

Overview

We tested how preschool children use inter-sentential cues to resolve an ambiguous pronoun's referent.

In a series of short stories, we varied:

- 1) Whether or not the topic switches from the first sentence to the probe sentence;
- 2) Whether verb aspect is perfective or imperfective, and
- 3) Whether the last mentioned character is the same as the current topic.

Children also completed a test of cognitive flexibility. Cognitive flexibility is thought to be important to children's early language (MacWhinney, 1987).

Children reliably disambiguated pronoun referent using verb aspect in isolation, but not when there were multiple cues to a pronoun referent. This poor group performance masked individual differences: performance on some, but not all, measures of cognitive flexibility predicted individual differences in pronoun interpretation.

Background: Cognitive Flexibility

Cognitive flexibility is the dynamic ability to modify representation or plans, based on changing information in the environment.

- ❖ There are large age differences in flexibility from 3 to 5 years
- ❖ There are large individual differences in children's cognitive flexibility.
- ❖ Pronoun resolution requires cue-based updating of understanding during discourse. This updating entails cognitive flexibility. Therefore, flexibility might relate to resolution.

Cognitive flexibility is often assumed to be a product of separate cognitive functions:

- a) Inhibition: Children are slow to inhibit prepotent responses (Diamond et al, 2005)
- b) Children show large differences in processing speed. (Cepeda et. al, 2001)
- ❖ Does cognitive flexibility predict children's use of multiple cues to resolve ambiguous pronouns? Which cues do children use?

Method

Participants: N = 27 Four year olds

Procedures:

- ❖ **Control Tests:** PPVT III-A, Woodcock-Johnson, Non-word repetition
- ❖ **Flexibility and Executive Function Tests:** [SEE FIGURES]
 - a) Task-switching: Sort cards by color or shape.
 - b) Inhibition: Go-No-Go test.
 - c) Processing speed: fill in as many boxes as possible in one minute.
- ❖ **Ambiguous Pronouns Test** [SEE BELOW]
 - Cues can interact or conflict in resolving ambiguous pronouns.
 - 40 5-sentence stories, each with either:
 - a) **Topic switch** or no switch: before probe (5th) sentence.
 - b) First or second **character named**: in 4th sentence.
 - c) Perfective or imperfective **aspect**: in probe sentence.

Results and Conclusions

Results:

Last-Mention Cue:

- ❖ Children did not use last-mention to identify a pronoun referent inter-sententially. (We collapsed across last mention condition in further analyses).

Aspect Cue:

- ❖ Children use verb aspect to identify a pronoun referent intersententially.
 - a) Children preferred **first** character as pronoun referent if verb was **completed**.
 - b) Children preferred **second** character if verb was **progressive**. (Switched the pronoun referent in response to aspect cue.)

Aspect x Topic Switch Interaction:

- ❖ When an additional cue (topic switch) was available, children showed no character-assignment preference *overall*.
- ❖ **HOWEVER:** This condition shows two distinct choice patterns:
 - a) *Flexible* children (who made few task-switch errors) preferred the **first** character in this instance. Like adults!
 - b) *Inflexible* children (many task-switch errors) preferred the **second** character.

Background: Pronoun Interpretation

Multiple cues are available for resolving pronoun reference across sentences.

- ❖ **Topic:** Adults and children prefer for a pronoun to refer to the ongoing topic. (Song and Fisher, 2005)
- ❖ **Last-mention:** Children tend to perseverate on the last mentioned character, even when there are strong competing cues. (Arnold, 1998)
- ❖ **Aspect:** Adults prefer Source over Goal continuation when verb is imperfective (progressive) (Rohde et. al 2006). For example:

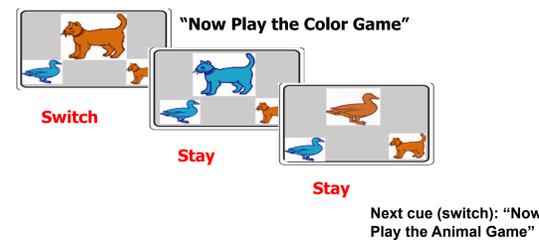
"John handed a book to Bob. **He** ____"
= 51% John

"John was handing a book to Bob. **He** ____"
= 70% John

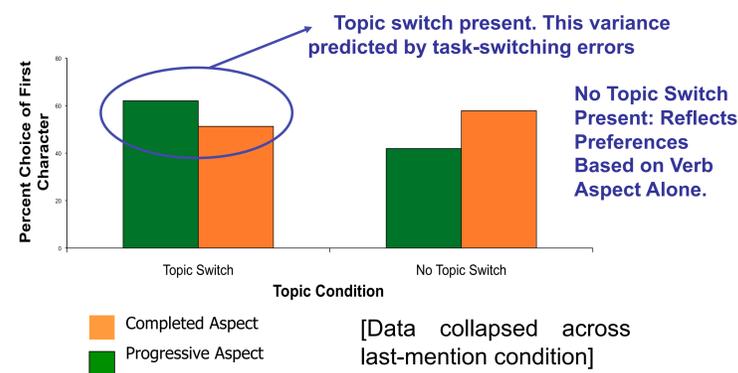
Aspect x Last-Mention x Topic Switch

	Here's Susie and here's Angelica. Susie wanted to play volleyball. She met Angelica at the beach.
w/ Topic Switch:	[Angelica threw a ball to her.]
No Topic Switch:	[Susie threw a ball to her.] She fell .
	Here's Susie, and here's Angelica. Susie wanted to play volleyball. She met Angelica at the beach.
w/ Topic Switch:	[Angelica threw a ball to Susie .]
No Topic Switch:	[Susie threw a ball to Angelica .] She fell .
	Here's Susie and here's Angelica. Susie wanted to play volleyball. She met Angelica at the beach.
w/ Topic Switch:	[Angelica threw a ball to her.]
No Topic Switch:	[Susie threw a ball to her.] She was falling .
	Here's Susie and here's Angelica. Susie wanted to play volleyball. She met Angelica at the beach.
w/ Topic Switch:	[Angelica threw a ball to Susie .]
No Topic Switch:	[Susie threw a ball to Angelica .] She was falling .

Flexibility: Task-Switching Test



Aspect x Topic Switch Choice Data



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EXAMPLES

New Topic, Completed Aspect

Susie wanted to play volleyball.
She met Angelica at the park.
Angelica threw a ball to **her**.
She **fell**.
Flexible switchers prefer Susie. **(Like Adults!)**
Inflexible switchers prefer Angelica.

New Topic, Progressive Aspect

Susie wanted to play volleyball.
She met Angelica at the park.
Angelica threw a ball to **her**.
She **was falling**.
Flexible switchers prefer Angelica. **(Like Adults!)**
Inflexible switchers prefer Susie.

Conclusions

- ❖ Cognitive flexibility is important for children's developing inter-sentential pronoun resolution.
 - a) Does not determine which children can use individual cues in isolation.
 - b) Instead, determines how efficiently children can process multiple, potentially conflicting cues in ongoing discourse.