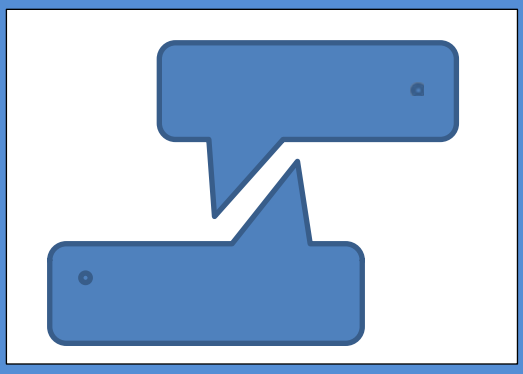
Journal of Child Language Acquisition and Development

JCLAD



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Editorial

Dear readers, reviewers, researchers and editorial team,
Journal of Child Language Acquisition and Development – JCLAD is still a young journal, started its journey in 2013. We would like to thank every individual who has even a tiny effort in the publication of the journal. So far, the publication frequency has been bimonthly. After receiving invaluable suggestions from readers, we decided to publish JCLAD quarterly as of 2015. We also decided to change page numbers into "continuous" volume long. So, an article in the second or third issues of a volume will not start with page number 1. Only each volume will start with page number 1. We wish you all a happy 2015.

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Mandarin-speaking children's pronoun interpretation

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Abstract

Acquisition data from English-speaking children reveal the Delay of Principle B Effect (the DPBE): pronouns (e.g. him) are misinterpreted as reflexives (e.g. himself) in sentences like "The boy sprayed him" as late as age 6;6. However, when the referential antecedent is quantified as in "Every boy sprayed him", the delay disappears. This is often referred to as the Quantificational Asymmetry (the QA). In the present study, we were interested in 1) whether or not Mandarin-speaking children display the DPBE; 2) whether or not Mandarin-speaking children display the QA. We conducted two experiments using the Truth Value Judgment Task and the Picture Selection Task respectively. Results of the two experiments were consistent in showing that Mandarin-speaking children did not exhibit either the DPBE or the QA. On the basis of these findings, we propose that the non-delay of pronoun interpretation in Mandarin can be attributed to language specific features, namely the topic-prominent features of Mandarin Chinese.

Keywords pronoun interpretation, Delay of Principle B Effect, Quantificational Asymmetry, Mandarin-speaking children, topic-prominent features

1. Introduction

Within the framework of Universal Grammar, Binding Principles regulate different referents of reflexives (e.g. himself, herself, itself) and pronouns (e.g. him, her, it) (Haegeman, 1991). Principle A requires that a reflexive should corefer with its antecedent in a local clause. As shown in example (1), "himself" should refer to "Peter" inside the local clause, rather than "Julian" outside the local clause. Principle B stipulates that pronouns must be free in the same local clause, as shown in example (2). "Him" is not allowed to corefer with "Peter" in the local clause, but can refer to "Julian" outside the local clause or a male outside the sentence.

(1) Julian$_j$ says Peter$_i$ likes himself$_i$.
(2) Julian$_j$ says Peter$_i$ likes him$_{j/k}$.

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1.1. The Delay of Principle B Effect and the Quantificational Asymmetry

As a part of Universal Grammar, these principles are expected to be respected in both adult and child languages. However, acquisition data from English-speaking children reveal that they misinterpret pronouns as reflexives (Chien & Wexler, 1990; Grodzinsky & Reinhart, 1993; Perovic, Modyanova, & Wexler, 2012, 2013; Thornton & Wexler, 1999 etc.). To be more specific, in (3), English-speaking children coindex "him" with "the boy", which is often referred to as the Delay of Principle B Effect (the DPBE). Yet, when a quantificational antecedent substitutes the referential antecedent, as in (4), the DPBE disappears. This is referred to as the Quantificational Asymmetry (the QA) (Elbourne, 2005).

(3) *The boy$_i$ sprayed him$_i$.
(4) Every boy$_i$ sprayed him$_j$.
(5) Everybody voted for him. Even he$_i$ voted for him$_i$.

The DPBE and the QA observed in English-speaking children have been attributed to immature development of pragmatic knowledge of child language (Chien & Wexler, 1990), overgeneralization of the "accidental coreference" from special contexts to normal contexts, as shown in example (5) (Thornton & Wexler, 1999), insufficient working memory capacity to accommodate the simultaneous representations of syntactic and pragmatic rules (Grodzinsky & Reinhart, 1993; Reinhart, 2004), and children's incompetence in changing perspectives from speakers to hearers (Hendriks & Spenader, 2006; Hendriks, Van Rijn, & Valkenier, 2007; Van Rij, Van Rijn, & Hendriks, 2010). We will elaborate on Chien & Wexler (1990)'s proposal in the following paragraphs, as it is relevant to the predictions we will make in the current study.

Chien & Wexler (1990) observed the DPBE and the QA in English-speaking children. Until age 6, English-speaking children reject the coreferential reading (e.g. The boy$_i$ sprayed him$_i$) only at chance level. However, the rejection rate rises to 90% in quantificational sentences (e.g. Every boy$_i$ sprayed him$_j$.) The asymmetry is attributed to children's immature development of pragmatic knowledge but not syntactic knowledge. In other words, children do know Principle B, but not the accompanying pragmatic principle which is called Principle P. Let us elaborate on their proposal by examples (3) and (4). Referential sentences (with a pronoun and a referential antecedent), like (3), allow three interpretations: the disjoint interpretation (the pronoun and the antecedent are not coreferential, as in 3a), the coreferential interpretation (the pronoun and the antecedent are coreferential, as in 3b), and the bound variable interpretation (the pronoun and the antecedent are coreferential, as in 3c).

(3) The boy sprayed him.
a. The boy$_j$ sprayed him$_i$. (disjoint interpretation)
b.* The boy$_i$ sprayed him$_i$. (coreferential interpretation)
c.* The boy$_i$ sprayed him$_i$. (bound variable interpretation)

Although seemingly the same, (3b) and (3c) are governed by different principles. Principle B regulates the bound variable interpretation in (3c). It is a part of the syntactic knowledge that should be innate. Children do know Principle B and they are able to exclude this interpretation as required by Principle B. However, the coreferential interpretation (3b) is governed by Principle P, which basically says that pronouns and its antecedent in a local clause are not coreferential unless the context explicitly forces coreference. Principle P is not innate, so it must be acquired during language development. Children cannot rule out the coreferential interpretation in (3b) if their pragmatic knowledge is immature. This is why English-speaking children display the DPBE. The immaturity of the pragmatic knowledge but not the syntactic principle causes the delay.
However, in quantified sentences like (4), the coreferential interpretation is inapplicable whereas the bound variable interpretation is available. As proposed by Chien & Wexler (1990), "him" cannot be coreferential with a quantificational antecedent, but can only be bound by a quantified antecedent. Principle B rules out the bound variable interpretation in (4b). Whether Principle P is acquired or not does not matter here. Children, knowing Principle B but not Principle P, should not exhibit delay in quantified sentences. This explains the QA.

(4) Every boy sprayed him.
a. $[\text{Every boy}]_k$ sprayed him_i. (disjoint interpretation)
b.*$[\text{Every boy}]_i$ sprayed him_i. (bound variable interpretation)

The distinction between a syntactic principle and a pragmatic principle explains the DPBE and the QA findings in English-speaking children. The next question to ask is whether or not the DPBE and the QA have been reported in children speaking other languages. In the next section, we will look at research in languages other than English. We will see that there are two groups, one with the DPBE and the QA and the other without the DPBE and the QA.

