



Production and Comprehension of Subject Pronouns

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Discourse: Adults & Children

Adult speakers & listeners: take partner's perspective into account, cognitively and linguistically.

Young children: *too egocentric* to take partner into account.

Cognitively, they do not pass "Theory of Mind" tests.

Linguistically, their discourse is hard to understand.

Older children: *expected* to take partner into account.

Cognitively, they pass "Theory of Mind" tests.

Linguistically, can they accommodate their partner?

Discourse: Pronouns & NPs

Adult Speakers:

- are economical, they prefer to use pronouns.

But they are also informative towards their listeners

- they linguistically mark topic shifts by using full NPs.

Adult Listeners:

- interpret pronouns as referring to discourse topic.

They expect speakers to use full NPs

- to linguistically mark a derivation from the present topic.

Speaker–listener mismatch - “derailed conversation”

Bidirectional Optimality Theory (1)

(Blutner, 2000; Blutner et al., 2006)

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Formal model

interdependence - of speaker's choice
- on listener's perspective
(and vice versa)

Bidirectionally optimal form-meaning pair

a <form, meaning> pair
- for which there exists
no other bidirectionally optimal pair
with a better form or better meaning

Bidirectional Optimality Theory (2)

Language acquisition:

Speaker/listener learns to find the pair that best satisfies conflicting and hence violable constraints of the grammar.

Two stages:

- (1) achieve adult-like ranking of constraints
- (2) unidirectional to bidirectional optimization of pairs

Topic Shift: Adult Discourse

Adult Bidirectional Optimization:

Speakers are optimally economical & informative to hearers.



Adults

- *produce & comprehend* pronouns
as maintaining an existing topic.
- *produce & comprehend* full NPs
as shifting to a different topic.



Bidirectional Production & Comprehension



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	Avoid NP	Pronouns Refer to Topics
✌ <pronoun, [+topic]>		
<pronoun, [-topic]>		*
<full NP, [+topic]>	*	
✌ <full NP, [-topic]>	*	

Topic Shift: Child Discourse

Children's Unidirectional Optimization:

Prediction - Children are unable to consider the linguistic perspective of a conversational partner.

They are overly economical.



meaning → form



form → meaning

Children predicted to

- *produce* unrecoverable pronouns after topic shift.

- not *comprehend* full NPs as signaling topic shift.

Unidirectional




Production



Input: + <i>topic</i>	Avoid NP	Pronouns Refer to Topics
☞ <pronouns>		
<NP>	*	

Input: - <i>topic</i>	Avoid NP	Pronouns Refer to Topics
☞ <pronouns>		*
<NP>	*	

Unidirectional Comprehension

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Input: <i>pronoun</i>	Avoid NP	Pronouns Refer to Topics
 <i><+ topic></i>		
<i><- topic></i>		*

Input: <i>NP</i>	Avoid NP	Pronouns Refer to Topics
 <i><+ topic></i>		
 <i><- topic></i>		

Three Experiments

Participants:

31 Dutch children (4;3 - 6;5 mean: 5;6 yrs.)

23 Dutch adults (20;7 - 30;9 mean: 24;7 yrs.)

Experiments:

Discourse production

Discourse comprehension

Working memory

Production Experiment

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Materials:

4 picture storybooks:

- all storybooks with topic shift (TS)
- 6 pictures per storybook

Task:

Participants tell a story

Score:

Description of Picture #6 (topic shift)

