Acquisition of Recursion in Child Mandarin

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Introduction

- **Recursion**

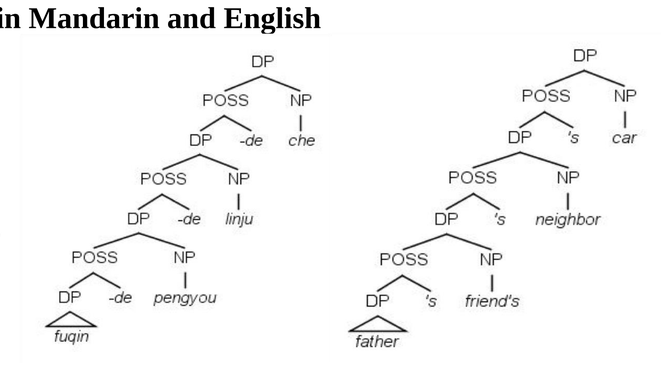
– Core of the language faculty (Hauser, Chomsky, & Fitch, 2002).
– Cross-linguistic differences in the forms of recursion (Snyder & Roeper, 2004).
e.g. father's friend's car / car of friend of father vs.
fuqin de pengyou de che
father GEN friend GEN car
father's friend's car

- **Acquisition of recursion in English, Romanian, Dutch & Japanese**

– Children successfully interpret recursion involving possessives, PPs, and RCs around age 6 (e.g., Limbach & Adone, 2010; Pérez-Leroux et al., 2012; Sevcenco et al., 2015).
– 3-to-4-year-old children tend to interpret recursion as conjunction -> Hypothesis: Conjunction is the acquisition default of recursion (e.g., Roeper, 2011).
– Younger children also tend to drop embedded DPs (Limbach & Adone, 2010).
– Cross-linguistic studies are needed.

- **Recursive possessives in Mandarin and English**

– Multi-level recursion
– Left branching
– Explicit marker *–de* and *'s*



- **Acquisition studies in Mandarin**

– Four-year-olds can understand and produce two-level recursive possessives in a Truth Value Judgment task (Giblin, Shi, Zhou, Bill, & Crain, 2018).
– But three-level is critical: Ambiguity
e.g. Bloomingdale's men's clothing = men's clothing available at Bloomingdale
OR clothing belonging to Bloomingdale's man (POSS)

- **Present study**

– How do Mandarin-speaking children interpret one- to three-level recursive possessives?
– Is conjunction the acquisition default for recursive possessives in Mandarin?

Methods

- **Participants:** Thirty Mandarin-speaking children from two age groups (4-year-olds: N = 10, M = 4;0, range = 3;4 – 4;3; 6-year-olds: N = 20, M = 5;11, range = 5;4 – 6;4).

- **Familiarization phase**

– Children were shown pictures depicting possessive relations on iPad (Figure 1).
– Experimenter described the relations with recursive possessives; children repeated.

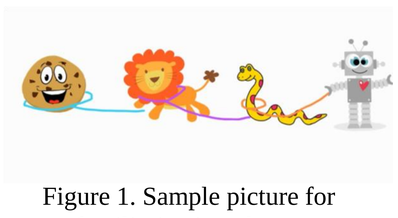


Figure 1. Sample picture for familiarization phase

Experimenter's description of Figure 1: "Look! There is a robot. The robot has a snake. So this is the robot's snake. The snake has a lion. So this is the robot's snake's lion. The lion has a cookie. So this is the robot's snake's lion's cookie."

- **Test Phase: Act-out task**

– Children were shown with pictures of possessive relations similar to those in familiarization phase on iPad (Figure 2), and were instructed to give an object to one character according to the recursive possessive they heard.
– 12 test items in total: 2 one-level, 5 two-level, 5 three-level.

Object Possessive relations

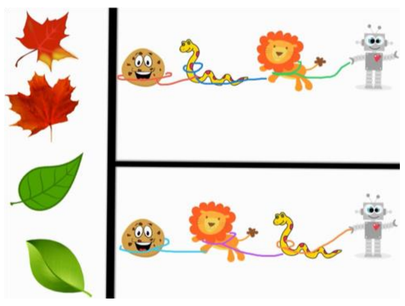


Figure 2. Sample picture for test phase

Test items for Figure 2:
a. one-level possessive:
she-de shizi
snake-GEN lion
snake's lion
b. two-level possessive:
jiqiren-de shizi-de she
robot-GEN lion-GEN snake
robot's lion's snake
c. three-level possessive:
jiqiren-de she-de shizi-de binggan
robot-GEN snake-GEN lion-GEN cookie
robot's snake's lion's cookie