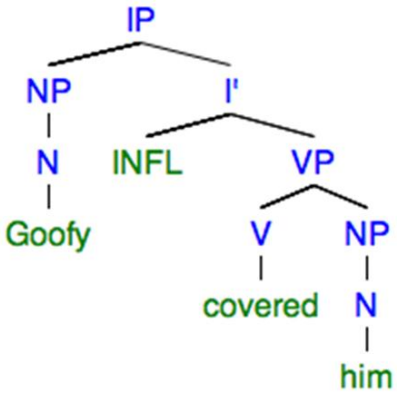
1.2. The cross-linguistic distinction of the DPBE

From the literature, children speaking English, Dutch, Hebrew, Russian and other languages display the DPBE and the QA (Dutch: Spenader, Smits, & Hendriks, 2009; Hebrew: Ruigendijk, Friedmann, Novogrodsky, & Balaban, 2010; Russian: Avrutin & Wexler, 1992). The reasons can be attributed to those mentioned previously, for example, children's immature pragmatic knowledge as Chien & Wexler (1990) proposed.
However, children speaking Romance languages are exempt from the DPBE and the QA, due to the Clitic Effect. Children who speak Italian (McKee, 1992), Spanish (Baauw, Escobar, & Philip, 1992; Baauw & Cuetos, 2003) and Greek (Terzi, Marinis, & Francis, 2012; Sanoudaki, 2003) exhibit neither the delay nor the asymmetry. It is argued that clitic languages (e.g. romance languages) and full pronoun languages (e.g. English) have different governing categories. In other words, they have different domains, in which Principle B

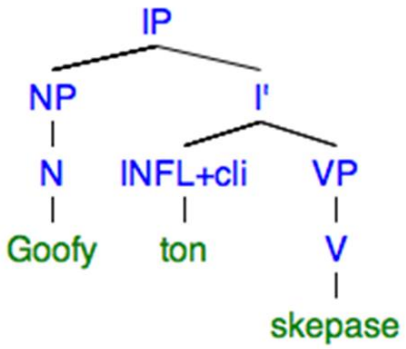
regulates referents of pronouns. Please consider examples (6) from English and (7) from Greek, and their tree structures. The governing category in English is the VP whereas it is the IP in Greek. According to Principle B, pronouns and its antecedents are not allowed to be coreferential in its governing category. Thus, English children knowing Principle B would corefer "him" with "Goofy" because "Goofy" is not in the governing domain VP. However, Greek children would not corefer "ton" (a clitic indicating a pronoun) with "Goofy" for the reason that they are in the same governing domain and Principle B excludes their coreference.

(6) English: Goofy covered him.
(7) Greek: Goofy ton skepase.
Goofy him-clitic covered.
Goofy covered him.

English



Greek



German does not belong to the Clitic Effect category even though German-speaking children do not display the DPBE (Ruigendijk et al., 2010). German does not have syntactic clitics as the clitic romance languages. The reason for the non-delay in German-speaking children is still unclear. Ruigendijk et al. (2010) suggested that German seems to be stricter in coreference constraints than English and Dutch. Please see examples (8) to (10) (quoted from Ruigendijk et al. (2010)). English and Dutch have a looser coreference restriction when pronouns are embedded in a prepositional phrase, as shown in (8) and (9), while German is stricter in pronoun coreference in the same environment, as shown in (10).

(8) English: The boy$_i$ put the chair behind him$_{i/j}$.
(9) Dutch: De jongen$_i$ xet de stoel achter hem$_{i/j}$ neer.
(10) German: Der Junge$_i$ stellt den Stuhl hinter ihn$_{i*/j}$.

Given the cross-linguistic data, it seems that if a language is exempt from the Clitic Effect, children in that language should display the DPBE and the QA. It applies to almost all languages investigated in the previous studies (even though German is an exception). Mandarin does not utilize clitics. The Clitic Effect does not exempt Mandarin-speaking children from displaying

the DPBE and the QA. Therefore we have good reasons to expect the exhibition of the DPBE and the QA in Mandarin. Moreover, if Chien & Wexler's (1990) pragmatic maturation proposal holds, it should also predict the same effect on Mandarin-speaking children as on English-speaking children. That is, Mandarin-speaking children should also exhibit the DPBE and the QA. However, if Mandarin-speaking children do not display the delay and the asymmetry, we will have to go beyond the pragmatic maturation account and look into language specific features in Mandarin to find an explanation.

To the best of our knowledge, whether or not Mandarin-speaking children exhibit the DPBE and the QA is unknown. In addition, previous research in this area mainly focused on Indo-European languages, and no study has investigated Mandarin, a typologically distinct language. The current research will therefore fill a gap in our knowledge.

1.3. Review of Methodologies used in previous research

Previous research studying pronoun interpretation in child language mainly used the Truth Value Judgment Task (the TVJT), the Picture Verification Task (the PVT) and the Picture Selection Task (the PST). In the TVJT, the experimenter presents orally narrated stories acted out with toy figures to a child and a puppet (acted by the other experimenter). After telling each story, the experimenter asks the puppet a question about this story and the puppet gives an answer. The child is required to judge the truth value of the puppet's answer according to the presented story. In the PVT, children are presented with a static picture while listening to short descriptive sentences such as "Here are a pig and a boy. The boy sprayed him". They are required to make judgments on whether the spoken sentence and the picture match. The PST also uses short descriptive sentences and pictures, but two pictures are presented simultaneously in one test item. Children are required to pick a picture from the two that matches the spoken sentence.

According to the literature, the TVJT seems to be more advantageous in general. First, it has been argued that the TVJT and the PVT can be used to test multiple interpretations of an ambiguous sentence while the PST can only assess children's interpretation preferences (Crain & Thornton, 1998; Eisele & Lust, 1996). Because PST only tests the interpretation preferences, children's performance in the PST should be better than that in the TVJT (Ruigendijk et al., 2010). Second, the TVJT appears to cause less anxiety and therefore more involvement for young children who are being investigated (Crain & Thornton, 1998). Because the puppet provides answers to the experimenter's questions, children would feel that it is the puppet (but not them) that is under investigation. This makes the whole process less stressful thus more enjoyable. The process can be more engaging when the stories are interesting. Lastly, as Conroy, Takahashi, Lidz, & Phillips (2009) noted: "in a picture-based task a greater burden is placed on the child to conjure up a relevant context in which to interpret the picture" (p474), whereas in the TVJT, the dynamic contexts provided by using toy figures greatly reduce the burden. The weakness of the TVJT is that it is quite time-

consuming (Crain & Thornton, 1998). Testing one child takes about one hour (Conroy et al., 2009).

Even though the TVJT is advantageous compared to picture-based tasks, contradictory results have been obtained in previous studies. The most obvious debate is between Thornton & Wexler (1999) and Conroy et al. (2009), both of which used the TVJT and both tested English-speaking children aged from around 4 to 6. The former study observed the DPBE and the QA while the latter did not. This indicates that the TVJT on pronoun interpretation must be very carefully formulated. Conroy et al. (2009) claimed that the Thornton and Wexler study failed to exclude the effect of salience that is regarded as greatly biasing pronoun referents. To be more specific, in Thornton & Wexler's (1999) research, there was a salient toy figure in every story. As pronoun is very sensitive to discourse prominence (Conroy et al., 2009; Elbourne, 2005; Song & Fisher, 2005; Song & Fisher, 2007), it is possible that the pronoun in the test sentence simply refers to the salient toy figure in the story. As a result, what was tested was not children's grammatical knowledge because pragmatic salience overrode grammatical knowledge. This may have led to English-speaking children's coreferential reading in Thornton and Wexler's study. In order to rid the effect of salience, Conroy et al. (2009) made up more complicated stories to reduce the salience of the single toy figure in Thornton & Wexler (1999). In their story design, more toy figures were added to reduce the emphasis on one salient toy figure. They claimed that when there was no salient toy figure in the context, children should not exhibit the DPBE and the QA. In a follow up experiment, they replicated Thornton & Wexler's (1999) design in which the salient toy figure existed; the DPBE and QA were observed again.

We have two main concerns with regard to Conroy et al.'s (2009) story design. The first concern is that we do not think they were able to completely rid the effect of salience. One character was still more obvious than others, even though a lot more figures were involved in. The added figures did not participate in the plot of the story to the same extent. In addition to this, the lead-in sentences before the test sentences were biased thus could have led to the disappearance of the DPBE and the QA. We will discuss lead-in sentences in detail later in Experiment 1. The other concern is that their story design was too complex therefore posed a high memory load on the young children. There were at least six toy figures in each story and at least six actions (e.g. hiking Smurf painted Grumpy is one action) happening among those characters. Based on the two concerns, the non-delay findings of their study may not be convincing. However, a detailed discussion regarding the debate on English-speaking children's pronoun interpretation is beyond the scope of the current study.

The foregoing review suggests that the TVJT has some advantages over picture-based tasks. In the current research, we first used the TVJT in Experiment 1 with children between 4;2 and 5;6 of age. We also piloted this task with younger children who were between 3;6 and 4;1. We found that children under 4-year-old in the pilot study failed to accomplish the task, but the reasons for their failure could be either task demand or under-developed syntactic-pragmatic knowledge. To rule out the potential influence

of task demand, we used the PST in Experiment 2. We will discuss the two tasks in Section 3, the general discussion part.

