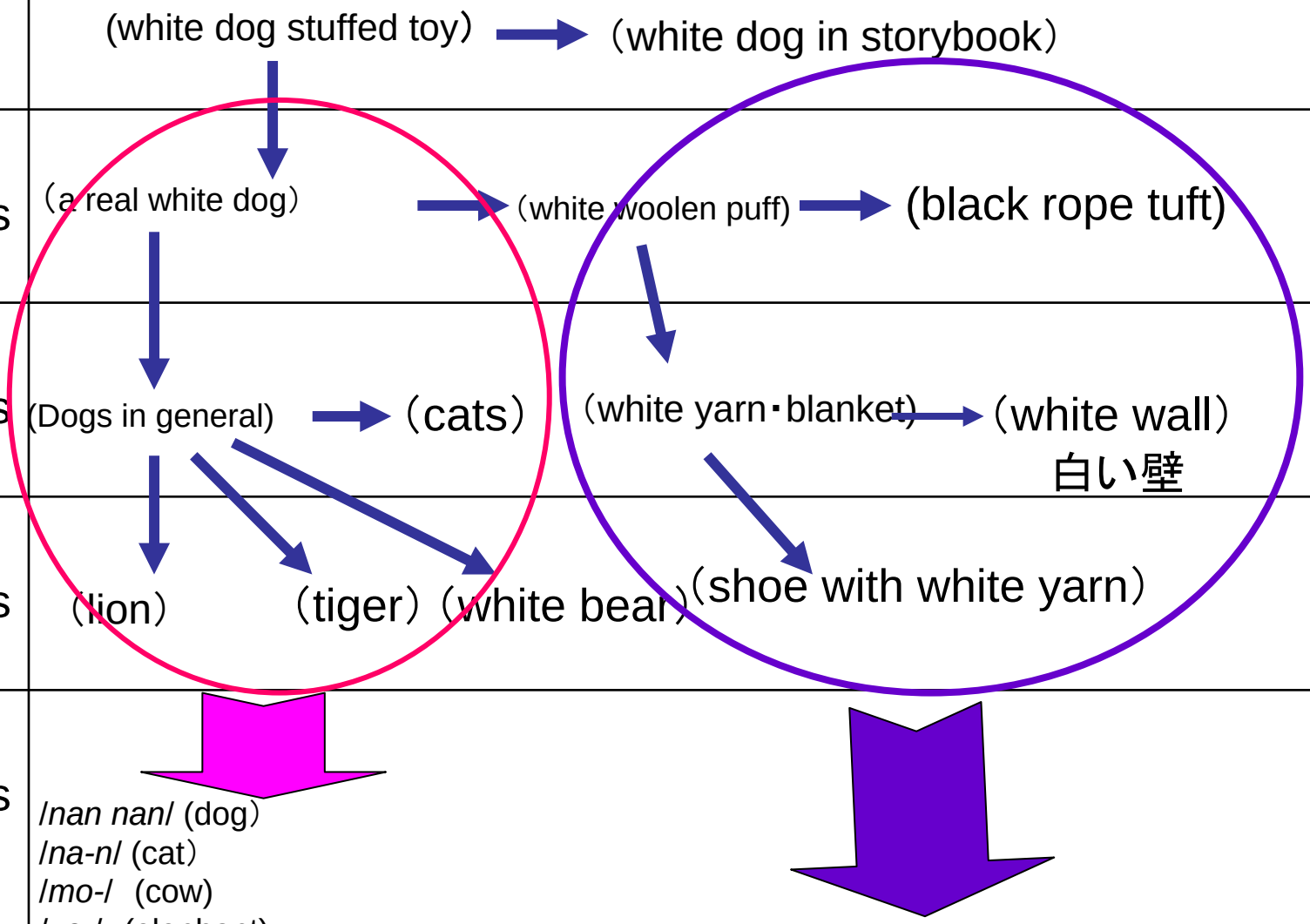
When a child hears a novel word…

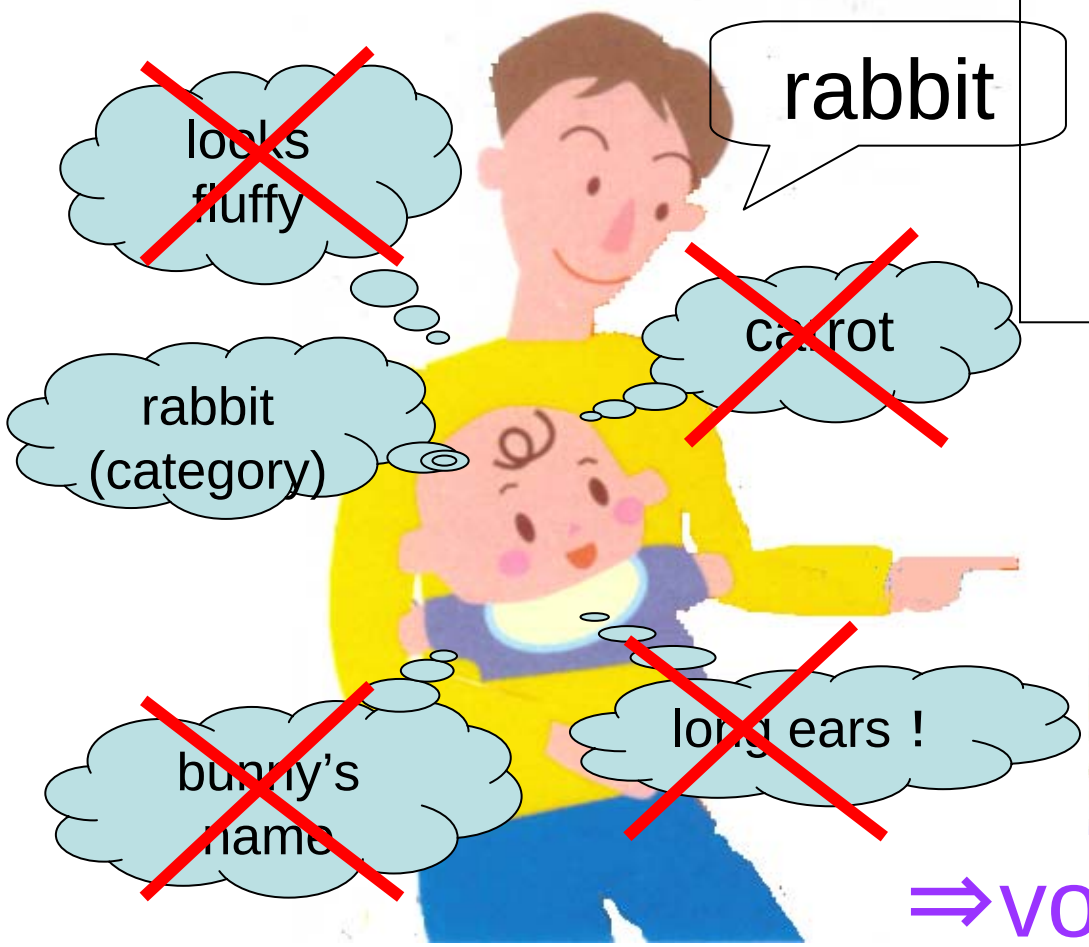
What does the word ‘rabbit’ mean?



