Mandarin-speaking children's understanding of *you* 'again' with goal-PPs*

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Abstract

Like the adverb 'again' in many other languages, Mandarin *you* displays the repetitive/restitutive ambiguity when it modifies a goal-PP (e.g., 'walk to the village'). This paper presents an experimental study which examined 4- and 5-year-old Mandarin-learning children's comprehension of *you* with goal-PPs. The results show that children performed well on the repetitive and restitutive readings, supporting a structural account that would predict no delay in the acquisition of the restitutive reading.

1 Introduction

In many languages, the adverb 'again' exhibits what is called the repetitive/restitutive ambiguity when it modifies a change-of-state predicate, cf. [11, 12, 2]. The difference between these two readings lies in the presupposition: the repetitive reading presupposes a prior event of the same kind, whereas the restitutive reading only presupposes that the result state of the event held before. Here we will focus on the case of goal-PP constructions (by which we mean the combination of a manner-of-motion verb with a PP indicating location/path), as illustrated in (1).

(1) John walked to the village again.
    a. *repetitive*: John had walked to the village before.
    b. *restitutive*: John had been at the village before (e.g., he was born at the village).

Prior research found good performance on restitutive *again* with English goal-PPs by age 4-5, despite extreme scarcity of direct evidence [15]: In a sample of more than 100,000 child-directed utterances, unambiguously restitutive uses of *again* with goal-PPs were entirely absent. The authors proposed English-learning children deduce the restitutive reading from the syntax of English goal-PPs and a basic, repetitive meaning for *again*.

In this study we investigate Mandarin-learning preschoolers' understanding of *you* 'again' with goal-PPs. Like English *again*, *you* permits both repetitive and restitutive readings (2).

(2) Zhangsan you zou dao le na-ge cunzi.
    Zhangsan again walk arrive Asp that-CL village
    'Zhangsan walked to the village again.'   (✓repetitive, ✓restitutive)

Yet, *you* also differs from *again*: (i) *you* always precedes the predicate; and (ii) alongside repetition and restitution it permits temporal continuation (3a), addition (3b), and rhetorical readings (3c).

(3)   a.   Ta xi-wan   yifu   you qu zuo fan.
             He wash-finish clothes YOU go cook meal
             'He did the laundry, and then cooked meals.'
    b.   Ta congming you qinfen.
             He clever   YOU hard-working
             'He's clever and hard-working.'
    c.   Ta you bu shi laohu, bu yong pa   ta.
             He YOU not be tiger   not need afraid him
             'He's not a tiger. You need not be afraid of him.'

Given that *you* is polysemous and precedes the predicate, it is less clear how its restitutive interpretation is derived and how it is acquired, as will be discussed in Section 2. Acquisitional evidence may provide a way to judge whether *you* is comparable to English *again*. To assess whether Mandarin-learning children understand restitutive readings with goal-PPs by age 4-5, as was found for English, we conducted a comprehension study and found no delay. We discuss the implications for possible sources of *you*'s repetitive/restitutive ambiguity.

2   Background and motivation

Many researchers argue that the repetitive/restitutive ambiguity of 'again' is structural [11, 12, 2]: There is only one 'again', which triggers the presupposition indicated in (4). The repetitive/restitutive readings differ in where *again* adjoins in syntax, as illustrated in (5).[1] Such a structural analysis correctly predicts that when English *again* is preverbal, there is only a repetitive reading (6).

(4)   Let P be a property of eventualities and let e be an eventuality.
       $[[again]](P)(e)$ is defined only if $\exists e'[P(e') = 1 \& e' < e]$.
       Where defined, $[[again]](P)(e) = 1$ iff $P(e) = 1$.   (adapted from [12])

(5)   a.   John walked to the village again.
    b.   [[John$_1$ [walked [PRO$_1$ to the village]]] again]   repetitive
    c.   [John$_1$ [walked [[PRO$_1$ to the village] again]]]   restitutive

(6)   John again walked to the village.   (✓repetitive, *restitutive)

In Mandarin, since *you* always precedes the predicate, the structural analysis predicts that it should only have a repetitive reading. This prediction is not borne out, as the restitutive interpretation is also allowed (2). Yet, [8, 9, 13, 14] propose that a structural analysis can be maintained: *you* can be generated low, move to a pre-verbal surface position, and later reconstruct. In other words, (2) may be interpreted with multiple scope choices (7): It receives a repetitive reading when it is base-adjoined to the whole proposition (7a), and a restitutive reading when it is base-adjoined to a result-denoting constituent (7b).