1.4. Objectives of this research

In the present study, we attempt to answer the following two questions: (1) whether or not Mandarin-speaking preschoolers, like their English-speaking counterparts, would display the DPBE; and (2) whether or not Mandarin-speaking children, like their English-speaking counterparts, would exhibit the QA. The outline of this research is as follows: in Section 2, we will introduce the two experiments that we conducted using the TVJT and the PST respectively; then, in Section 3, relevant issues will be discussed, especially how language specific features aid Mandarin-speaking children's pronoun interpretation; the last section concludes the current study.

2. Experiments

2.1. Experiment 1

2.1.1. Methodology - The Truth Value Judgment Task

We used the TVJT in the first experiment. According to the literature, the main consideration of formulating stories in this task is that we should avoid the effect of salience in the context, because pronoun referents can be very sensitive to discourse salience (Conroy et al., 2009; Elbourne, 2005; Song & Fisher, 2005; Song & Fisher, 2007). We revised Conroy et al.'s (2009) research design to further rid the salience effect. Please see a sample story (and a picture illustration of the story) and then a detailed analysis of the story design afterwards. Figure 1 illustrates the scheme of the story design. Please note that in this experiment we did not show any picture to children. We told stories by showing toy figures. Figure 1 is just to help readers to understand the sample story and the story design.

"One day, a girl finds a big Chinese cabbage. She decides to organize a game called "Jumping Chinese cabbage". Her good friends the panda, the standing panda and the dinosaur are invited. They all find the cabbage too big to jump over, so the girl suggests: "I have some magic ribbons. Once you tie them on your body, you can jump over the big Chinese cabbage!" She gives everyone different ribbons: the panda receives black ribbons because his eyes are black; the standing panda receives red ribbons because his butt is red; the dinosaur gets green ribbons because his body is green. Now, they all tie one ribbon of their own colors for themselves, so they all successfully jump over the Chinese cabbage once. Then, the dinosaur wants to jump again, but he is too lazy to tie himself, so he asks the panda for help. The panda generously ties a black ribbon on him so the dinosaur jumps again. The dinosaur then goes to the standing panda. The standing Panda is unwilling to help because he is also lazy. Then, because standing panda is also lazy, he also wants to ask others for help. He firstly goes to the panda. The panda is always willing to offer help. He ties a ribbon on the standing panda and the standing panda jumps over. Finally, the standing panda goes to the dinosaur. The standing panda does not receive help because he rejected the dinosaur before. The game finishes. Everyone enjoys this game."

Referential condition: Zhe ge gushi jiang de shi san ge xiao dongwu tiao da baicai de gushi. Zuihou, xiao konglong bangzhu le ta. (*The story is about three animals jumping over a big Chinese cabbage. In the end, the little dinosaur helped him.)*
Quantificational condition: Zhe ge gushi jiang de shi san ge xiao dongwu tiao da baicai de gushi. Zuihou, mei zhi xiao xiongmao dou bangzhu le ta. (*The story is about three animals jumping over a big Chinese cabbage. In the end, every panda helped him.)*

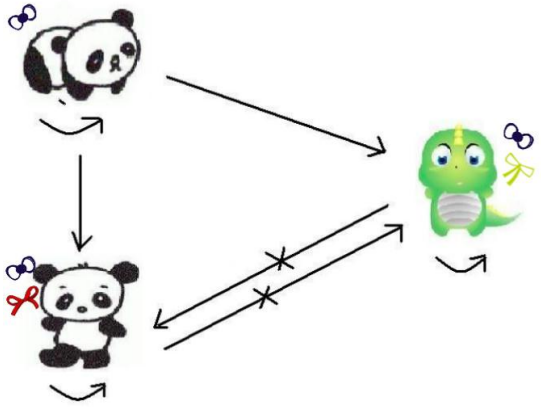


Figure 1. Illustration of the story design of the TVJT[4]

As can be seen from the sample story, children should reject the test sentences under both the referential condition and the quantificational condition. Under the referential condition, the dinosaur never helps others but only himself; so the test sentence "xiao konglong bangzhu le ta" (the dinosaur helped him) is wrong. Under the quantificational condition, only the normal panda helps the dinosaur while the standing panda does not help the dinosaur; so the test sentence "mei zhi xiao xiongmao dou bangzhu le ta"(every panda helped him) is wrong.
We believe our experimental design is more effective in avoiding salience than Conroy et al.'s (2009). The improvements are as follows: 1) instead of adding more toy figures to reduce the salience of one single toy figure, we made two toy figures equally salient. In the sample story, the dinosaur and the standing panda are equally salient. To achieve the equality, both figures take four actions (as can be seen in the illustrative picture, both have four arrows). Moreover, we increased the salience of the standing panda by making him different from the normal panda in appearance and color (e.g. he is standing; we paint his butt red); 2) Our lead-in sentences (e.g. "This story is about three animals jumping over the Chinese cabbage") did not involve any particular toy figures that could be possible referents in this story. We also kept the lead-in sentence consistent in both conditions so that the test sentence is the only variable. Note that in Conroy et al. (2009), the lead-in sentences in the two conditions were different, which could have

[4] Please note that this picture is not what we have shown to children. It only illustrates the story design to better readers' understanding of the story. We told stories using toy figures rather than showing pictures. Straight arrows indicate actions for the other character (in this example, the action is "help") while arched arrows mean actions for oneself. The cross on arrows means the action is not successfully carried out. Ribbons beside each animal are reminders showing from whom they receive help.

biased children to say "no". For example, in the quantificational condition, the dinosaur[5] was emphasized in their lead-in sentence "This was a story about helping. The dinosaur did not help others and the two pandas all looked great". The test sentence was "every panda helped him". The emphasis of the dinosaur may yield the non-coreferential reading of the test sentence.

The other effort we made is to reduce the memory load, which Conroy et al. (2009) did not pay attention to. In order to reduce the memory load of the task: 1) the number of pandas was reduced from three to two. Since "every" must refer to three or more characters in English, previous research all included three characters in the "every" group. However, Mandarin allows "every" to target two and more individuals, thus we reduced the number of pandas from three to two; 2) to further reduce the memory burden, we added some reminders to help children recall the story. In this sample story, the reminders are ribbons of three different colors. The colors are relevant to specific features of the three toy figures. The dinosaur has green ribbons because his body is green; the standing panda's ribbons are red because his butt is red; the normal panda has black ribbons because his eyes are black. At the end of the story, the dinosaur with one green ribbon and one black ribbon indicates that he helped himself once and the normal panda helped him once.

2.1.2. Participants

Twenty seven children, aged from 4;2 to 5;6 (mean age 4;9), participated in this experiment. Data of 3 children were excluded because they were not competent in accomplishing warm-ups and fillers. The remaining 24 children all gave correct answers to warm-ups and fillers so their data were analyzed. Twelve (mean age 4;9) of them attended the referential condition and 12 (mean age 4;9) attended the quantificational condition. They were all native monolingual speakers of Mandarin Chinese from Beijing Language and Culture University Kindergarten. All of them were typically developing children without any hearing loss or language impairment.

2.1.3. Materials and Procedures

A between-subject design was applied. Each child attended only one condition. There were altogether 12 stories for each condition, two stories were warm-ups, four were fillers and six were test items. The sequence was fixed pseudo random.

Warm-ups were made to familiarize children with the task: one warm-up item was correct and the other was incorrect. By doing this, children were trained to know that the test sentences could be right or wrong. Fillers were all correct while test items were all incorrect. We made all test items incorrect because we had to obtain reasons for children's judgments. It was hard for us to obtain reasons for a "yes" judgment.

[5] This is not the exact lead-in sentence and test sentence in Conroy et al. (2009). Here we use our toy figures to illustrate the lead-in sentences and test sentences in their research.

The six verbs we chose were: bangzhu (help), tie (paste), xihuan (like), tao (tie up), gai (cover), ca (wipe). We avoided verbs that have obvious self-oriented (e.g. enjoy) or other-oriented (e.g. feed) meanings in the test. Two native Mandarin-speaking adults reached an agreement that the above verbs were neither self-oriented nor other-oriented.