Okamoto(1982)

A child's use of the word /nyan nyan/ :

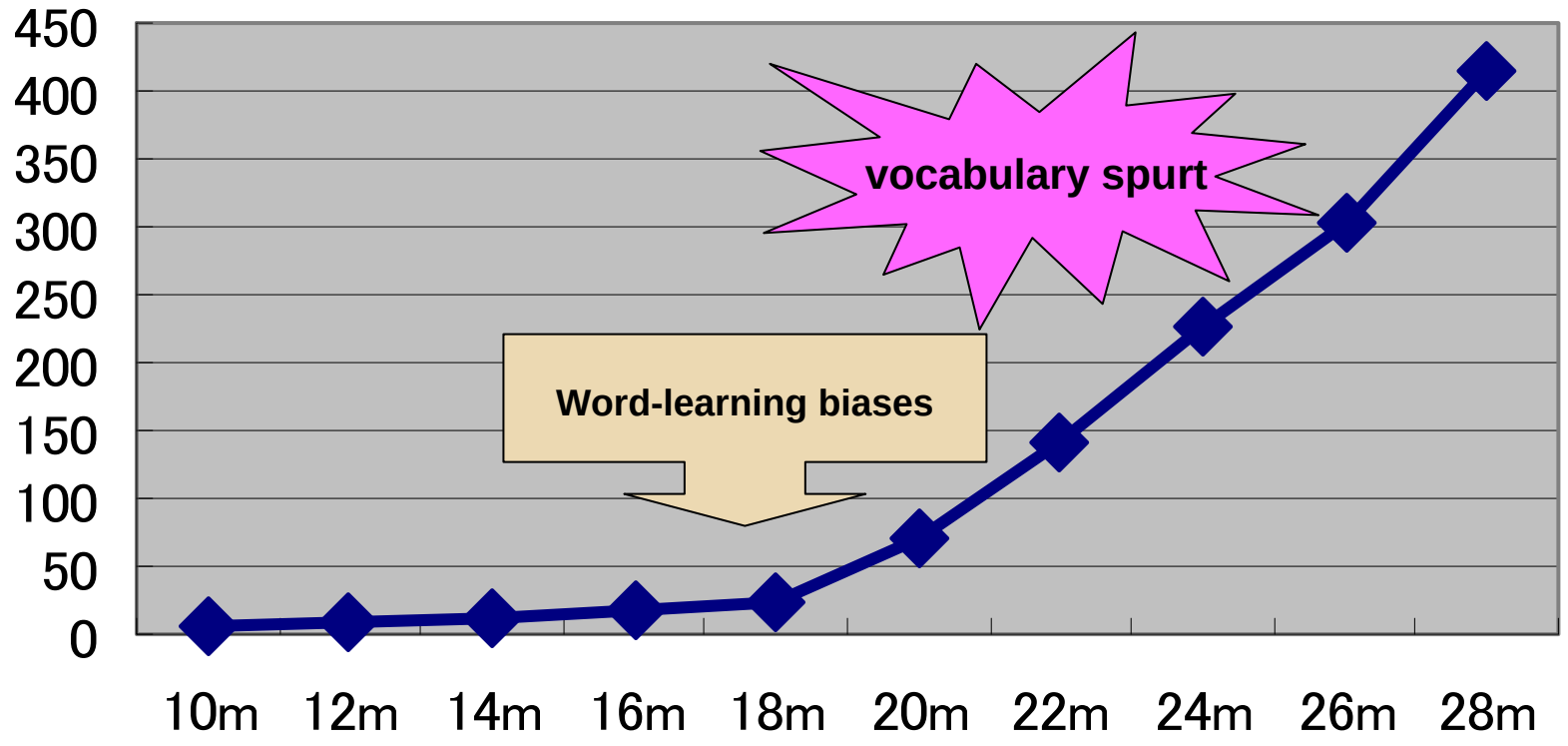




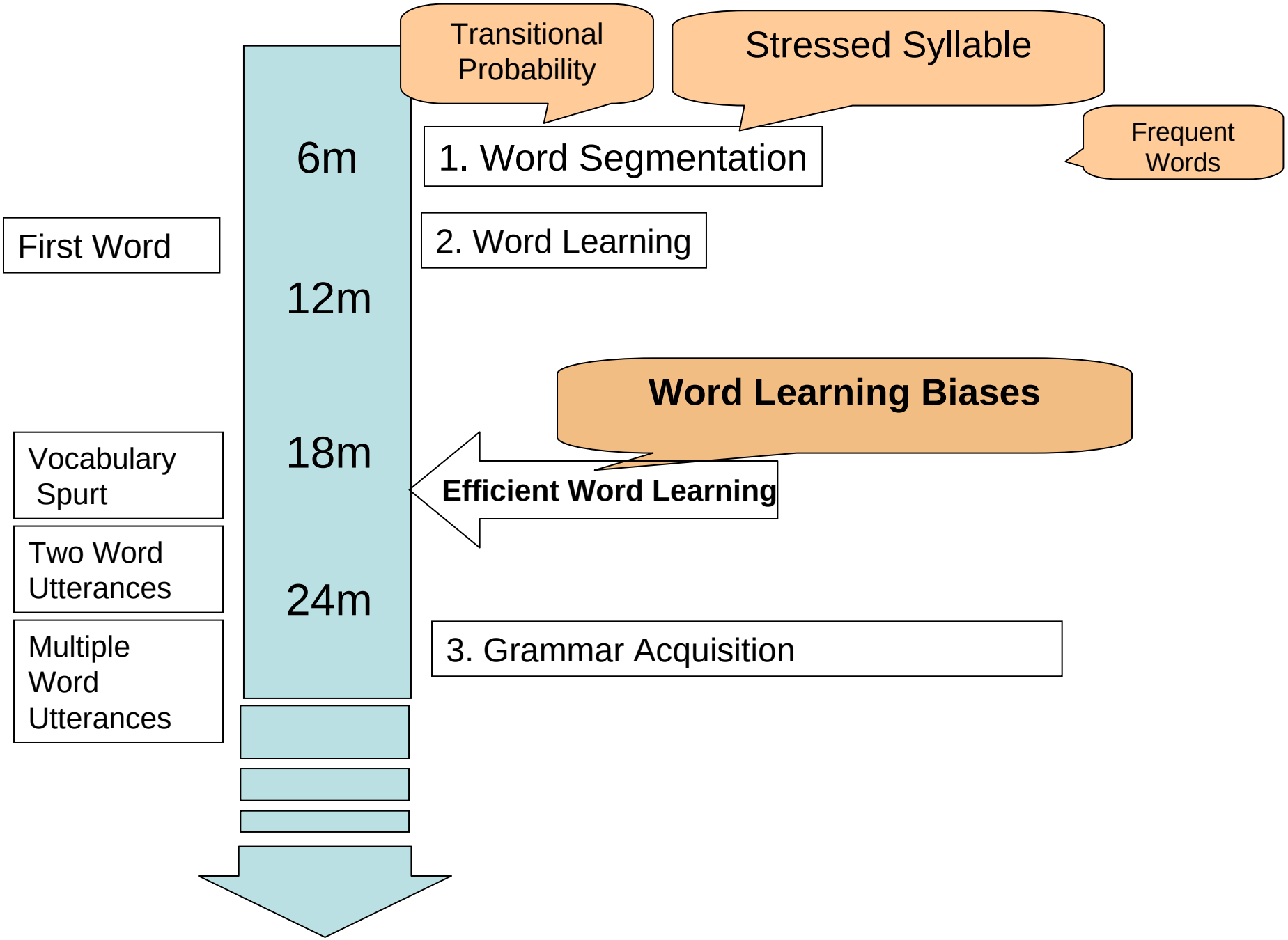
Word-learning
- mutual exclusivity bias
- whole-object bias
- taxonomic bias
  （shape bias）

⇒vocabulary spurt

- Number of productive words



Ogura（2000）


Transitional Probability
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6m
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Is that enough?…

All the words children must learn are NOT object labels.

"*Ah,* ***NEKE***** ga iru*!"
(Ah, here is ***NEKE****)
「あ、ネケがいる！」

"*Ah-* ***NEKE**** *-tte iru*!"
(Ah- it *is* ***NEKE**** *-ing*!)
「あー　ネケっている！」

Word's form class

Kinds of meaning characteristic of the form class

* 'NEKE' is a nonsense word in Japanese, which was used to examine whether children were able to infer its meaning, an object label or a verb denoting the action, by attending to the sentence frame in which the word appeared.