(7)   a.   [again [Zhangsan$_1$ [walk [PRO$_1$ to that village]]]]   repetitive
    b.   [again$_2$ [Zhangsan$_1$ [walk [t$_2$ [PRO$_1$ to that village]]]]]   restitutive

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[1][3],[1] treat *to* as synonymous with *at*.

This analysis means learners with knowledge of the repetitive reading will get the restitutive reading for free, as soon as they know both (i) the syntax of goal-PPs and (ii) the syntax of movement and reconstruction for *you*. If children acquire these key characteristics (the nature of goal-PPs and pre-verbal adverbs) prior to repetitive '*you*', we expect simultaneous mastery of repetitive and restitutive *you*. In contrast, an account attributing *you*'s restitutive reading to the existence of a specifically restitutive denotation (à la [6, 10]) would require the learner to rely on direct evidence: uses of *you* in unambiguously restitutive contexts. Given that repetitive *you* undoubtedly occurs more frequently than restitutive *you* in child-directed Mandarin, repetitive *you* should be acquired prior to restitutive *you*. This leads us to ask: Do children understand restitutive *you* as well as they do repetitive *you*?

3 Experiment

3.1 Participants

Participants included 65 Mandarin-learning children from age 3;05 to 5;11 (12 3-year-olds, 38 4-year-olds and 15 5-year-olds, mean age: 4;07) in Beijing, China, who were brought to the lab by their parents and tested individually. We also tested 16 native-speaker adult controls.

3.2 Method and materials

Participants watched a series of stories alongside a puppet who sometimes did not pay attention. The stories were told by the experimenter through cartoon pictures presented in PowerPoint on a laptop. At the end of each story, a puppet popped up on the computer screen and uttered a sentence as a description of what happened in the story, and the participant was asked whether the puppet 'got it right'. If a child participant rejected the test sentence, he/she was asked a follow-up question like, "Why do you think the puppet didn't get it right"? (3) is a sample restitutive item.

(8)   *Experimenter*: This is a story about a baby lizard and a baby snail. The lizard hatches under a rock, and the snail is born by a river. The lizard stays under the rock for a while. Then he starts to feel thirsty. So he crawls away from the rock to the river, and gets some water. There he meets the snail. Soon the sun comes out. Feeling hot, the lizard wants to go back under the rock to enjoy the cool shade. He asks his new friend to join him. The snail is sleepy, but decides to follow the lizard and crawls under the rock. Both of them like the cool shade very much, and decide to stay under the rock for a long rest.
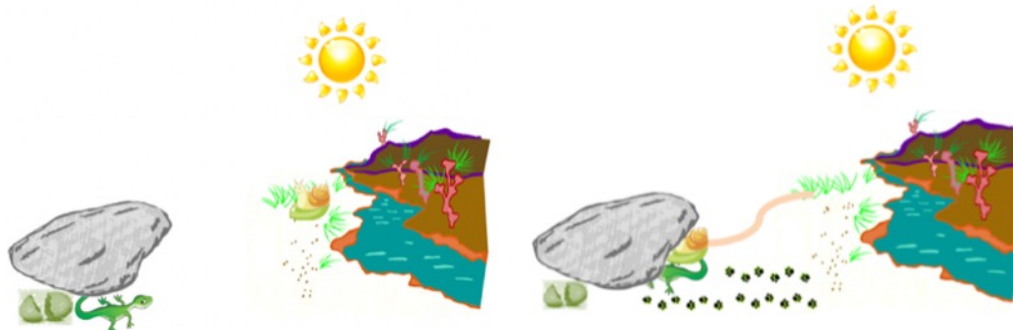
First slide of the story   Last slide of the story

> *Puppet*: I know what happened in the story...
> a. Xiyi   you   pa-dao   le   shitou-xia. (Match)
>   lizard again crawl-arrive Asp stone-under
>   The lizard crawled under the rock again.
> b. Woniu you   pa-dao   le   shitou-xia. (Mismatch)
>   snail   again crawl-arrive Asp stone-under
>   The snail crawled under the rock again.

In the story above, the lizard was born under the rock, and thus satisfied the presupposition of restitutive *you* (i.e., the lizard was under the rock before). The other character, the snail, was born near a river and thus did not satisfy the presupposition. There are two possible test sentences for each story: a match sentence such as (8a) and a mismatch one such as (8b). Each participant heard only one test sentence for each story.