We recap the procedure of the TVJT. One experimenter tells stories using toy figures and the other experimenter acts as a puppet. Following each story, the puppet describes one thing that happens in the story, and children are required to judge if the description is right or wrong according to the story. In order to assess children's interpretation of the test sentence, we ask children to state reasons for all the rejections.

2.1.4. Results

The dependent measure in this experiment was the proportion of rejections under each condition. Children should say "no" to reject the test items.

Under the referential condition, Mandarin-speaking children rejected the test sentences 82% (59/72) of the time. When asked about the reasons, they answered in the way like "no, because the dinosaur did not help the standing panda". This showed that they did not misinterpret "him" as "himself". Thus, Mandarin-speaking children, aged from 4;2 to 5;6, did not exhibit the DPBE. The individual responses are presented in Table 1 in the appendix.

Under the quantificational condition, Mandarin children rejected the test sentences 81% (58/72) of the time. The rejection reasons were "not every panda helped the little dinosaur, the standing panda did not help him" or similar. Mandarin-speaking children, at the same age, did not display the QA. The individual responses are reported in Table 2 in the appendix.

We compared proportions of rejections in the two conditions using a Chi-Squared Goodness-of-Fit Test. The test shows that the difference is not statistically significant [Chi^2(1, n=72)=0.089, $p=.766$].

2.1.5. Discussion

We compare our data with those from Thornton & Wexler (1999) and Conroy et al. (2009). Both of them used the TVJT. In Thornton & Wexler (1999), 4 to 5 years old English-speaking children rejected the test sentences 42% of the time under the referential condition and 92% of the time under the quantificational condition. The results from their study indicate a DPBE and a QA. Yet, in Conroy et al. (2009), English-speaking children, aged from 4;0 to 5;6 (mean age 4;6), rejected the test sentences 89% of the time under the referential condition and 86% of the time under the quantificational condition. The results from this research clearly show a non-DPBE and a non-QA. In our Experiment 1, we used the TVJT with revised experimental design and materials attempting to avoid the salience effect of the context on pronoun referents from the context. We observed that Mandarin-speaking children, aged from 4 to 6, did not display the DPBE and the QA. The comparison of our results with those of the two previous relevant studies (both used the TVJT and both children are aged from 4 to 6) shows that the Mandarin-speaking children performed similarly as the English-speaking children in Conroy et al. (2009). Although Conroy et al. (2009) attributed the

non-delay findings of English-speaking children to the advanced experimental design, specifically, the complete riddance of salience, as we have argued earlier, the characters in their stories were not equally salient and the lead-in sentences could have biased children towards rejecting the test sentences. Therefore, their study did not provide convincing evidence of the non-delay of pronoun interpretation. We believed that our experimental design allowed us to examine children's pronoun interpretation in a less biased manner.

Now let us recap the research questions we raised at the beginning of this paper and see what answers we can obtain from conducting Experiment 1. The question we are focusing on is whether or not Mandarin-speaking children display the DPBE and the QA. The results indicate that Mandarin-speaking children aged from 4 to 6 do not exhibit either. However, before we confirm the non-DPBE and the non-QA findings in Mandarin-speaking children, we question if younger Mandarin-speaking children could actually display the delay. However, the complex nature of the task may introduce confounding explanations to younger children's performance. We then conducted a pilot study using the TVJT in younger children.

2.1.6. A pilot study in younger children

Twenty one Mandarin-speaking children, aged from 3;6 to 4;2, participated in this pilot study. They were all Mandarin monolingual speakers from Beijing Language and Culture University Kindergarten. None of them was reported as having hearing loss or language impairment. Eleven children (mean age 3;10) participated in the referential condition and 10 (mean age 3;10) participated in the quantificational condition. The methodology, materials and procedures were exactly the same as those in Experiment 1.

The results were: under the referential condition, children rejected the test sentences 41% (27/66) of the time; under the quantificational condition, children rejected the test sentences 60% (36/60) of the time. Wilcoxin signed Rank Test shows the difference between the two conditions is not significant (z=.82 , p=.44).

The fact that children's performance was near chance level in both conditions of the task made the results difficult to interpret. This level of performance may be due to the lack of syntactic-pragmatic knowledge concerning pronoun interpretation or alternatively, due to children's inability to comprehend the task instruction or to retain the details of the stories. Indeed, when asked for reasons for rejecting the test sentences, many children either gave no response or said something irrelevant (e.g. repeat the story). This prompted us to use a less complex task to test younger preschoolers in Experiment 2.

2.2. Experiment 2

2.2.1. Methodology - The Picture Selection Task

In order to more validly assess pronoun interpretation in younger children, we employed a Picture Selection Task in Experiment 2. In the PST, two pictures were simultaneously presented to the children. While looking at the

pictures, children heard a test sentence. They were required to speak out or point to one picture from the two that matched the test sentence they had heard. There were two experimenters. One showed the pictures and recorded children's responses, and the other acted as a puppet and verbally presented the test sentences.

2.2.2. Participants

Twenty eight Mandarin-speaking children, aged from 2;7 to 4;1 (mean age 3;5), participated in this experiment. Results of 2 children were excluded because they could not choose the right pictures in filler items. Therefore data from 26 children were analyzed. Thirteen (mean age 3;5) children attended the referential condition and 13 (mean age 3;5) participated in the quantificational condition. They were monolingual Mandarin-speaking children from Beijing Language and Culture University Kindergarten. All of them were typically developing children without any hearing loss or language impairment.

2.2.3. Materials and Procedure

We used a between-subject design. The materials contained 3 warm-ups, 4 fillers and 9 test items. Warm-ups introduced the task and involved the children in the task. Fillers and test items were alike, with the same two characters doing different things in the two pictures. Sample test items under the referential condition and the quantificational condition are shown in the following two figures. All of them were sequenced pseudo randomly.

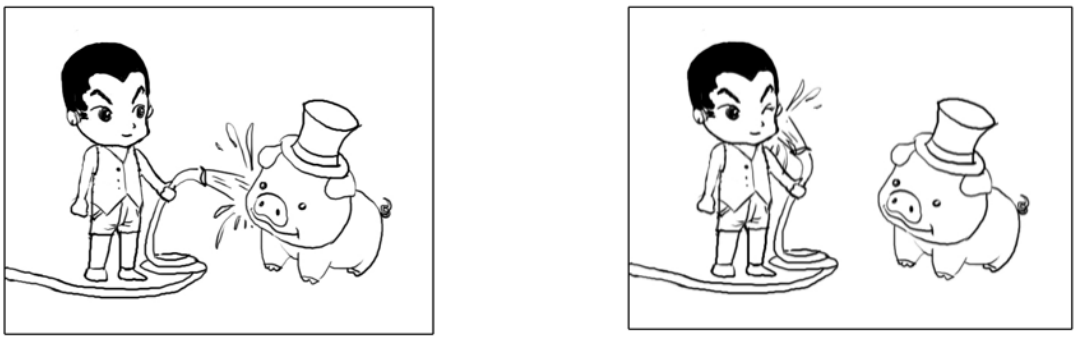


Figure 2. An example of test items under the referential condition. *Nikan, xiao nanhair chong le ta. (Look, the little boy sprayed him.)*

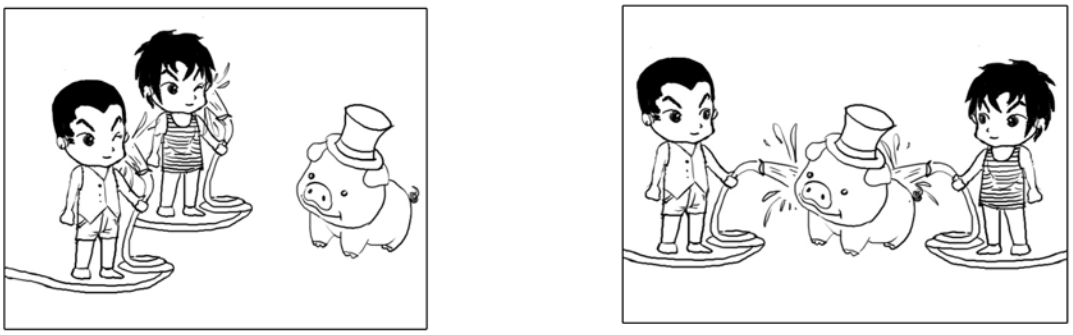


Figure 3. An example of test items under the quantificational condition. *Nikan, mei ge xiao nanhair dou chong le ta. (Look, every little boy sprayed him.)*

Again, we were very careful in avoiding the effect of salience in this experiment. First, the size of every character in every picture was almost the same. As pointed out by Elbourne (2005), Chien and Wexler's (1990) pictures can be biased because one character was significantly bigger in size than others. Second, our lead-in sentences did not include any salient referent. For example, if the lead-in and test sentence are like "This is the girl. Every bear touched her", it clearly emphasizes "the girl", which yields a non-coreferential reading of the test sentence. Spenader et al. (2009) argued that children are proficient at using pragmatic clues in context. If lead-in sentences involve any discourse salience, children would use pragmatic knowledge rather than grammatical knowledge. In order to avoid discourse salience, in the current experiment, we did not include a lead-in sentence before a test sentence. We presented the test sentences directly to children.