Noun Condition

(Imai, Haryu, & Okada,2005)

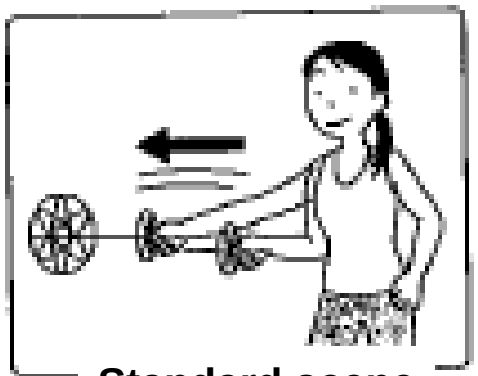
Mutsumi Imai, Etsuko Haryu

‘Construction of the Lexicon: How Children Learn Words and Concepts’（Iwanami 2007）‡

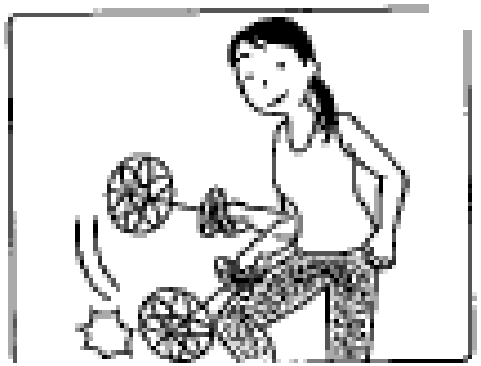
“*Hora*、***NEKE**** *ga aruyo*”

(Look, here is (a) NEKE)

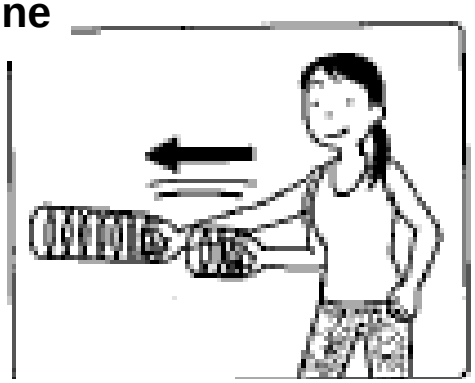
「ほら、ネケがあるよ」



Standard scene



Object-Same-Action-Change scene



Action-Same-Object-Change scene

Drawing 5.3 Imai et al.(2005)

“***NEKE**** *ga aru no ha dotchi*?”

(In which is NEKE?) 「ネケがあるのはどっち？」

Verb Condition

(Imai, Haryu, & Okada, 2005)

"*Hora*、***NEKE**** *-tteiru*"

(Look, it is NEKE-ing)

「ほら、ネケっているよ」

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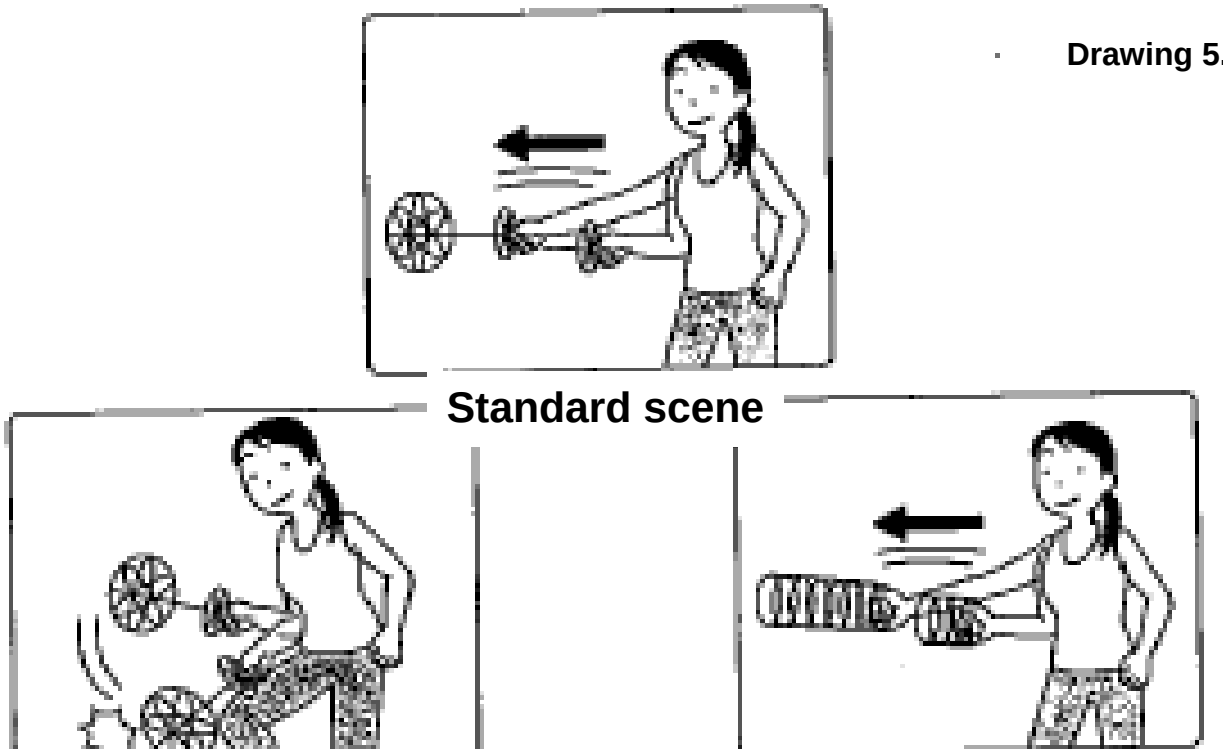


