

# On the comprehension-production dilemma in child language

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# Abstract

- **Problem:** how to explain that production lags behind comprehension in child language  
two possible answers:
  - something outside of grammar restricts children (eg., insufficient motor control)
  - limitations can be explained by grammar
- This is a **dilemma** because both answers are undesirable
- OT to the rescue

# Issues

Problems with first answer:

something outside of grammar restricts children (eg., insufficient motor control)

- Even if certain words are not produced, they can often be imitated by children
- Some children make systematic errors, eg. saying 'puzzle' for 'puddle' and vice versa
- In general, a solution should explain that children avoid many configurations that are marked across languages

# Issues

Problems with second answer:  
limitations can be explained by grammar

- In most theories this would mean the child has two grammars
- That is bad because it is not parsimonious

# Proposal

A way out, using one **OT grammar**:

- Children have rich (adult-like) underlying forms
  - These facilitate comprehension
  - However, during production these are neutralized to unmarked forms
- The result: a grammar that correctly comprehends but produces [ta] for every input

# Proposal

This seems paradoxical:

- faithful **comprehension** requires high-ranked faithfulness constraints
- massive neutralization in **production** requires low-ranked faithfulness constraints

Resolution: take kinds of competing structures into account

# Proposal

- In **comprehension** all competitors share the same surface form
- In **production** competitors share one underlying form

The result:

- In **comprehension** the surface forms are equally marked, so markedness constraints don't differentiate
- In **production** neutralization can be achieved by ranking faithfulness low

ie., Smolensky's proposal is that in the initial grammar faithfulness constraints are dominated by markedness constraints.

**Tableau 1**

Production: /kæt/ → ?

Candidates			Grammar	
Input	Surface form	Structure	STRUCH: NoCODA, *DORS, ...	FAITH: PARSE, FILL, ...
a. $\sigma$		 $\langle k \text{ æ} \rangle t \boxed{a}$		
/kæt/	[ta]	/k æ t / [ t a ]		*
b.		 $\begin{matrix} \sigma \\ /k \text{ æ} t/ \end{matrix}$		
/kæt/	[kæt]	/k æ t / [ k æ t ]	*!	

Tableau 2

Comprehension: [kæt] → ?

Candidates			Grammar	
Input	Surface form	Structure	STRUCH: NoCODA, *DORS, ...	FAITH: PARSE, FILL, ...
b. ➔		$\begin{array}{c} \sigma \\ \diagup \quad \diagdown \\ k \quad \text{æ} \quad t \end{array}$		
/kæt/	[kæt]	/k æ t/ [ k æ t ]	*	
c.		$\begin{array}{c} \sigma \\ \diagup \quad \diagdown \\ \langle s \rangle k \quad \text{æ} \quad t \langle i \rangle \end{array}$		
/skæti/	[kæt]	/s k æ t i/ [ k æ t ]	*	i*

Vive la différence

Candidates			Grammar		Functions using grammar	
Input	Surface form	Structure	STRUCH: NoCODA, *DORS, ...	FAITH: PARSE, FILL, ...	Production: /kæt/ → ?	Comprehension: [kæt] → ?
a.		$\begin{array}{c} \sigma \\ / \quad \backslash \\ \langle k \ \text{æ} \rangle \quad t \quad \boxed{a} \end{array}$				
/kæt/		/k æ t /		*	→	
	[ta]	[ t a ]				
b.		$\begin{array}{c} \sigma \\ / \quad / \quad \backslash \\ k \ \text{æ} \quad t \end{array}$				
/kæt/		/k æ t /	*!			+æ
	[kæt]	[k æ t]				
c.		$\begin{array}{c} \sigma \\ / \quad / \quad \backslash \\ \langle s \rangle k \ \text{æ} \quad t \quad \langle i \rangle \end{array}$				
/skæti/		/s k æ t i/	*	i*		
	[kæt]	[ k æ t ]				

A stage in the acquisition of *wh*-questions (data from Thornton 1995:140)

Candidates		Grammar				Functions using grammar	
PF	Structure	MINLINK <sup>[-ref]</sup>	*e	MINLINK <sup>[+ref]</sup>	FILL	Production: Index → ?	Comprehension: (adult) PF → ?
<i>who</i> do you think <b>who</b> the cat chased	a. <i>who</i> <sub>1</sub> ... <b>wh</b> <sub>1</sub> ... t <sub>i</sub>				*	⊖	
<i>who</i> do you think the cat chased	b. <i>who</i> <sub>1</sub> ... e <sub>1</sub> ... t <sub>i</sub>		*!				+⊕
	c. <i>who</i> <sub>1</sub> ... ... t <sub>i</sub>	i*!					
<i>which mouse</i> do you think <b>who</b> the cat chased	a'. [which mouse] <sub>i</sub> ... <b>wh</b> <sub>1</sub> ... t <sub>i</sub>				*	⊖	
<i>which mouse</i> do you think the cat chased	b'. [which mouse] <sub>i</sub> ... e <sub>1</sub> ... t <sub>i</sub>		i*!				
	c'. [which mouse] <sub>i</sub> ... ... t <sub>i</sub>			*		⊖	+⊕

## Comments

- Very extreme case, **all** forms are produced as [ta].
- Not clear (to me) if it would work when many forms are produced correctly
- For example, wouldn't it require special constraints for the child that confused 'puddle' and 'puzzle'?
- What if an unfaithful input has to be comprehended? The proposal can't deal with the rad-rat problem! (always comes out faithfully as 'rat')

In general, OT would predict that an improved ranking of constraints produces a general improvement, whereas evidence indicates that children improve selectively (eg., only inflect most frequent verbs correctly)

## Comments

- That children have rich, adult-like underlying structure might be plausible for phonology
- But not for semantics / pragmatics, I think
  - Acquiring the right representations seems the most crucial part of language acquisition
- Two-word stage seems qualitatively different from adult-language
  - Children seem to **gradually** move from concrete experience to abstract usage

But OT would suggest that children are merely fine-tuning their ordering of constraints.

## Comments

My hypothesis:

- In the two-word stage children's meaning representation is limited (limited abstraction)
- The mental **lexicon** is very incomplete, mainly contains content words for objects and actions relevant to the child (toys, food, etc.)
- Utterances are interpreted and produced by extrapolating from previous linguistic experience (exemplars)
- Production can only use words which have already been **abstracted** from experience, whereas comprehension can make use of the whole situation to make an educated guess

## Conclusion

- OT can model a lot of phenomena with little mechanism
- but OT's strong assumptions about representations make the problem of language acquisition too easy → little explanatory power
- The comprehension-production dilemma benefits from being viewed in a broader cognitive perspective