2.2.4. Results

The dependent measure in Experiment 2 was the proportion of choosing the correct pictures. The right choices are the pictures of the non-coreferential reading and the wrong choices are the pictures of the coreferential reading. The overall correct rates were 92% (108/117) under the referential condition and 89% (104/117) under the quantificational condition. Please see individual selections in tables 3 and 4 in the appendix. The high correct rates in both conditions indicate that younger Mandarin-speaking children do not exhibit the DPBE and the QA as well. Chi-Squared Goodness-of-Fit Test shows that the difference of the two conditions is not statistically significant [Chi^(1, n=117) = 1.385, *p=.239*].

2.2.5. Discussion

The two experiments together reveal that Mandarin-speaking children, aged from 2;7 to 5;6, do not exhibit the DPBE and the QA. Please also see Figure 4. The results align with Ruigendijk et al. (2010) in that the TVJT was argued to lead to lower performance than the PST.

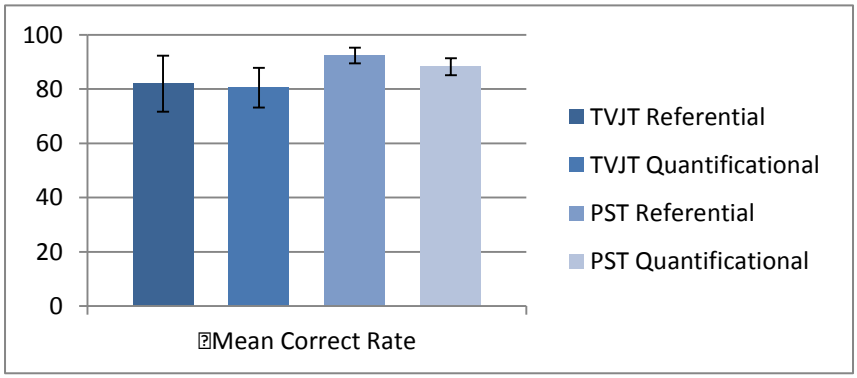


Figure 4. Comparison of the rates of correct responses in the TVJT and the PST.

3. Discussion

We predicted at the beginning of this paper that if Chien & Wexler's (1990) pragmatic maturation account holds, Mandarin-speaking children should also exhibit the DPBE and the QA as English-speaking children. However, the results contradicted their prediction. Mandarin-speaking children did not display the pronoun interpretation problem in both the referential and the quantificational conditions. Due to the absence of pronoun clitics in Mandarin, it is obvious that we cannot attribute the non-DPBE and non-QA to the Clitic Effect as in many romance languages. Therefore, we argue that language-specific features could help Mandarin-speaking children resist the delay. In this part, we first discuss topic-prominence features that may help Mandarin-speaking children interpret pronouns, including similarities between these findings and the non-delay patterns in German. Next, we will discuss how long-distance binding could help Mandarin-speaking children's pronoun interpretation. Then, the observed "residue" left to child language from adult language will be discussed. We will also discuss the methodologies used in the two experiments. We finally talk about the limitations and future directions of the current research.

3.1. Topic-prominence features affecting Mandarin-speaking children's pronoun interpretation

An important question to ask is why English-speaking children display the DPBE and the QA while Mandarin-speaking do not. Or we may ask a more ambitious question: why do children in languages like English and Dutch display the DPBE, whereas children in languages like Mandarin and German do not?

We have discussed Chien and Wexler's (1990) proposal in the introduction section. Their main idea is to separate syntactic and pragmatic knowledge. Syntactic knowledge is regarded as innate while pragmatic knowledge needs to be acquired during language development. However, our data do not support their explanation. If syntactic rules are innate in both English and Mandarin, their explanation cannot account for why Mandarin-speaking children are able to acquire the pragmatic rule while English-speaking children are not. It is unlikely that Mandarin-speaking children are simply more advanced in developing their pragmatic rules. As far as we are concerned, there must be some language specific features that aid

Mandarin-speaking children, whereas English does not have the same features so that English-speaking children are not able to develop proper pronoun interpretations.

We propose that the topic-prominence contributes to the acquisition difference between English and Mandarin. Topic prominence is a language-specific feature of Mandarin Chinese (Haegeman, 1987). Consider examples (11) and (12). Topicalization is often realized by word order in Mandarin Chinese, for example, putting the topic to the beginning of a sentence. In example (11), "Zhe ke shu" (the tree) is the topic of the sentence. "Zhe ke shu" (the tree) possesses "shuye" (leaves) constituting a possessive relationship. In example (12), "Zhegeren" (the person) is the topic being fronted to the initial position. The referent of "ta" (him) is the topic "Zhegeren" (the person). Please note that the equivalent sentences in English are ungrammatical.

(11) Zhe ke shu shuye hen da.
This Classifier tree leaves very big.
The tree, the leaves are big.

(12) Zhe ge ren , Xiao nanhai xihuan ta.
This Classifier person, little boy like him.
The person, the little boy likes him.

The lack of the DPBE in Mandarin can be attributed to the influence of the topic prominent feature of Mandarin Chinese. For example, when two referents are equally salient in a context, the unmentioned referent should be the topic and the pronoun automatically refers to the unmentioned topic as its referent, as shown in example (12). In Experiment 1, "the dinosaur" and "the standing panda" are equally salient. When "the dinosaur" is the antecedent of the pronoun "him" in the test sentence, Mandarin children would regard the other character, the unmentioned "standing panda", as the topic. In other words, when Mandarin-speaking children hear a sentence like "The dinosaur helped him", they may interpret it as a topic prominent structure like "The standing panda, the dinosaur helped him". By contrast, English is not a topic prominent language; so topic-fronted sentences are ungrammatical in English. These sentences must be rare in English-speaking children's language input; thus English children cannot be guided by the topic-prominent structure in their pronoun interpretation. We speculate that the topic-prominence feature is also the reason for German-speaking children to resist the pronoun interpretation problem. German and Mandarin are the same in that topic-hood affects word order with topics being fronted to the sentence initial position. Though the speculation seems reasonable, it requires empirical evidence that links topicality to pronoun interpretation.

In addition to topicality, as we have reported in the introduction, some other structural distinctions also seem to divide the two language categories. We add the Mandarin equivalent sentence to the sentences we have discussed above. In English and Dutch, the pronoun "him" can refer to "the boy", as

well as another male outside the sentence. However, in Mandarin and German, the same pronoun is not allowed to corefer with the antecedent in the sentence. As compared to English and Dutch, Mandarin and German more strictly follow the nonlocal coreference with respect to pronoun referents.

(8) English: The boy$_i$ put the chair behind him$_{i/j}$.
(9) Dutch: De jongen$_i$ xet de stoel achter hem$_{i/j}$ neer.
(10) German: Der Junge$_i$ stellt den Stuhl hinter ihn$_{i*/j}$.
(13) Mandarin: Xiao nanhai$_i$ zai ta$_{i*/j}$ shen hou fang le yizi.

3.2. The long-distance binding of bare reflexives helping Mandarin-speaking children interpret pronouns

As stated in the introduction, Principle A requires that reflexives should be locally bound. However, the bare reflexive "ziji" (self) in Mandarin allows long-distance binding, as shown in (14). We think the long distance binding familiarizes Mandarin-speaking children with non-local binding. Because Principle B requires non-local reference, it helps Mandarin-speaking children respect Principle B.

(14) Mali$_j$ shuo Bide$_i$ xihuan ZIJI$_{i/j}$.
Mary say Peter like ZIJI
Mary said that Peter liked ZIJI.