Standard scene

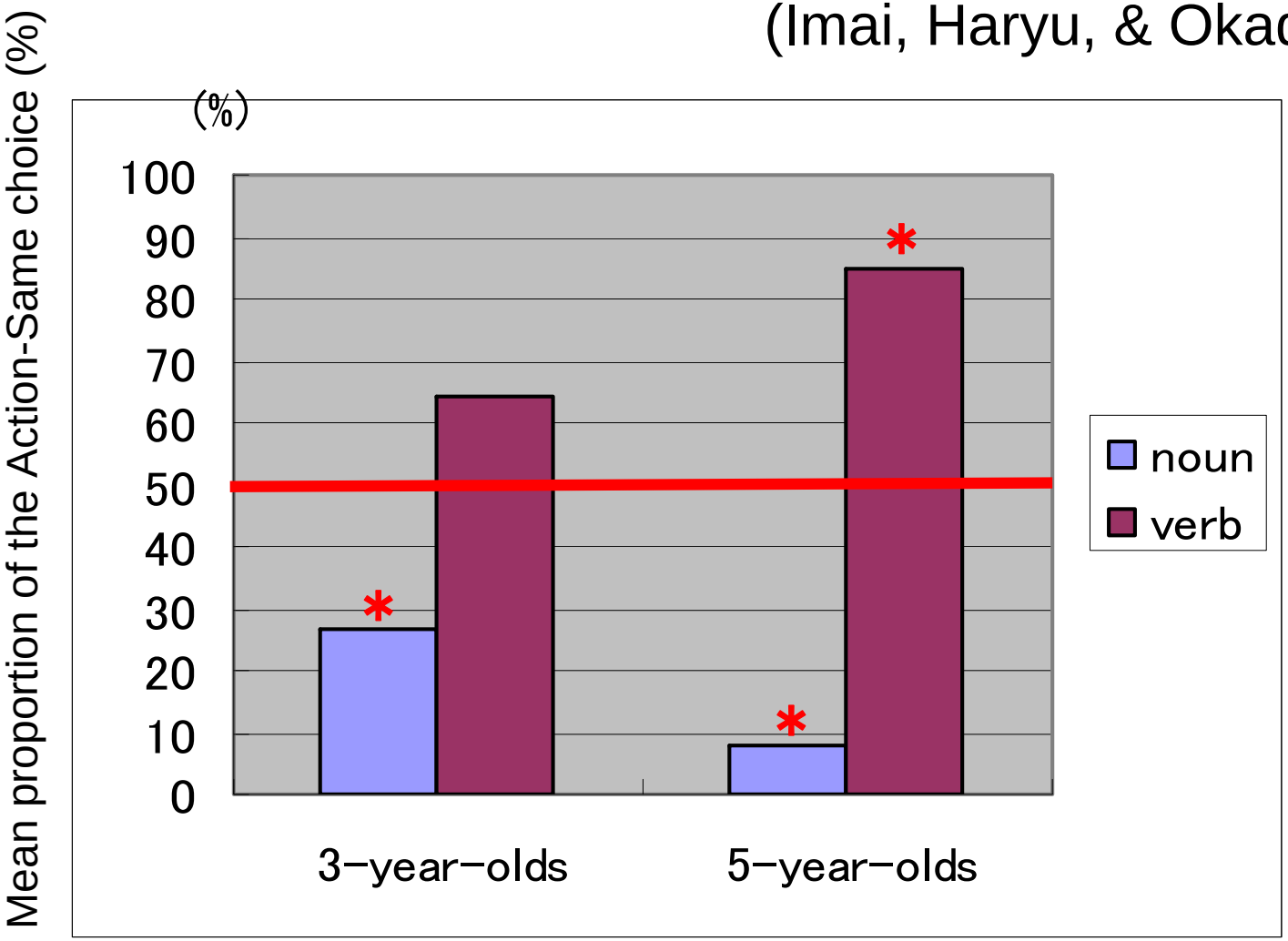
Object-Same-Action-Change scene

Action-Same-Object-Change scene

"*NEKE*- tteiru no ha dochi*?"

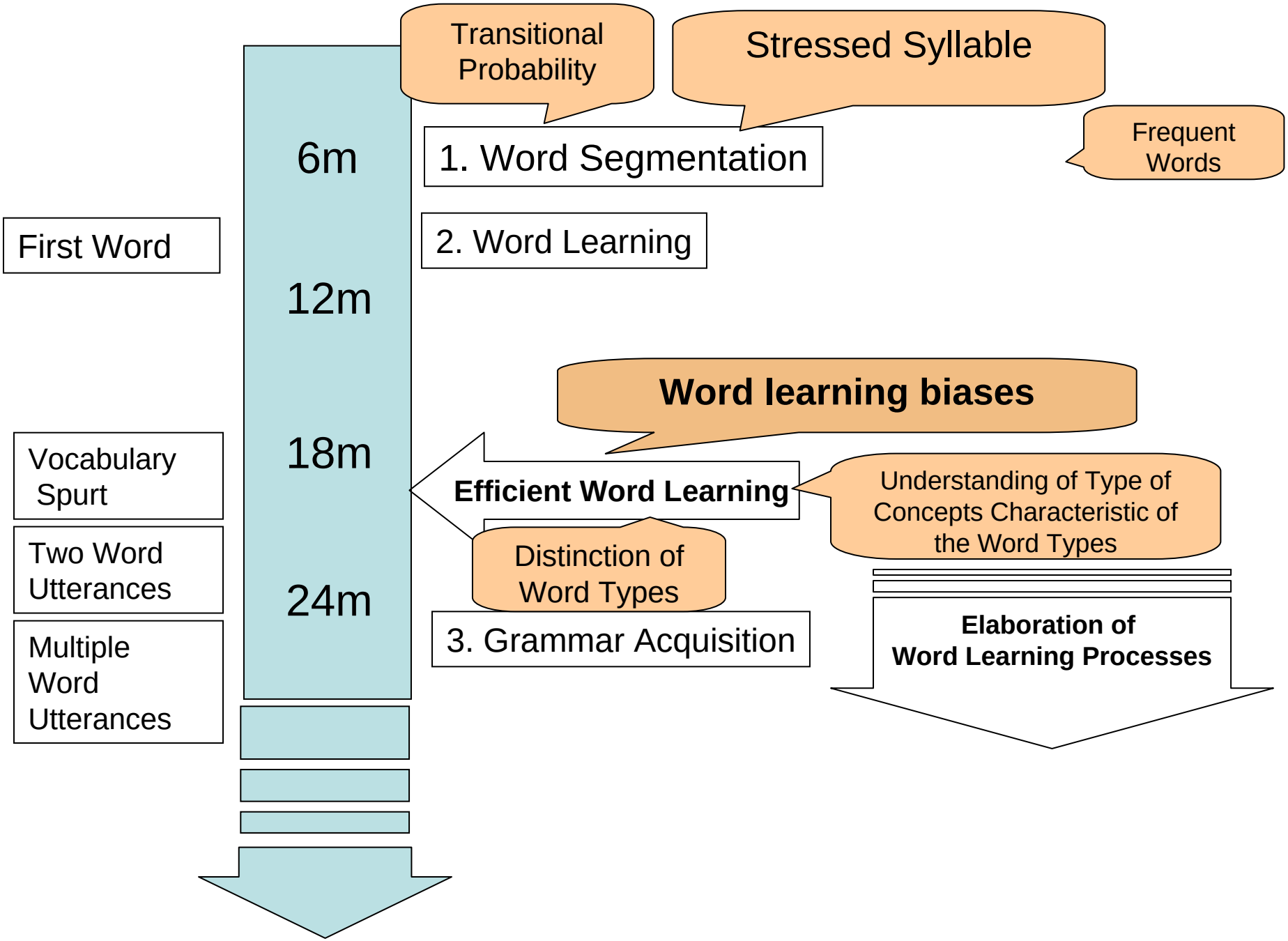
(In which is she NEKE-ing?) 「ネケっているのはどっち？」

(Imai, Haryu, & Okada,2005)



⇒**Distinction of word types**

~~**Mapping to an appropriate concept**~~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Multiple Word Utterances
Elaboration of Word Learning Processes

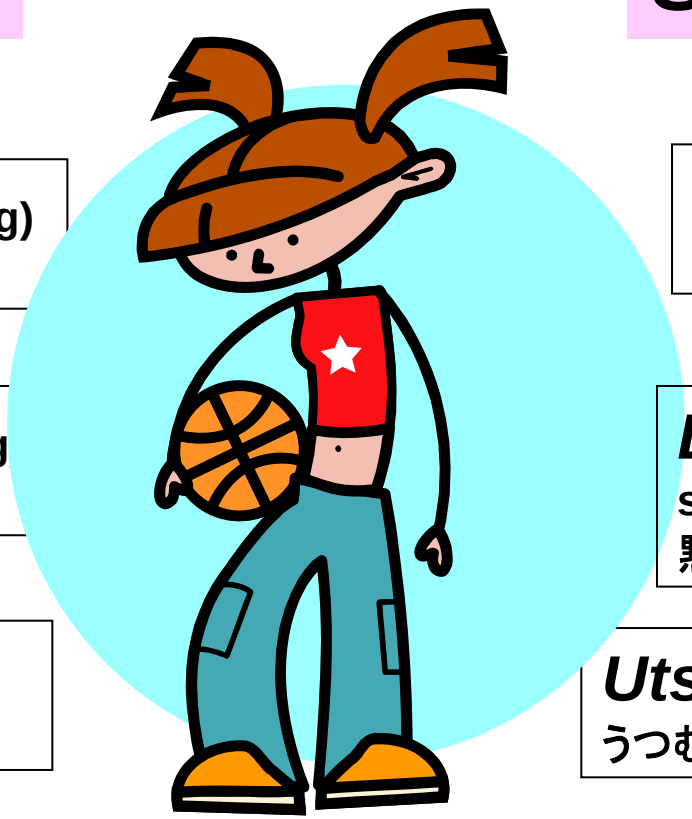
Many verbs can be applied to this scene…