We used a 2×2 design: For the story, we manipulated the CONTEXT (2 levels: repetitive and restitutive); for puppet's utterance, we manipulated the TARGET RESPONSE (2 levels: match and mismatch). Participants received 4 trials under each condition. They also received 8 plain goal-PP items, 2 training items and 8 filler items, for a total of 34 items. The goal-PP items and 'again'-items involved the following 8 combinations of manner-of-motion verb and location/path P: *zou-jin* 'walk into', *fei-jin* 'fly into', *tiao-jin* 'jump into', *pao-jin* 'run into', *you-dao* 'swim to', *hua-dao* 'slide to', *piao-dao* 'float to', *pa-dao* 'crawl under'.

4   Results

Of the 65 child participants, 7 children were first excluded from data analysis for low performance ($< 75\%$ accuracy) on goal-PP items (n=1) or filler items (n=6). We then excluded data from 23 children who constantly accepted all the *you*-sentences (acceptance rate $\geq 14/16$), as if they were ignoring *you*. Finally, we excluded data from one child who constantly rejected the test sentences (rejection rate $\geq 14/16$) based on her wrong explanations for why the puppet was wrong (e.g., 'because the lizard wasn't the only one who crawled under the rock'). The explanations suggested the child was both ignoring *you* and calculating an ad-hoc implicature of uniqueness. Our data analysis focused on the remaining 34 children (5 3-year-olds, 22 4-year-olds, 7 5-year-olds, age range: 3;08-5;08; mean: 4;07).

Adults' and the remaining children's acceptance rates are in Figure 1. As expected, for both the repetitive and restitutive stories, the adults overwhelmingly accepted the match items and rejected the mismatch items. Children's performance was highly similar to the adults'.

We fitted mixed effects logistic regression models to the adults data, the child data, and the combined data, with participants' response (1=accept, 0=reject) as the dependent variable, and the intercepts for participants and items as random effects. For the adult model, fixed factors included CONTEXT (repetitive vs. restitutive), TARGET RESPONSE (match vs. mismatch), and their interaction. The model revealed a significant effect of TARGET RESPONSE ($\beta = -10.34$, $p < .001$), but no effect of CONTEXT ($\beta = -1.68$, $p = 0.128$) and no interaction between TARGET RESPONSE and CONTEXT ($\beta = 1.66$, $p = .231$). We fitted models to the child data and compared models with and without CONTEXT, TARGET RESPONSE, AGE (in years as a continuous variable), and their higher order interactions. Model comparison showed no significant improvement in the model's fit when AGE and its interaction with other fixed factors were included; AGE was therefore excluded from the model. The final child model revealed a significant effect of TARGET RESPONSE ($\beta = -2.93$, $p < .001$), but no significant effect of CONTEXT ($\beta = 0.008$, $p = .983$) and no interaction between TARGET RESPONSE and CONTEXT ($\beta = 0.202$, $p = .695$). These results
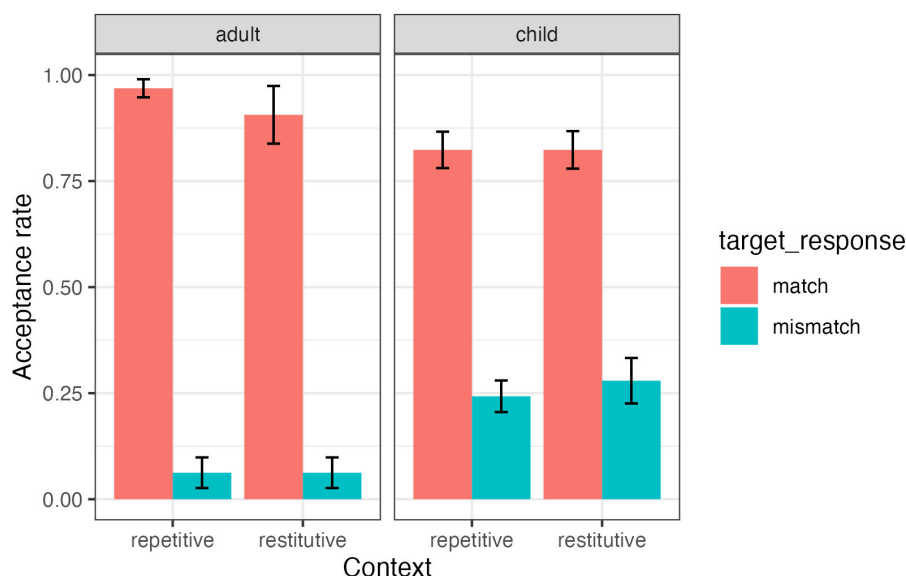
Figure 1: Acceptance rate of adult and child participants. (Error bars indicate standard error.)