Our data may lend support to Hyams & Sigurjonsdottir (1990). In their research, Icelandic-speaking children's preference for long-distance binding of the anaphor "sig" (self) is directly relevant to their high correct rate of non-local responses for pronouns. "Icelandic children who perform well with respect to pronouns (i.e., who eschew a local binder) will also choose the long-distance antecedent for a pronominal anaphor. (P87)" Hyams and Sigurjonsdottir provided further evidence from Korean and Danish claiming that children showed strong long-distance binding on reflexives also followed Principle B better.

3.3. Coreferential reading in a few Mandarin-speaking children and adults

It is interesting that coreferential interpretations can be found in a few Mandarin speakers, both children and adults. We observed similar responses from Mandarin-speaking adults and Mandarin-speaking children. In Experiment 1, we found two children who equalized "him" to "himself". Please see the following conversation between the experimenter and one of the two children:

Experimenter : Umm, this story is about three animals jumping over the big Chinese cabbage. In the end, the little dinosaur helped him.
Child : He is right. ("He" refers to the puppet.)
Experimenter : So, could you tell me whom the little dinosaur helped?
Child : Himself.

We also tested 10 Mandarin-speaking adults under the referential condition using the TVJT. They were tested to investigate the residue effect. These adults rejected the test sentence 90% (54/60) of the time. It is very interesting that the six acceptance responses were all from the same adult. It is more interesting that the rejection reason was the same as the child's in this example. In Conroy et al. (2009), they also found the same phenomenon. Residue can be caused by "accidental coreference" in our real life, and children's coreferential readings could be explained by the residue effect in the language of a few adults. Please note that for most Mandarin-speaking adults and children, Principle B cannot be violated and the "accidental coreference" only exists in special contexts.

3.4. Methodology

We compared the TVJT and the PST in the introduction, which highlighted some advantages of the TVJT over the PST. Our two experiments together with the pilot experiment indicated that both tasks can be used to assess children's pronoun interpretation and the PST is especially useful for younger children given the simplicity of the task format and short duration of the task. On the other hand, the TVJT may be especially useful for testing older children as it allows us to probe explanations for children's rejections and thus may reveal more information about children's understanding of pronouns. It is important to point out that in both tasks, the experimenter has to pay close attention to salience so as not to bias children in their responses. Finally, our results indicate the importance of considering the cognitive skill levels (i.e. memory capacity) of young participants when assessing their linguistic knowledge.

3.5. Limitations and future directions

The current research has some limitations. First, we did not test the older children (4;2 to 5;6) on the PST in Experiment 2. However, the near-ceiling level performance of the younger preschoolers suggests that the older children will achieve almost perfect performance had they been tested. Second, we did not have direct evidence that links the topic-prominent features of Mandarin as well as other features (e.g. familiarity to long-distance binding) to children's pronoun interpretation. Therefore our proposed explanations are still speculations. Future studies may compare the frequency of topicalization in child-directed speech between Mandarin and English. Future studies may also use the priming paradigm and expose English-speaking children to topic-prominent input and investigate if this would lead to changes in children's pronoun interpretation.

4. Conclusion

Using the Truth Value Judgment Task and the Picture Selection Task, the current study examined Mandarin-speaking children's pronoun interpretation. Mandarin-speaking preschoolers displayed highly accurate responses to both tasks, indicating a lack of the DPBE and the QA. We propose that the topic prominent features of Mandarin Chinese may facilitate children's nonlocal interpretation of Mandarin pronouns. We

conclude that both the TVJT and the PST are appropriate methods in assessing children's comprehension of pronouns.

Acknowledgments

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References

Avrutin, S., & Wexler, K. (1992). Development of Principle B in Russian : Coindexation at LF and Coreference. *Language Acquisition*, *2*(4), 259–306.

Baauw, S., & Cuetos, F. (2003). The Interpretation of Pronouns in Spanish Language Acquisition and Breakdown : Evidence for the "Principle B Delay" as a Non-Unitary Phenomenon. *Language Acquisition*, *11*(4), 219–275.

Baauw, S., Escobar, M. A., & Philip, W. (1997). A Delay of Principle B-Effect in Spanish Speaking Children : The Role of Lexical Feature Acquisition. In *Language Acquisition: Knowledge Representation and Processing: Proceedings of GALA* (p. 97).

Chien, Y.-C., & Wexler, K. (1990). Children's Knowledge of Locality Conditions in Binding as Evidence for the Modularity of Syntax and Pragmatics. *Language Acquisition*, *1*(3), 225–295.

Conroy, A., Takahashi, E., & Lidz, J. (2009). Equal Treatment for All Antecedents: How Children Succeed with Principle B. *Linguistic Inquiry*, *40*(3), 446–486.

Crain, S., & Thornton, R. (1998). *Investigations in Universal Grammar. A Guide to Experiments on the Acquisition of Syntax and Semantics*. Cambridge: the MIT Press.

Eisele, J., & Lust, B. (1996). Knowledge about Pronouns : A Developmental Study Using a Truth-Value Judgment Task. *Child Development*, *67*(6), 3086–3100.

Elbourne, P. (2005). On the Acquisition of Principle B. *Linguistic Inquiry*, *36*(3), 333–365.

Grodzinsky, Y., & Reinhart, T. (1993). The Innateness of Binding and Coreference. *Linguistic Inquiry*, *24*(1), 69–101.

Haegeman, L. (1987). Register Variation in English: Some Theoretical Observations. *Journal of English Linguistics*, *20*(2), 230–248.

Haegeman, L. (1991). *Introduction to Government and Binding Theory. Blackwell Textbooks in Linguistics 1* (2nd ed., Vol. 2). Oxford: Blackwell.

Hendriks, P., & Spenader, J. (2005/2006) When Production Precedes Comprehension: An Optimization Approach to the Acquisition of Pronouns. *Language Acquisition*, *13*(4), 319–348.

Hendriks, P., Van Rijn, H., & Valkenier, B. (2007). Learning to reason about speakers' alternatives in sentence comprehension: A computational account. *Lingua*, *117*(11), 1879–1896.

Hyams, N., & Sigurjonsdottir, S. (1990). The Development of " Long-Distance Anaphora ": A Cross-Linguistic Comparison With Special References to Icelandic. *Language Acquisition*, *1*(1), 57–93.

McKee, C. (1992). A Comparison of Pronoun and Anaphors in Italian and English Acquisition. *Language Acquisition*, *2*(1), 21–54.

Perovic, A., Modyanova, N., & Wexler, K. (2012). Comprehension of reflexive and personal pronouns in children with autism: A syntactic or pragmatic deficit? *Applied Psycholinguistics*, *34*(04), 813–835.

Perovic, A., Modyanova, N., & Wexler, K. (2013). Comparison of Grammar in Neurodevelopmental Disorders: The Case of Binding in Williams Syndrome and Autism With and Without Language Impairment. *Language Acquisition*, *20*(2), 133–154.

Reinhart, T. (2004). The Processing Cost of Reference Set Computation: Acquisition of Stress Shift and Focus. *Language Acquisition*, *12*(2), 109–155.

Ruigendijk, E., Friedmann, N., Novogrodsky, R., & Balaban, N. (2010). Symmetry in comprehension and production of pronouns: A comparison of German and Hebrew. *Lingua*, *120*, 1991–2005.

Sanoudaki, I. (2003). Greek " strong " pronouns and the delay of principle B effect. *Reading Working Papers in Linguistics*, *7*, 103–124.

Song, H.-J., & Fisher, C. (2005). Who's "she"? Discourse prominence influences preschoolers' comprehension of pronouns. *Journal of Memory and Language*, *52*(1), 29–57.

Song, H.-J., & Fisher, C. (2007). Discourse prominence effects on 2.5-year-old children's interpretation of pronouns. *Lingua.*, *117*(11), 1959–1987.

Spenader, J., Smits, E.-J., & Hendriks, P. (2009). Coherent discourse solves the pronoun interpretation problem. *Journal of Child Language*, *36*, 23–52.

Terzi, A., Marinis, T., Francis, K., & Kotsopoulou, A. (2012). Crosslinguistic Differences in Autistic Children 's Comprehension of Pronouns : English vs. Greek. In *BUCLD 36 Proceedings*.

Thornton, R., & Wexler, K. (1999). *Principle B, VP ellipsis, and interpretation in child grammar*. Cambridge, MA: MIT Press.