Results

Table 1. Percentage of types of answers

Participant group	Recursion level	Recursion (correct)	Conjunction (errors)	Reduction (errors)	Other errors
4-yrs	1	75%	5%	10%	10%
	2	54%	12%	26%	9%
	3	46%	14%	30%	10%
	All	64.17%	11.67%	25%	9.17%
6-yrs	1	80%	0	17.5%	2.5%
	2	76%	9%	11%	4%
	3	72%	16%	4%	6%
	All	75%	10.42%	9.17%	5.42%

Coding:
Test item – snake's lion's cookie

Conjunction – snake's lion and cookie;
Reduction – snake's lions

- **Interpretation of recursive possessives**

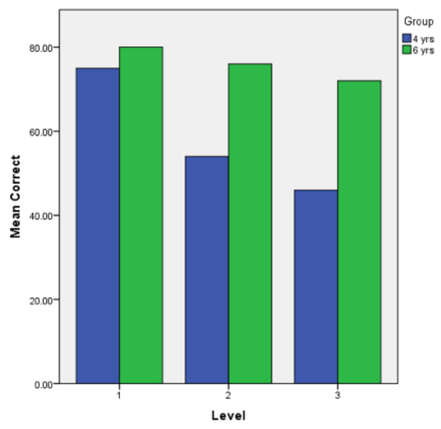
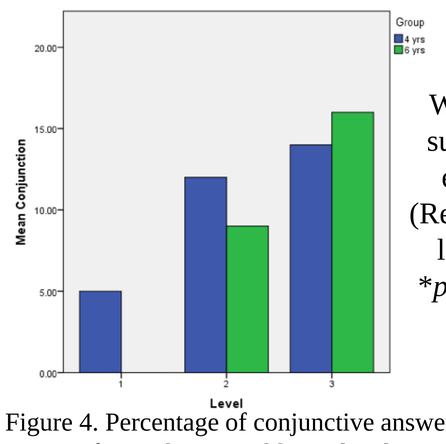


Figure 3. Percentage of recursive (correct) answers of 4- and 6-year olds per level

Between-subjects effect (Age): p = .125

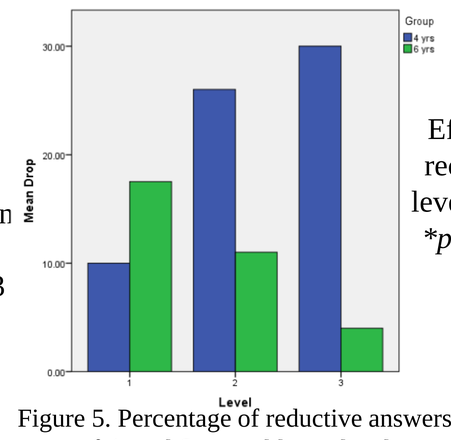
Within-subjects effect (Recursion level): *p = .023

- **Conjunctive and reductive answers**



Within-subjects effect (Recursion level): *p = .013

Figure 4. Percentage of conjunctive answers of 4- and 6-year olds per level



Effect of recursion level * age: *p = .011

Figure 5. Percentage of reductive answers of 4- and 6-year olds per level

- **Earlier acquisition in Mandarin than in English**

– Gentile (2003): 4-year-olds' 2-level conjunctive rate: 30% (vs. 12%)
– Limbach & Adone (2010): 6-year-olds' 2-level recursive, conjunctive, and reductive rate: 59%, 15%, 22% (vs. 76%, 9%, 11%)

Discussion & Conclusion

– Children of both age groups demonstrated comprehension of recursive possessives. But they still had difficulty with interpretation, and the higher the recursion level, the greater difficulty they had.
– Children avoided recursion by interpreting it as conjunction or by dropping one or more embedded DPs. Younger children were especially inclined to drop DPs.
– The reduction – conjunction – recursion pattern might be a universal path for the acquisition of recursive possessives.
– The differences in parametrically dominant branching direction between English (right) and Chinese (left) may play a role in causing the English/Chinese variation in the point of acquisition (Pérez-Leroux et al., 2012).
– Future research can examine children's interpretation of other recursive structures and also investigate production.

Selected References

- Limbach, M., & Adone, D. (2010). Language acquisition of recursive possessives in English. *Proceedings of the 34th annual Boston University Conference on Language Development, 34,* 281-290.
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