SOV verbs

Mo-tteiru **(gripping)**
持っている

Kakae-teiru **(carrying**
かかえている

Osae-teiru **(holding)**
おさえている



SV verbs

Ta-tteiru **(standing)**
立っている

Dama-tteiru **(staying silent)**
黙っている

Utsumui-teiru **(looking down)**
うつむいている

Fumishime-teiru **(standing firmly)**
ふみしめている

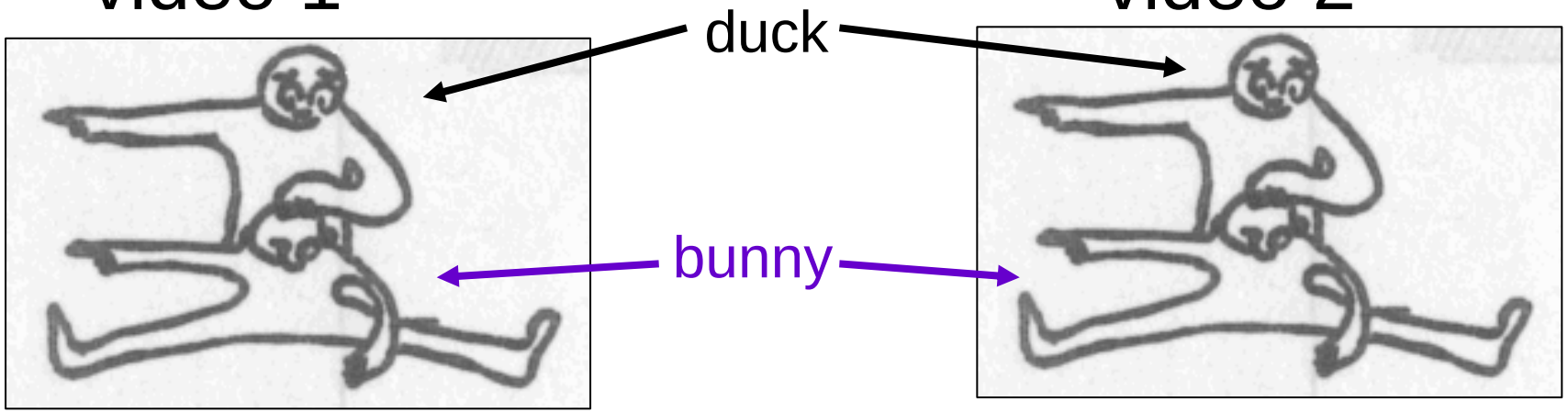
From when are children able to infer the meaning of a novel verb by utilizing the syntactic structures in which the verb appears ?

Do children utilize syntactic structures to figure out the meaning of a novel verb?

(Naigles,1990)

video 1

video 2



Transitive Condition

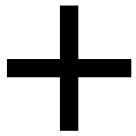
"Look, the duck is *gorping** the bunny!"

* '*gorp*' is a nonsense word that was used to examine children's use of sentence frame in Interpreting a novel verb

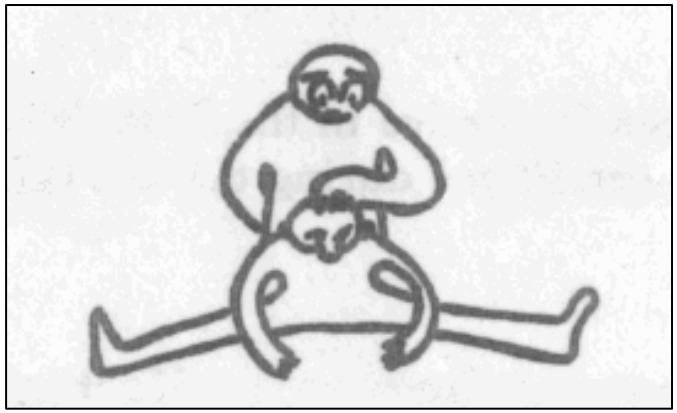
Intransitive Condition

"Look, the duck and the bunny are *gorping*!"

‡ Drawings were borrowed from Naigles et al, "Children Use Syntax to Learn Verb Meanings.", Journal of Child Language (Cambridge University Press), vol.17 No.2 p357-374 (1990)、Fig.2 http://journals.cambridge.org/