Van Rij, J., Van Rijn, H., & Hendriks, P. (2010). Cognitive Architectures and Language Acquisition: A Case Study in Pronoun Comprehension. *Journal of Child Language*, *37*, 731–766.

Appendices

Table 1 Results of Experiment 1 under the referential condition

	HTY	ZJH	HC	DHY	DJH	WRY	GJR	ZZJ	GZD	ML	ZJ	QHR
	4;10	5;1	4;2	4;8	4;9	5;1	5;3	4;6	5;3	4;10	4;8	4;2
The dinosaur helped him.	no	no	yes	no	no	no	no	no	no	no	no	no
The elephant pasted him.	no	no	yes	yes	no	no	no	no	no	no	no	no
The dolphin liked him.	no	no	yes	yes	no	no	no	yes	no	no	no	no
The girl tied her.	no	no	yes	yes	no	no	no	no	no	no	no	no
The fish covered her.	no	no	yes	yes	no	no	no	no	no	no	no	no
The frog wiped her.	no	no	yes	yes	no	no	no	yes	no	no	no	no
right answer percentages	100%	100%	0%	17%	100%	100%	100%	67%	100%	100%	100%	100%

Table 2 Results of Experiment 1 under the quantificational condition

	LKQ	LJS	LXJ	LZY	YZJ	GYF	CJQ	MM	CJA	WXR	CRX	SJH
	4;3	4;2	5;1	4;6	4;5	5;6	5;3	5;0	5;5	4;7	4;11	4;2
Every panda helped him.	no	yes	no	no	no	no	no	no	no	no	no	No
Every frog pasted him.	no	no	no	yes	no	no	yes	yes	no	no	no	No
Every hippo liked him.	no	no	no	yes	no	no	no	no	no	no	no	Yes
Every Smurf tied her.	no	yes	no	yes	no	no	no	no	no	no	no	No
Every frog covered her.	no	yes	no	yes	no	no	no	yes	yes	yes	no	No
Every cow wiped her.	no	no	no	yes	no	no	no	no	no	no	no	No
right answer percentages	100%	50%	100%	17%	100%	100%	83%	67%	83%	83%	100%	83%

Table 3 Results of Experiment 2 under the referential condition

	JXN	WCY	LJT	LTH	DZS	CYH	WT	FYF	CJY	LXC	LXX	WY	HLE
	4;1	4;0	3;11	3;7	3;6	3;5	3;4	3;3	3;2	3;2	3;2	3;0	2;11
Look, the penguin hit him.	√	√	√	√	√	√	√	√	√	√	×	√	√
Look, the girl patted her.	√	√	√	√	√	√	√	√	√	√	√	√	×
Look, the girl washed her.	√	√	√	√	√	√	√	√	√	√	√	√	√
Look, the monkey tickled him.	√	√	√	√	√	√	√	√	×	√	√	√	√
Look, the girl touched her.	√	√	√	√	√	√	√	√	√	×	×	√	√
Look, the hedgehog tied him.	√	√	√	√	√	√	√	√	√	√	√	√	√
Look, the boy sprayed him.	√	√	√	√	√	×	√	√	√	×	√	√	√
Look, the bear pointed at him.	√	√	√	√	√	√	√	√	√	√	×	×	√
Look, the cat scratched her.	√	√	√	√	√	√	√	√	√	√	√	√	√
Correct rates of test items	100%	100%	100%	100%	100%	89%	100%	100%	89%	78%	67%	89%	89%

Table 4 Results of Experiment 2 under the quantificational condition

	CYZ	ZJK	LJW	NZY	ZYH	THZ	SZY	WYY	QZJ	XYH	CR	WJN	ZXW
	4;0	3;11	3；10	3；10	3；8	3；6	3；6	3；6	3；3	3；1	3；1	2；9	2；7
Look, every penguin hit him.	√	√	√	√	√	√	√	√	×	√	√	√	×
Look, every girl patted her.	√	√	√	√	√	√	√	√	√	√	√	√	×
Look, every girl washed her.	√	√	√	√	√	×	×	√	√	√	√	√	√
Look, every monkey tickled him.	√	√	√	√	√	√	√	√	√	√	×	√	√
Look, every girl touched her.	√	√	√	√	√	√	√	√	√	√	√	×	√
Look, every hedgehog tied him.	√	×	√	√	√	√	×	√	×	√	×	√	√
Look, every boy sprayed him.	√	√	√	√	√	√	√	√	√	√	√	√	√
Look, every bear pointed at him.	√	√	√	√	√	√	√	√	√	√	√	×	√
Look, every cat scratched her.	√	√	√	√	√	√	√	√	√	√	√	×	√
Correct rates of test items	100%	89%	100%	100%	100%	89%	78%	100%	78%	100%	78%	67%	78%

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A look into vocabulary spurt in a Typically Developing Child and a Child with a Developmental Language Disorder

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Abstract

Vocabulary spurt is a swift increase of lexicon in the process of language acquisition of children's. The goal of the present research, thus, was to test the replicability and refutability of the claim in both typically and atypically developing children's. For this, one typically developing child and one child with developmental language disorder from Child Language Data Exchange System/CHILDES (MacWhinney, 2000) were taken. The data was longitudinal. Computerized Language Analysis (CLAN) v.30 for Windows was employed to analyze the non-elicited spontaneous speech of the typically developing child and the child with developmental language disorder. Number of lexicon across age (in months) was calculated. Based on observed regression line of number of lexicon produced, the present study unveils the existence of VS in typically developing child, while the presence of VS in the child with developmental language disorder is refuted.

Keywords Vocabulary Spurt, Developmental Language Disorder, Lexicon, Language Acquisition, Children

1. Introduction

In the literature on the acquisition of lexicon, researchers come across the notion Vocabulary Spurt (VS). VS denotes that children (typically developing or children with SLI) would go through a stage in their language acquisition process, where the vocabulary increases more rapidly than before (Dandurand and Shultz, 2011). There are several explanations given for VS. Some authors claim a cognitive basis (e.g. based on Piaget's theory (Santrock, 2010) of cognitive development): children know at a certain stage that objects have names and this knowledge helps them to name objects more rapidly and more frequently.

As Plunkett (1993) proposes, the identification of appropriate lexical segmentations of the speech signal constitutes a problem for the language learner and the child language researcher alike. Numerous observers of children's early lexical development have noted a transition from slow to rapid word-learning in the latter half of the child's second year. The findings in the relevant literature suggest that the terms 'vocabulary spurt' and 'naming explosion' best describe children who focus their early linguistic efforts on a single strategy: learning names for things. Other children may attempt to encode a broad range of experience with a more varied lexicon, a

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strategy that results in more gradual lexical growth (Goldfield and Reznick, 1990).

Special attention is given to the age of the child at which the spurt is observed, for age is a variable found to have a strong relationship with diversity of words among children with developmental language disorders and typically developing children. Operationally, 18-30 months of age is taken as a reference point, since many research findings (e.g. Dandurand and Shultz, 2011; Nicholas and Geers, 2003; Connor and Craig, 2006; James, 2007; Honig, 2007; and Leigh, 2013) uncovered that typically developing children exhibit burst of vocabulary at this age range. A study conducted with typically developing children by Dandurand and Shultz (2011) reported that vocabulary spurt was observed in the second year of life, in which children exhibited a sharp increment in vocabulary acquisition. Key outcomes for the child with a developmental language disorder (DLD) are auditory perceptual, language and speech development, together with the related areas of literacy and phonological awareness (Pascoe et al., 2013); and hence children with DLD is expected to demonstrate an increase in diversity of types of words immediately after the implant. By administering Peabody Picture Vocabulary Test 3, Connor et al. (2006) reported that speech and vocabulary development were strongly influenced by chronological age, length of cochlear implant use and the age.

In a comparative study conducted by Dimling (2010) with normally hearing (NH) and implanted children, deaf and hard of hearing children were reported to be seriously delayed in vocabulary growth and they did not experience vocabulary spurt at any age.

The assertion that there is a substantial and reliable vocabulary spurt during the second year has been repeated so often that most developmental psychologists readily accept it. This apparent consensus on an interesting phenomenon has led to a variety of explanations. Most of these explanations emphasize factors endogenous to the child; some based on sudden developmental changes and others based on leveraging of previous learning.