suggest that both adults and children distinguished match from mismatch items regardless of the context. For the model fitted on the combined data, fixed factors included CONTEXT, TARGET RESPONSE and PARTICIPANT GROUP (child vs. adult). The model revealed a significant effect of TARGET RESPONSE ($\beta = -2.93$, $p < .001$), PARTICIPANT GROUP ($\beta = -2.12$, $p < .01$), and their interaction ($\beta = 3.89$, $p < .001$). All other p's $> .05$ NS. The results suggest that both groups made a distinction between match and mismatch items, although adults distinguished match and mismatch items to a greater extent than children.

5   Discussion

5.1   On how Mandarin-learning children acquire restitutive *you*

Our experimental results show that Mandarin-learning 4- and 5-year-olds show good performance on both repetitive and restitutive *you* with goal-PPs. This has implications for developing a theory of how children acquire the restitutive reading of *you*.

In Section 2, we discussed how structural and lexical analyses of the repetitive/restitutive ambiguity of *you* make different predictions for children's acquisition process. A lexical analysis would require the learner to rely on direct evidence: uses of *you* in unambiguously restitutive contexts. Currently we are examining the parental input of two Mandarin-learning children, Tong and Xuexue, whose spontaneous longitudinal data are available in the CHILDES database [16, 5]. While annotation is still in progress, preliminary results suggest that unambiguous restitutive *you* with a goal-PP is not available.[2] The scarcity of direct evidence in child ambient

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[2]Our search was limited to goal-PPs, because in certain languages (e.g., French), restitutive 'again' is unavailable with goal-PPs, even though it is available with a lexical accomplishment verb such as 'open'. This means that knowing her language allows restitutive 'again' with a change-of-state predicate does not tell the child that restitutive 'again' is possible with a goal-PP.

speech raises the question of how children can learn the restitutive reading of *you* with goal-PPs if the reading is derived lexically.

Under a structural analysis, on the other hand, learners with knowledge of the repetitive reading will get the restitutive reading for free, as soon as they know both (i) the syntax of the change-of-state predicate and (ii) the characteristic of *you* that allows the adverb to modify a subevent of the complex predicate (i.e., movement and reconstruction for *you*). Given the lack of direct evidence in the input, our experimental finding (i.e., that young preschoolers can access the restitutive reading) favors this analysis.

Notice that the current results are compatible with either simultaneous or sequential acquisition of the two readings (i.e., with the repetitive reading acquired either concurrently with or prior to the restitutive). Data from younger children would help us tease apart these two possibilities. Crucially both possibilities raise the question of what kind of evidence children make use of to master the characteristics of *you*, such as movement and reconstruction. The evidence should be quite general and go beyond goal-PPs or even complex change-of-state predicates. In fact, [8, 9] observed that the ambiguity of *you* is not restricted to change-of-state predicates but can include restructuring verbs, as illustrated in (9).

(9)   John you   xiangyao guanshang na-shan men.
         John again want   close   that-CL door
         'John wants to close that door, and ...'
         a.   'he wanted to closed that door before.'
         b.   'he close that door before.'
         c.   'the door was in a state of being closed before.'

Thus it is possible that the child learns *you* can move and reconstruct based on evidence from restructuring verbs or other change-of-state predicates. We plan to probe this possibility in more detail as our next step.

5.2   On children's indifference to *you*

Despite the success of a number of children, quite a few children behaved as if they were ignoring *you* in our experiment. Why was it easier for children to ignore the presupposition trigger than it was for adults? We speculate that this may be task-related: Our method is adapted from a Truth Value Judgment Task (TVJT, see [4]). Previous studies using the same methodology on children's processing of scalar implicatures (e.g., [7]) have suggested that children are more pragmatically tolerant than adults and thus tend to penalize pragmatic oddity less strictly than adults. As a result, the current task may be less suitable for evaluating children's presuppositions as compared with asserted content. As our next step, we plan to explore other methodologies to better tap into children's knowledge of presupposition.

6   Conclusion

In this study we conducted an experiment to examine Mandarin-learning preschoolers' comprehension of *you* with goal-PPs, and found good comprehension of *you*'s repetitive and restitutive readings. This finding favors a structural analysis of the ambiguity, which would predict no delay in the acquisition of the restitutive reading.

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