Type of referring expression in last picture

- *NP*, *Pronoun*, or “Other” response

Production: Picture Storybook



A pirate with the ball



Then he kicks it



Then it is in the water



Then the knight will catch it



And he caught the ball in a net



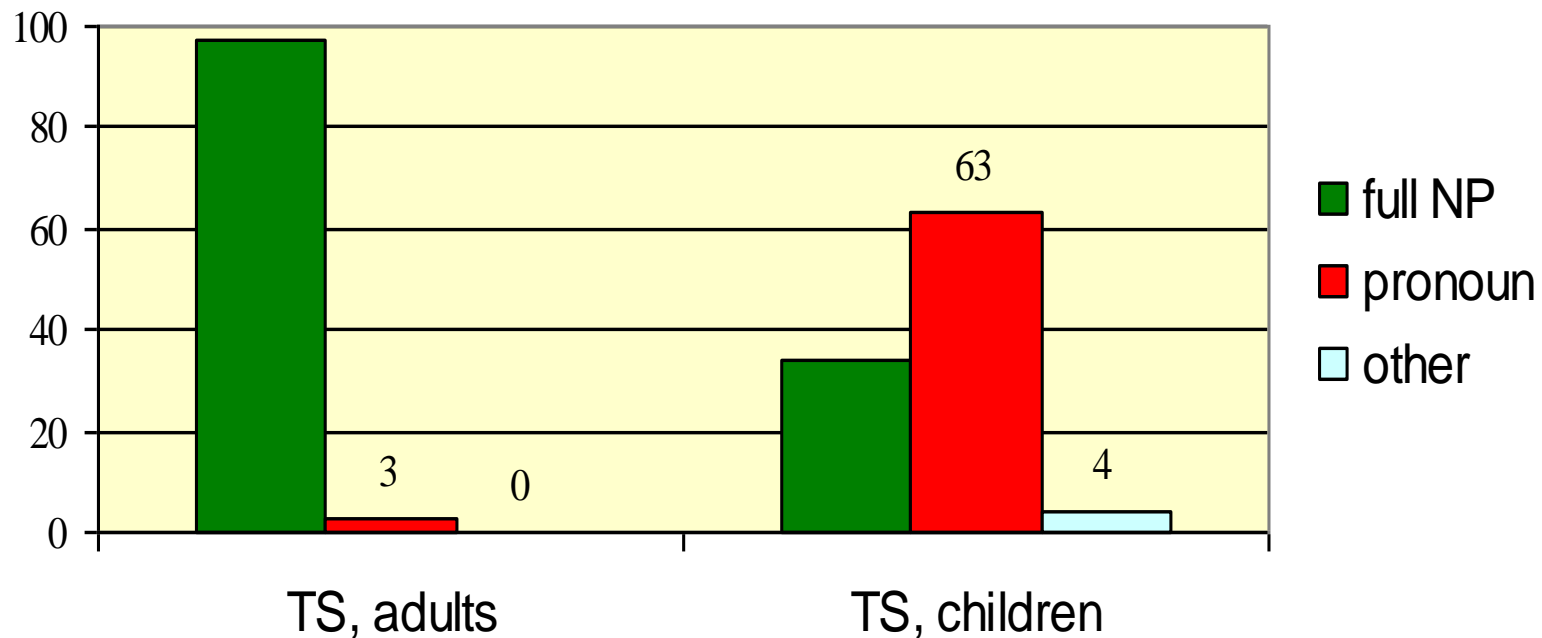
Now **he** has his ball back

Production: Form Results

When re-introducing the 1st character in Picture #6:

Adults use a full noun phrase: *“the pirate”*

Children prefer a pronoun: *“he”*



Comprehension



Experiment

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Materials:

8 recorded stories

- 4 with a topic shift (TS)
- 4 with a continued topic (TC)
 - 6 sentences & 1 final question per story

Task:

Participants listen to story and answer question

Score:

Answer to final question

- 1st Character, 2nd Character, “Other” response

Comprehension: Topic Shift

Topic Shift (TS) example:

1. The *cleaning-lady* wants to go feed the ducks.
2. *She* gets the old bread out of the breadbox.
3. *She* asks a *teacher-lady* to come along.
4. The *teacher-lady* tears the *cleaning-lady*'s bread in pieces.
5. And then the *teacher-lady* gives the *cleaning-lady*'s bread to the ducks.
6. *She* thinks ducks are very sweet little animals.

Question:

Who thinks ducks are very sweet little animals?

Comprehension: Topic Continued

Topic Continued (TC) example:

1. A *clown* has just painted his own face.
2. *He* wants to paint someone else.
3. *He* comes across a *cook* (masc.) in the kitchen.
4. The *clown* decides to paint the *cook*.
5. Then the *clown* paints a real tough face on the *cook*.
6. *He* thinks it turned out great.

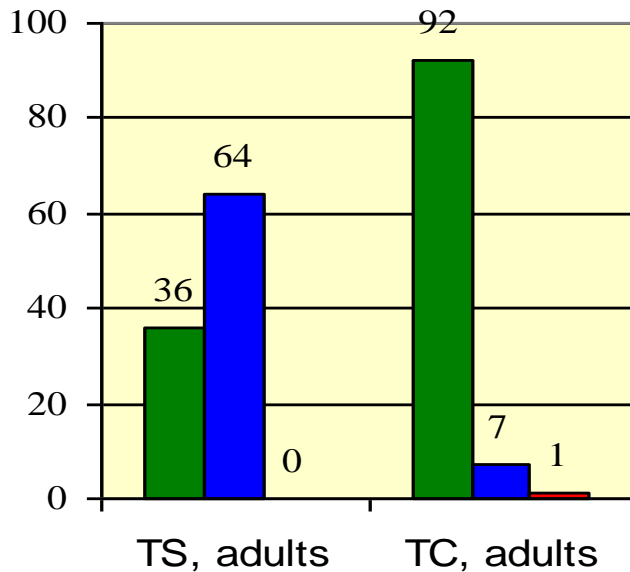
Question:

Who thinks it turned out great?