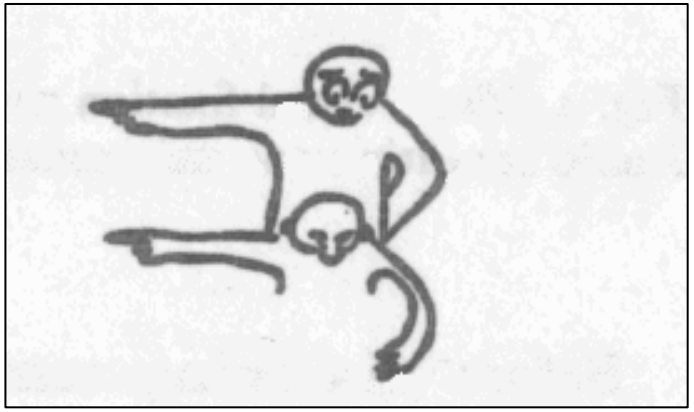


video 1



Causative event

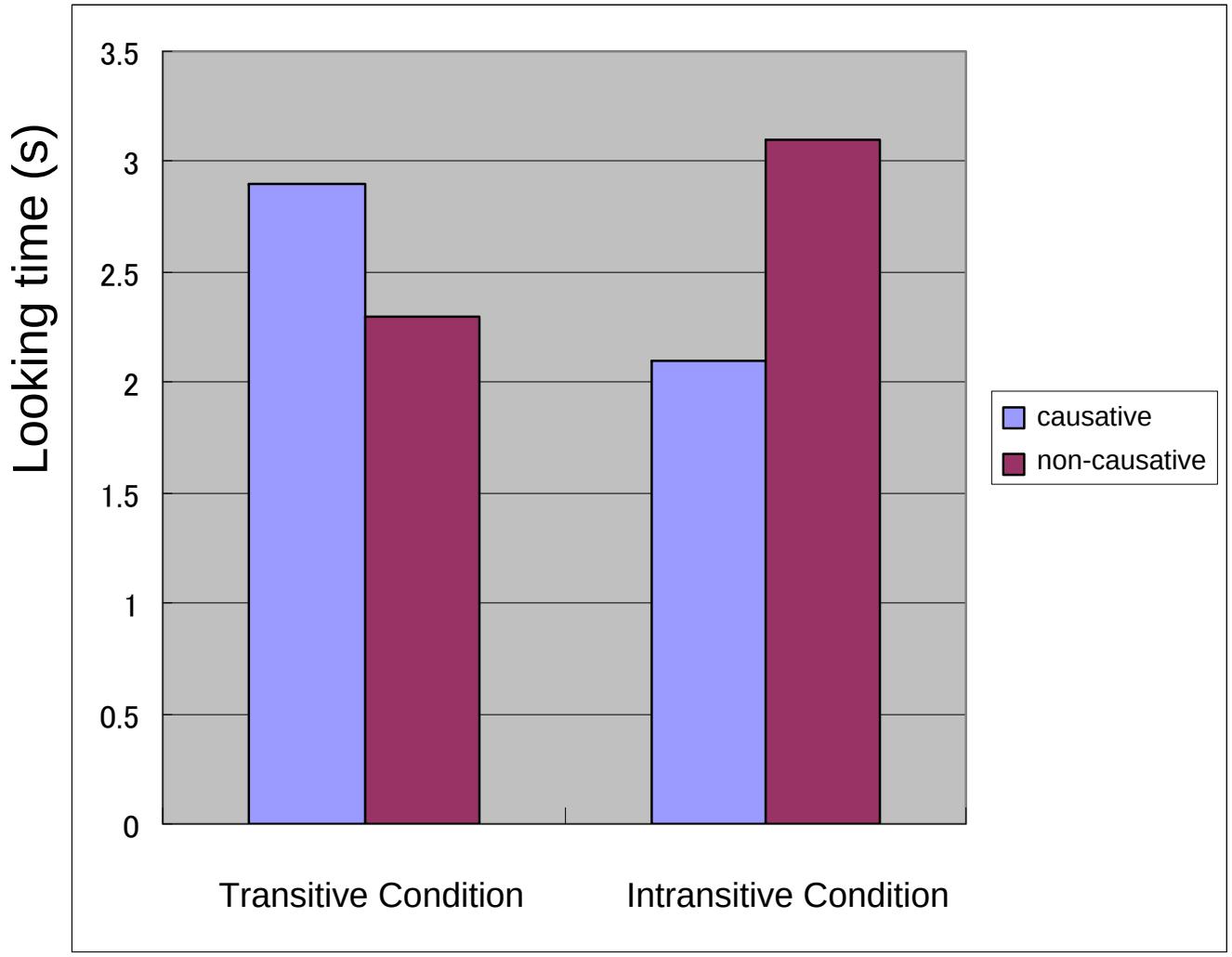
video 2

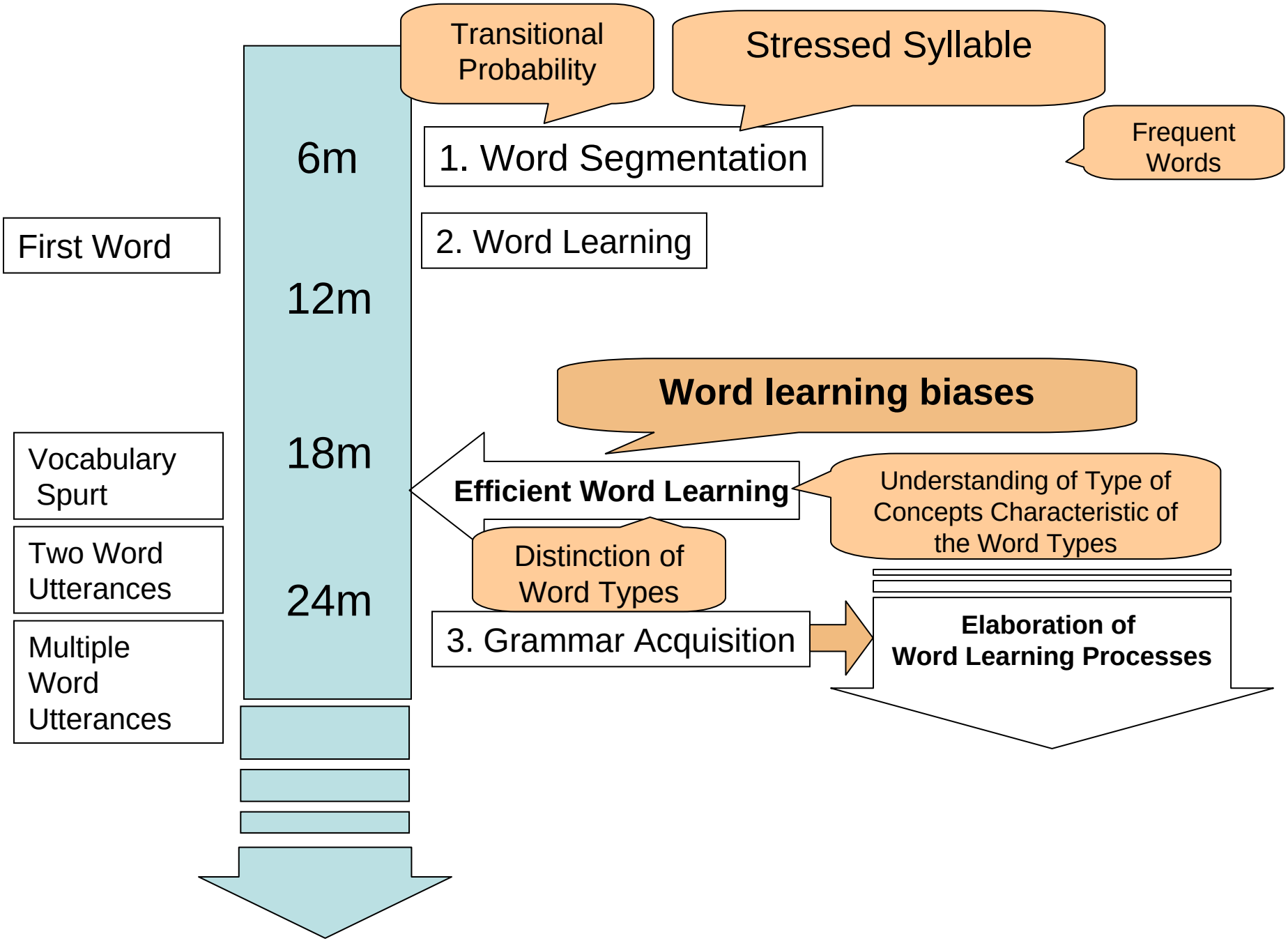


Non-Causative event

Where is *gorping* now?
Find *gorping* !

‡ Drawings were borrowed from Naigles et al, “Children Use Syntax to Learn Verb Meanings.”, Journal of Child Language (Cambridge University Press), vol.17 No.2 p357-374 (1990)、Fig.2
http://journals.cambridge.org/


Looking time (s)
3.5
3
2.5
2
1.5
1
0.5
0
Transitive Condition
Intransitive Condition
causative
non-causative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But…

Japanese language allows ellipsis of arguments.

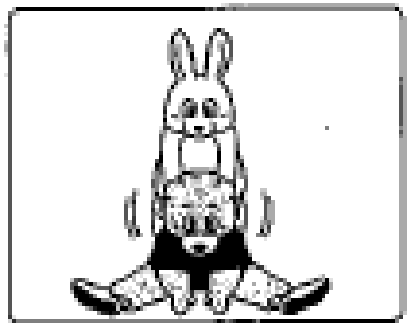
"A, ninjin tabe-teiru ne"
(Ah, ___ eating carrot, is it not)
「あ、にんじん　食べてるね」

"Ahー　usagi san tabe-teiru yo"
(Ah, bunny is eating ___.)
「あー　うさぎさん　食べてるよ」

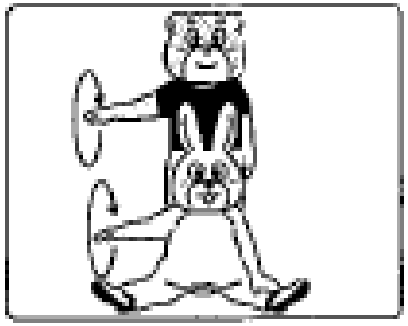
"Ahー　tabe-teiru !"
(Ah, ____ ____ eating!)
「あー　食べてる」

⇒ Do Japanese children also use syntactic structures to infer the meaning of a novel verb?

Do Japanese Children Infer the Meaning of a Novel Verb on the Basis of Sentence Structures ?（Imai・Haryu, 2007)



Causative event



Non-Causative event

Drawing 5.7 Can Japanese children map a novel verb on the basis of syntactic structures of the sentence in which the verb appears ? : Stimulus materials (movies) used in the experiments done with Japanese children. (Imai, Haryu et al., in preparation)

Mutsumi Imai, Etsuko Haryu ‘Construction of the Lexicon: How Children Learn Words and Concepts’（Iwanami 2007）‡

* ‘HEKU’ is a nonsense word in Japanese, which was used to examine whether children were able to infer its meaning, an object label or a verb denoting the action, by attending to the sentence frame in which the word appeared.

