Complement Control in Early Child Mandarin: Evidence from a Preferential Looking Experiment

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Introduction

Complement control
- **Subject control:** $Mary_i$ wants [PRO_i to learn French].
- **Object control:** Mary asks $John_i$ [PRO_i to learn French].

To select the right controller of PRO, children should know:
- The lexical properties associated with control verbs
- The co-referential relation between the controller and PRO

> **The Generalized Control Rule (GCR)** (Huang, 1984, 1989): An empty pronoun is coindexed with the closest nominal element in the phrase-structure tree.

Children's interpretation (McDaniel et al. 1990/1991; Cairns et al., 1994):
- Subject control: allowing PRO to be co-referenced with
  - √ the matrix subject
  - ✕ a sentence-external referent
- Object control: allowing PRO to be co-referenced with
  - √ the matrix object
  - ✕ the matrix subject
  - ✕ a sentence-external referent

The linear order strategy (Hsu, 1981; Hsu et al., 1985)
- Children initially use linear strategies to interpret control, i.e., consistently choosing either the first noun of the sentence or the noun adjacent to the control complement as the controller of PRO.

The hierarchical structure strategy (Sherman & Lust, 1986, 1993; Landau & Thornton, 2011)
- Children have continuous knowledge of the structural constraints such as GCR on the interpretation of control.

Properties of complement control in Mandarin
- Following GCR in controller choice in the non-linear syntactic tree
- Lack of overt morphological markers
- Covert object control
  e.g. *Zhangshan   jinzhi e_i [PRO_i wan   youxi].*
       Zhangsan   prohibit   play   game
       'Zhangsan prohibits (someone) from playing games.'

Acquisition of complement control in Mandarin

Yang and Yang (2015): Production of control in 2-year-olds:
- Producing more subject control than object control
- Differentiating control structures from serial verb constructions (SVCs) or coordinate constructions

Yang (2014): comprehension of control in 3-to-5-year-olds :
- Allowing a sentence-external referent for subject control
- Accepting both subject & sentence-external referents for overt object control with *rang* 'let' & covert object control with *bu-rang* 'not let'

> **A *pro* analysis of PRO** (Yang, 2014): Mandarin-speaking children initially misanalyze PRO as *pro*.

Research questions

How do 2-year-old Mandarin-learning children comprehend complement control?
- Do children distinguish between subject control vs. object control?
- Do children identify the right controller of PRO in subject control, covert object control and overt object control in accordance with GCR?

Method

Task: Intermodal Preferential Looking Paradigm (IPLP)
Participants: 32 Mandarin-learning 24-to-26-month-olds (mean age: 2;1;7)

Test stimuli: 6 training trials;
    12 test trials (3 sentences ✕ 4 structure types in the form of two minimal pairs)

The NVV form	
Subject control *xiang* 'want'	**Covert object control *rang* 'let'**
$Xiaotu_i$ xiang [PRO_i chi-fan]. Little Rabbit want eat-meal 'Little Rabbit wants to eat a meal.'	*Xiaotu rang e_i [PRO_i chi-fan].* Little Rabbit let eat-meal 'Little Rabbit lets (Little Goat) eat a meal.'

The NVNV form	
Benefactive *gei* 'for'	**Overt object control *jiao* 'ask'**
Xiaogou gei Xiaohou kai-men. Little Dog for Little Monkey open-door 'Little Dog opens the door for Little Monkey.'	*Xiaogou jiao $Xiaohou_i$ [PRO_i kai-men].* Little Dog ask Little Monkey open-door 'Little Dog asks Little Monkey to open the door.'

Design:

Visual	Audio	Visual
(Blankness)	*$Xiaotu_i$ xiang [PRO_i chi-fan].* 'Little Rabbit wants to eat a meal.'	(Blankness)
(Blankness)	*Shei chi-fan a?* 'Who eats a meal?'	(Blankness)
	(Silence) 3.6s	

> **A methodological innovation :** Children's success in the training trials show that presenting only the pictures of the potential controllers in the test sentence rather than video clips or pictures of events is a successful new way to study children's knowledge of verb arguments and verb structures.