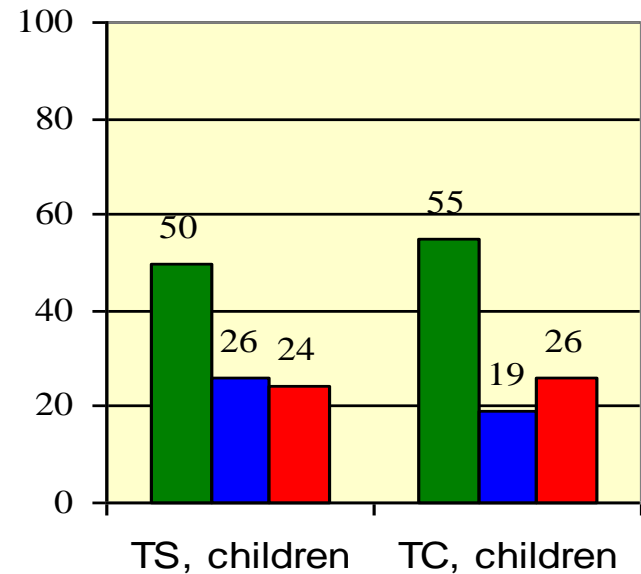
Comprehension: Meaning Results

When answering the final question after Sentence 6:

- Adults say: **2nd character**, in Topic Shift stories
1st character, in Topic Continued stories
- Children say: **1st character**, in both TS and TC stories



■ 1st character
■ 2nd character
■ other



Production & Comprehension

Production & Comprehension Experiments:

- Adults function bidirectionally, as predicted by the Bidirectional Optimality tableau.

- Children function unidirectionally, as predicted by the Unidirectional Optimality tableaux.

Why do the children fail to take their partner's linguistic needs/signals into account?

Memory Experiment

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Materials:

Auditory memory test (Schlichting et. al. 1995)

Sets of one-syllable words

- increasing from 2 to 9 words per list

Task:

Repeat word-lists

bal – koek, muis – boom, bed – kip

Score:

Number of word-lists correctly repeated

Correlation Analyses:

Memory with Age, with Production, with Comprehension

Memory & Age: Correlations

Memory & Age:

(Adults: no correlations)

No correlation with age (4.3 – 6.5 yrs.)

age	score	age	score	age	score	age	score
4;3	6	5;0	6	5;7	10	6;0	9
4;3	4	5;2	10	5;8	10	6;1	8
4;4	6	5;3	4	5;9	8	6;1	9
4;5	9	5;3	10	5;9	4	6;2	10
4;9	8	5;3	8	5;9	10	6;2	9
4;10	10	5;5	6	5;10	8	6;3	7
4;11	10	5;5	7	5;11	7	6;5	10
		5;6	7	5;11	7		
		5;6	4				

Children's scores: mean 7.8; range 4-10

Memory & Language: Correlations

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(Adults: no correlations)

Children's Correlations:

Memory with:	Positive Correlation	Negative Correlation
Production (TS) <i>picture 6:</i> <i>"pirate"</i>	<i>Full NPs</i>	<i>"Other" response</i>
Comprehension (TS)		
Comprehension (TC)		

Memory & Language: Correlations

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(Adults: no correlations)

Children's Correlations:

Memory with:	Positive Correlation	Negative Correlation
Production (TS) <i>picture 6:</i> <i>"pirate"</i>	<i>Full NPs</i>	<i>"Other" response</i>
Comprehension (TS) <i>final question:</i> <i>"teacher-lady"</i>	<i>2nd Character</i>	<i>"Other" response</i>
Comprehension (TC)		

Memory & Language: Correlations

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(Adults: no correlations)

Children's Correlations:

Memory with:	Positive Correlation	Negative Correlation
Production (TS) <i>picture 6:</i> <i>“pirate”</i>	<i>Full NPs</i>	<i>“Other” response</i>
Comprehension (TS) <i>final question:</i> <i>“teacher-lady”</i>	<i>2nd Character</i>	<i>“Other” response</i>
Comprehension (TC) <i>final question:</i> <i>“clown”</i>	<i>1st Character</i>	No

Discourse Reference & Topic Shift

Summary (compared to adults):



Production: Children produce significantly more unrecoverable pronouns at topic shifts.



Comprehension: Children fail to interpret a full NP as topic shift marker.



Memory: Children's use/understanding of NPs vs pronouns at topic shift correlates with higher vs lower memory scores.

Conclusion:

Children fail to optimize bi-directionally in dealing with discourse topic shifts.