Transitive Condition:

「ウサギ（さん）が　クマ（さん）を　ヘクっているのは、どっち？」

“usagi(san) ga kuma(san) o HEKU- teiru no ha, dotchi?”*

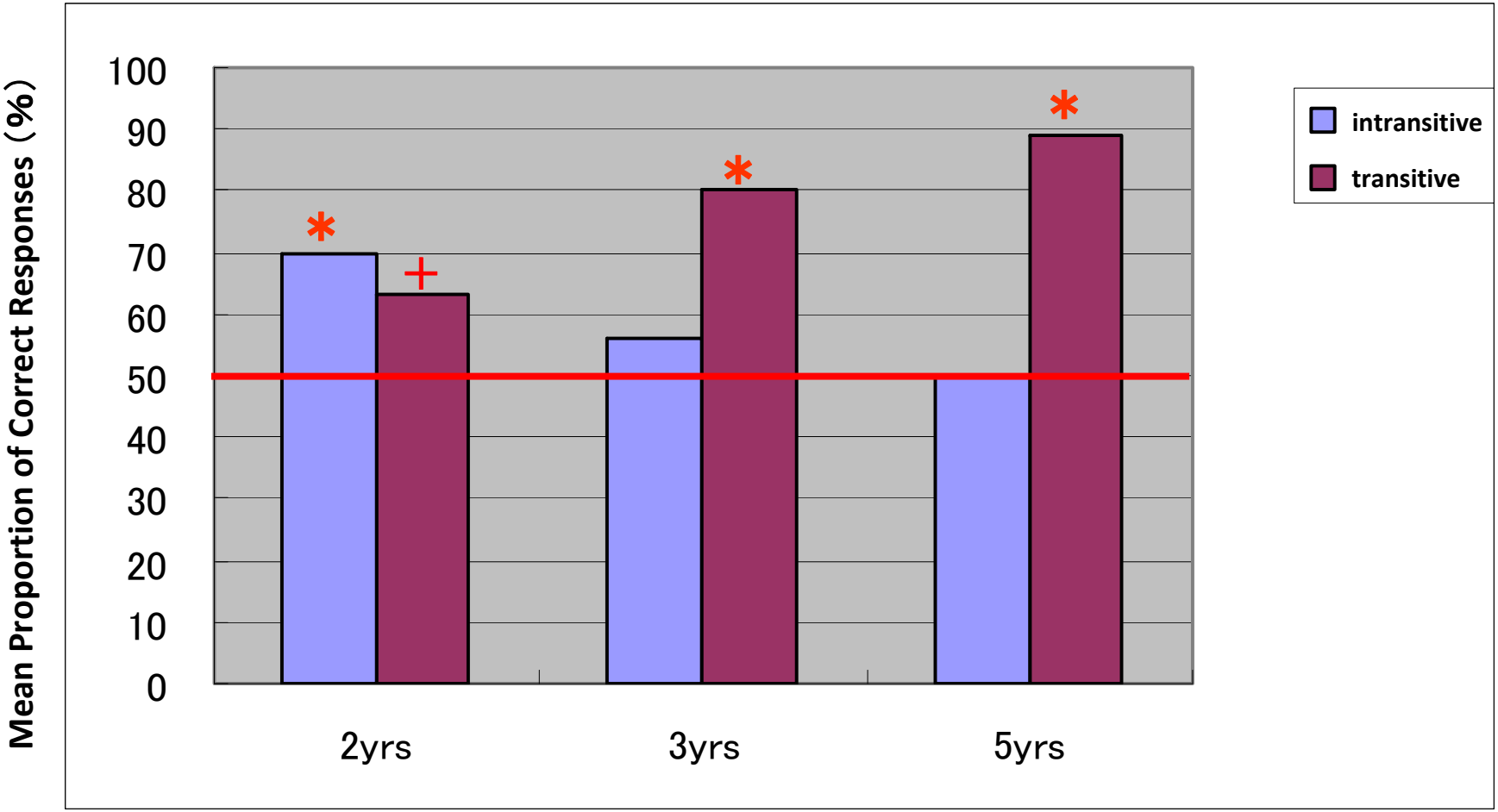
(In which one is the bunny HEKU*-ing the bear?)

Intransitive Condition:

「ウサギ（さん）と　クマ（さん）が　ヘクっているのは、どっち？」

“usagi(san) to kuma(san) ga HEKU-tteiru no ha, dotchi?”*

(In which one are the bunny and the bear HEKU*-ing?)



Correct Responses:

Transitive Condition: Mapping the novel verb to a causative event

Intransitive Condition: Mapping the novel verb to a non-causative event

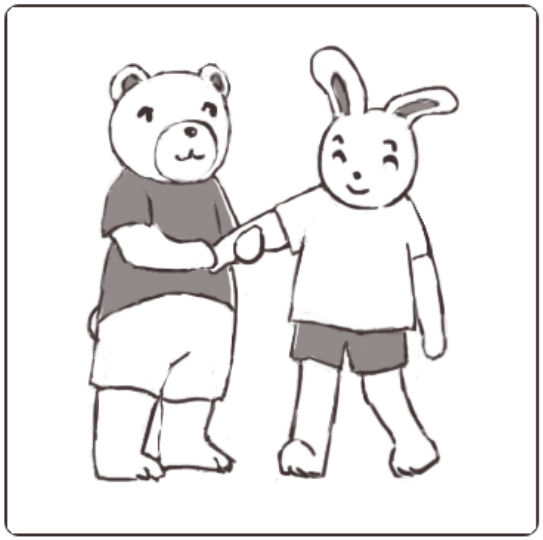
Japanese two-year-olds already know that causative verbs typically appear in transitive frames whereas non-causative verbs are likely to appear in intransitive frames, and utilize this knowledge to learn verbs.

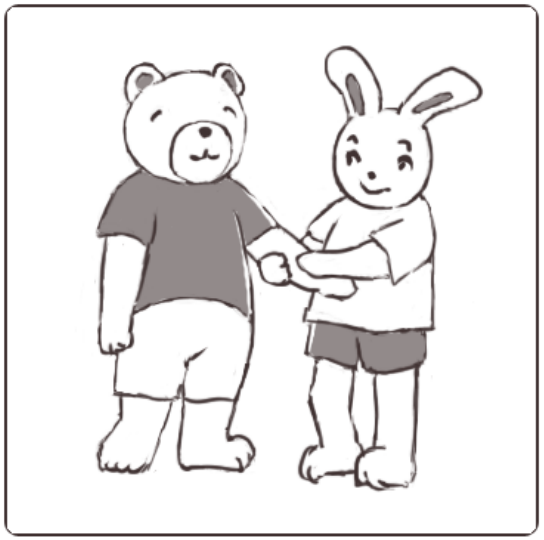
＊＊＊

How do Japanese children determine semantic roles of noun phrases in transitive sentences?

- ○ word order …Subjects are likely to come first.
- ○ Case-marking particles mark the semantic role of the preceding noun-phrase.

⇒The bear pushes the bunny





‘subject＋object’ word order condition
「クマさんが　ウサギさんを　ネケっている　のはどっち？」
‘*kuma san GA usagi san O NEKE*-tteiru no wa dochi*?’
(bear)　　(rabbit)　　(which one)
(In which is the bear NEKE*-ing the rabbit?)

‘object ＋subject’ word order condition
「ウサギさんを　クマさんが　ネケっている のはどっち？」
‘*usagi san O kuma san GA NEKE*-tteiru no ha dochi*?’
(rabbit)　　(bear)　　(which one)
(In which is the bear NEKE*-ing the rabbit?)