Analysis & Predictions

- Comparing children's proportion of looking to the matrix subject in two minimal pairs

Minimal pairs	Predictions	Hierarchical structure strategy	Linear order strategy
Subject control vs. Covert object control		Significant difference	No difference
Gei 'for' structure vs. Overt object control		Significant difference	No difference

- Comparing children's proportion of looking to target of each structure type with chance level 0.5

Structures	Predictions	Targets	Proportion of looking to target
Subject control		Matrix subject	Above chance
Covert object control		External referent	Above chance
Gei 'for' structure		Matrix subject	Above chance
Overt object control		Matrix object	Above chance

Results

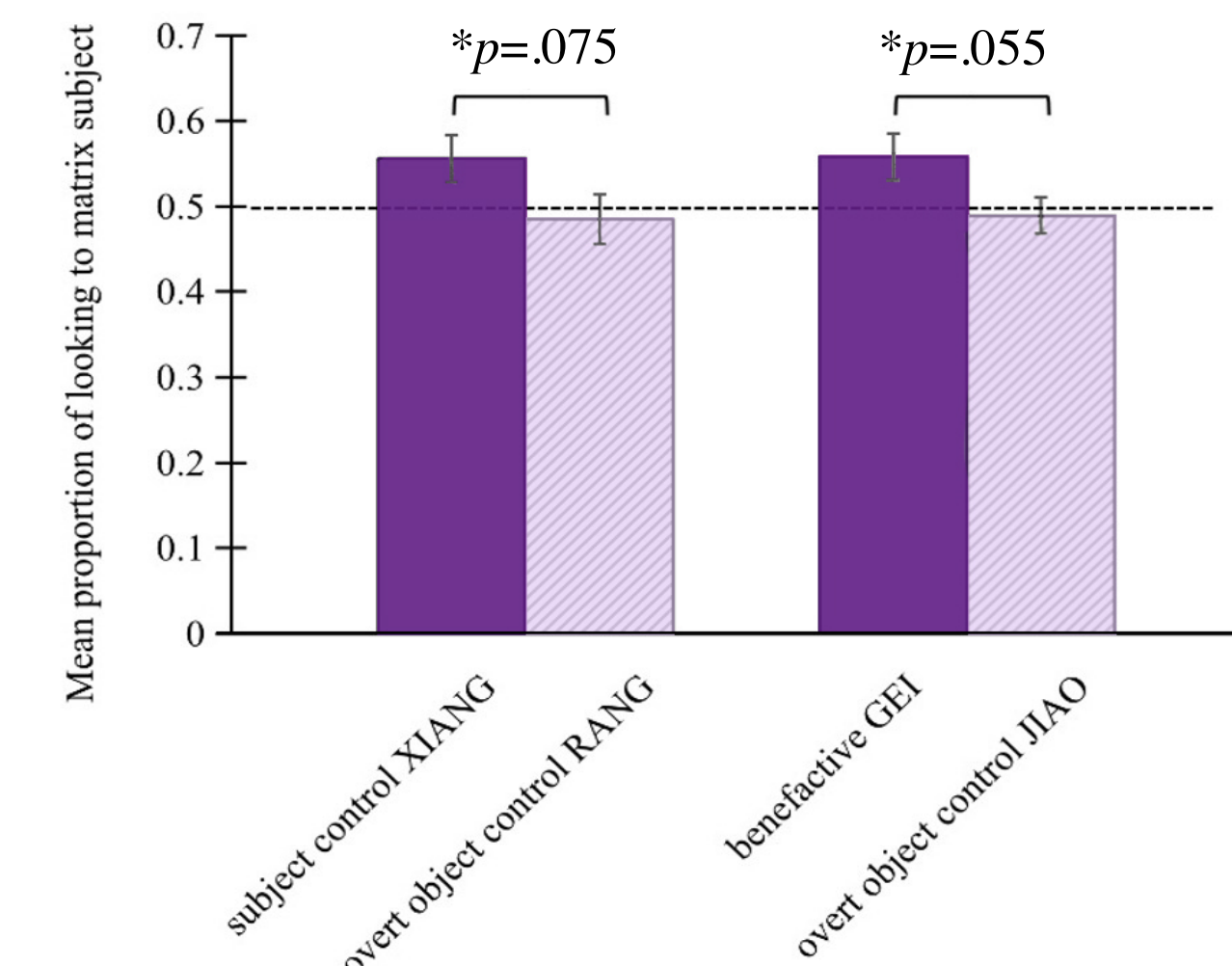
Comparison of structures within each minimal pair