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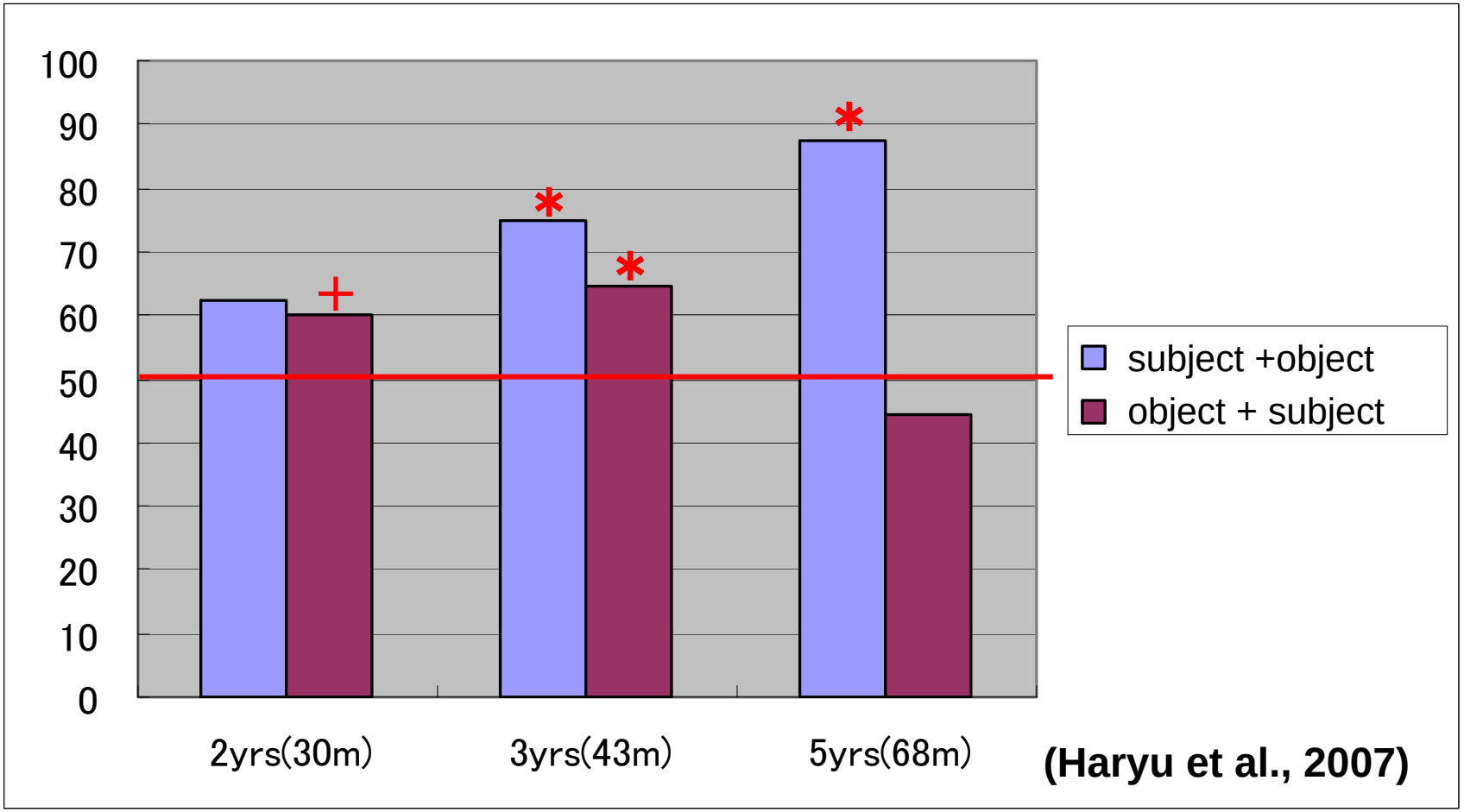
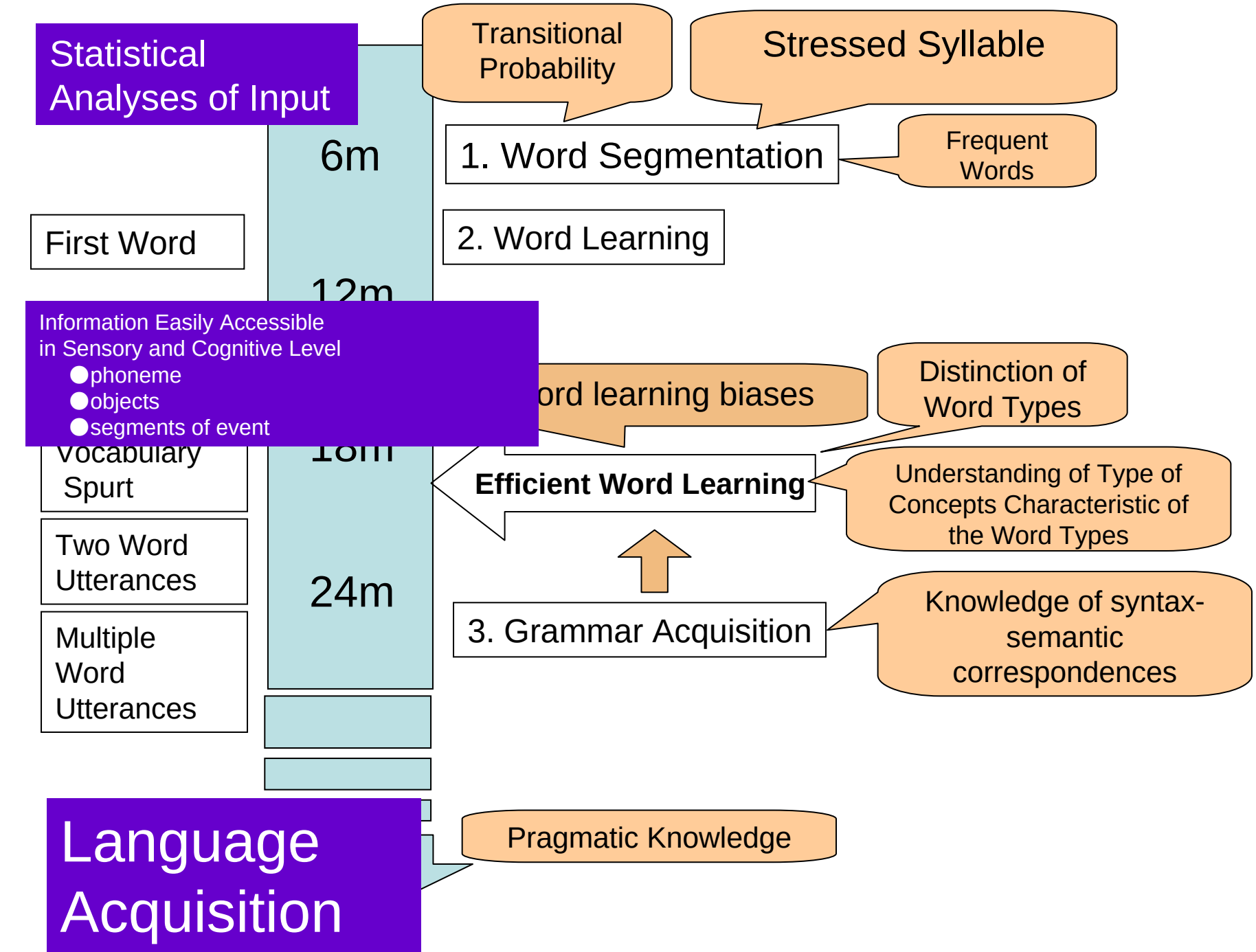


Why do five-year-olds fail to correctly respond to the 'object+subject' sentence whereas three-year-olds succeed?

Pragmatic Knowledge ?


Statistical Analyses of Input
Transitional Probability
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6m
1. Word Segmentation
Frequent Words
First Word
2. Word Learning
12m
Information Easily Accessible in Sensory and Cognitive Level
phoneme
objects
segments of event
ord learning biases
Distinction of Word Types
Vocabulary Spurt
Efficient Word Learning
Understanding of Type of Concepts Characteristic of the Word Types
Two Word Utterances
24m
3. Grammar Acquisition
Knowledge of syntax-semantic correspondences
Multiple Word Utterances
Language Acquisition
Pragmatic Knowledge