Figure 1. Mean proportion of looking to matrix subject in two minimal pairs

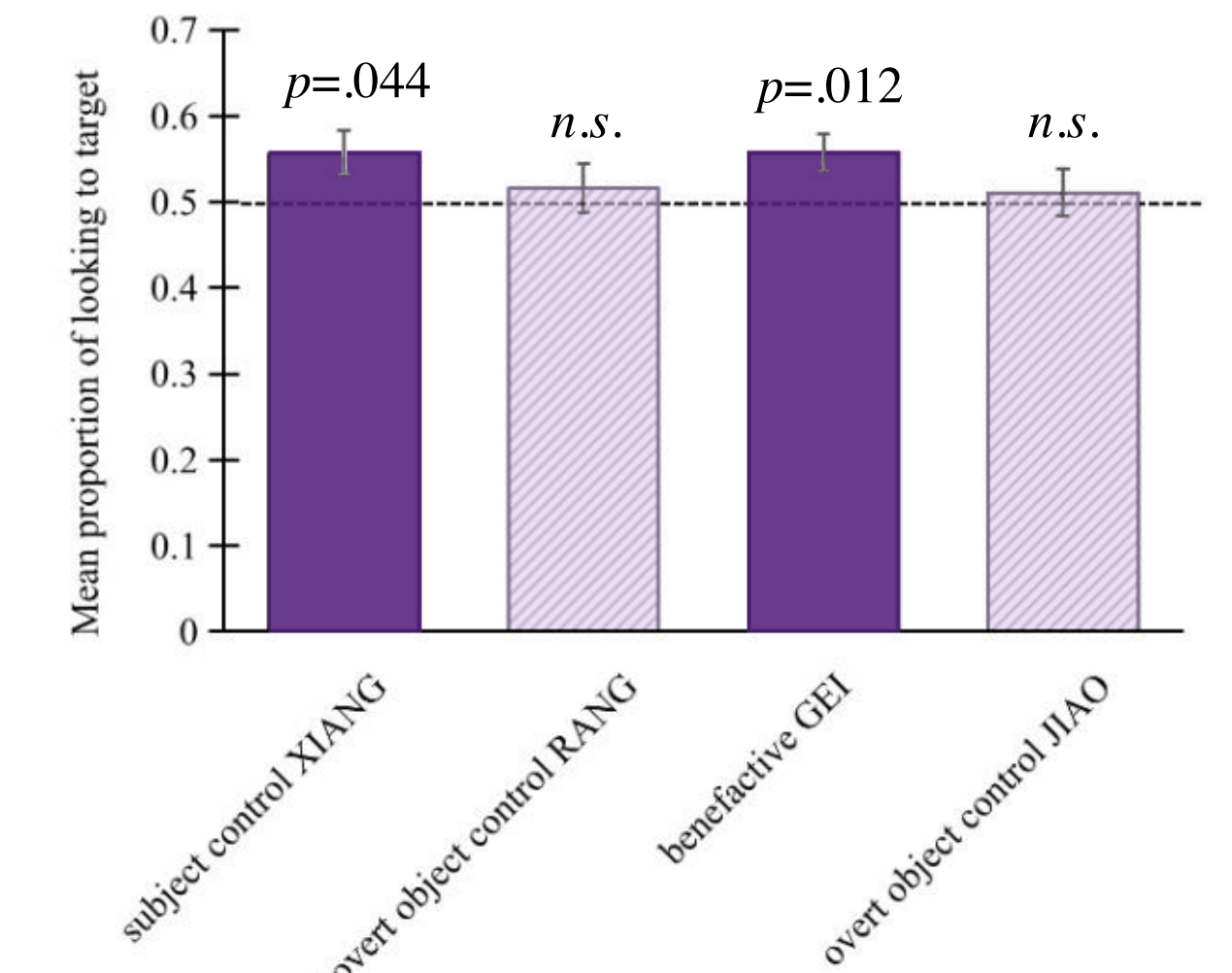Proportion of looking to target in each sentence structure

Figure 2. Mean proportion of looking to target in each sentence structure

Discussion

How do 2-year-old Mandarin-learning children comprehend complement control?
- Sensitivity to the structural distinctions between different types of complement control; better comprehension of subject control than object control.
- Children are not driven by the identical linear surface form of each contrasting pair of structures. Instead, they demonstrate awareness of the hierarchical structure of the sentences by selecting the controller of PRO in accordance with the Generalized Control Rule (GCR), though they are still working on object control at this age.

What account for Mandarin-learning children's non-adult-like interpretations of control?
- Our results are consistent with Yang's (2014) *pro* analysis of PRO.
- Children are aware of PRO and the structural constraints on the interpretation of PRO. However, as *pro*-drop is characteristic of Mandarin and is acquired early, young children may misanalyze PRO as *pro*. Since the referent of *pro* can be identified by sentence-internal NPs and the discourse topic, children may allow *pro* to be co-referential with the matrix subject, the matrix object, or a sentence-external referent.

Why do children comprehend subject control better than object control?
- To fully acquire control, children must integrate structural knowledge of control with lexical knowledge of control verbs; such an integration of different modules takes time.
- Subject control verbs (such as *xiang* 'want') is more frequent than object control verbs such as *rang* 'let' and *jiao* 'ask' in children's input.

Conclusions

The results of this study support:
- the continuity view of control representation during language acquisition;
- hierarchical structural dependence in toddlers, consistent with recent findings in European-language-learning toddlers (Shi, Legrand & Brandenberger, 2020).

Acknowledgments

References

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