The psychological literature on vocabulary spurt in children is in an interesting state of turmoil. The spurt is usually taken to mean a sharp increase in vocabulary acquisition in the second year of life. There are at least eight different explanations for vocabulary spurt with rather little consensus and there is a disagreement about whether a spurt even exists in most children (Dandurand and Shultz, 2011).

By using hierarchical linear modelling, Connor (2006) examined latent-growth curves in vocabulary for 100 children who had received their implants when they were between 1 and 10 years of age and concluded that children received early treatment before the age of 2.5 years (29 months) might exhibit a burst in both speech and vocabulary. The researcher also underlined that burst of growth in vocabulary diminishes systematically with an increasing age at implantation and a spurt in vocabulary was not observed in children who were older than 7 years.

For a few authors, like Woodward et al. (1994) quoted by Nazzi and Bertoncini (2003), the vocabulary spurt corresponds to changes in abilities to produce words not directly linked to lexical acquisition itself, such as increased lexical memory abilities, increased motivation to communicate

with the environment, and developments in articulatory abilities. However, the predominant view is that the vocabulary spurt reflects qualitative changes regarding the nature of the lexicon and the way words are acquired. Therefore, the present paper is to assess the existence of vocabulary spurt in both a typically developing child and a child with a developmental language disorder. Developmental language disorder is a condition in which the child has limited ability in acquisition and spoken language compared to typically developing children.

2. Methodology

Two techniques have been used to assess the vocabulary spurt. The simplest is to calculate a ratio of vocabulary size to age and argue whether it is large enough to be a spurt (Schafer and Plunkett, 1998) and the second approach is to plot vocabulary growth over age and visually judge whether a spurt is present (Dromi,1987), cited by (Dandurand and Shultz, 2011).

The present paper used the data collected from a child with a language disorder by Joseph, Serratrice, and Conti-Ramsden (2002) and uploaded to Child Language Data Exchange System/CHILDE, and transcript files containing data from a typically developing child; the files uploaded by Lieven, Salomo and Tomasello (2009). Both files contain longitudinal data obtained during a case study on language acquisition by two children. The child with language disorder was between 31 – 49 months of age at the time of the conversation. The typically developing child created by Lieven, Salomo and Tomasello (2009) was between 20 – 36 months of age at the time of the conversation. The data were longitudinal and the objective of the paper was to see the number of words through age. Much emphasis was given to match the data based on the number of words of both the child with specific language impairment and typically developing one. Both files are non-elicited, spontaneous speech, non-specified.

The data were downloaded and analyzed by CLAN (Version 30 for Windows). To see the total number of different words or types within 100 phonemes "freq @ +t*CHI +z100u +d3" command was employed for each session.

3. Findings

As Figure 1 depicts, the number of words increases with increasing age, whereas the increment or the number of words added in each/one month is different. At the age of 33 months the child's lexicon starts to rise sharply and it reaches to 185 at the age of 37 months, the rise which clearly supports the notion of the existence of 'vocabulary spurt'. The mean number of words was 98.7 with a range from 150 to 185. The figure clearly shows that the number of words deviates from the regression line, which is considered as the mean change across the data.

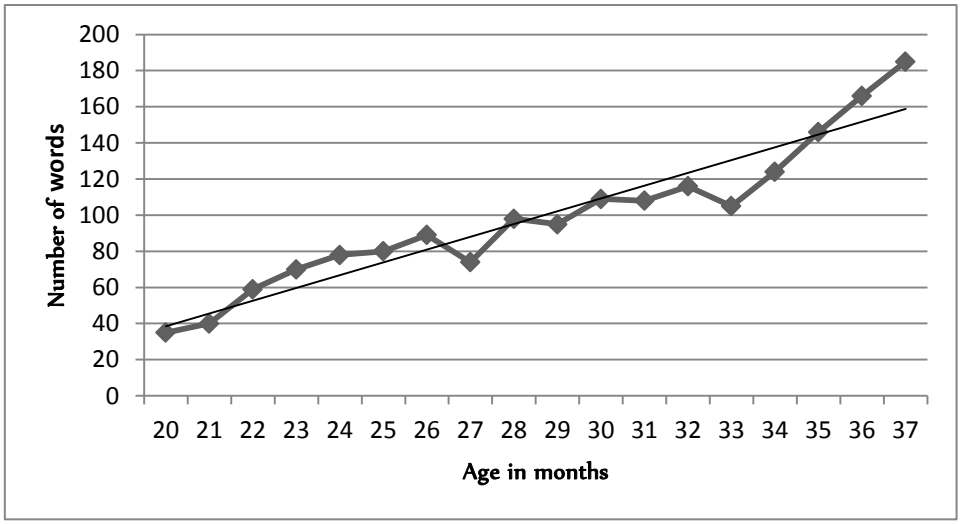

Figure 1. The increase in the number of words in the lexicon of a typically developing child in months

Figure 2 reveals that the number of words is increasing with the increasing age of the child. While the number of words was 36 at the age of 31 months, it reaches to 124 at the age of 49 months.

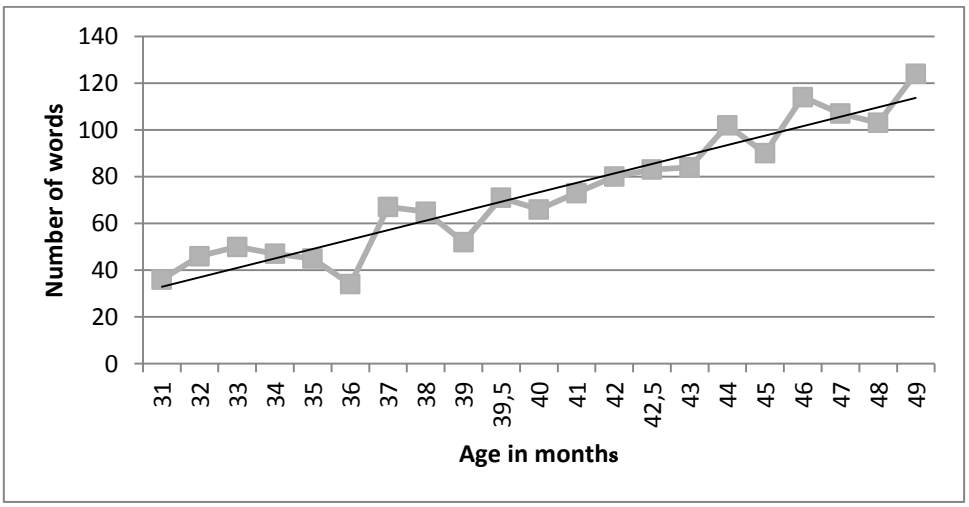

Figure 2. The increase in the number of words in the lexicon of a child with specific language impairments in months

The trend of the increment is predictable, in the sense that the number of words increases within the trend line, even though there is an observable difference in the number of the words added in each month. Therefore, the notion of the 'vocabulary spurt' does not seem to exist in this child with specific language impairments, for there is no sudden increment in the number of words in the lexicon.

4. Discussion

The findings of the present paper regarding typically developing child is very consistent with the notion that sudden increase in vocabulary spurt started at the age of two years (in the present paper 33 months or 1:9 years). Dandurand and Shultz (2011) argued that the spurt is usually taken to mean a sharp increase in vocabulary acquisition in the second year of life. Thus, it is safe to conclude that there is a vocabulary spurt for the typically developing child starting from 33 months of age. The analysis of the child with specific language impairment, however, failed to go with the findings of the typically developing child.

From figure 2, we can conclude that there is no sudden increment in vocabulary, and hence there is no spurt. Woodward et al. (1994) quoted by Nazzi and Bertoncini (2003) argued that the vocabulary spurt corresponds to changes in abilities to produce words not directly linked to lexical acquisition itself, such as increased lexical memory abilities, increased motivation to communicate with the environment, and developments in articulatory abilities. One possible justification for unobserved spurt in the child with SLI might be language impairment can be a challenge to communicate and facilitate with the environment because of their impairments and that impairment deter their articulatory abilities.

To sum up, there is a difference between a child with specific language impairment and typically developing child regarding vocabulary spurt. There was an observed spurt in the typically developing child, whereas there was no observed vocabulary spurt in the child with specific language impairments.

References

Connor, C. M., & Craig, H. K. (2006). African American Preschoolers' Language, Emergent Literacy Skills, and Use of African American English: A Complex Relation Preschooler' Language, Emergent Literacy, and AAE. *Journal of Speech, Language, and Hearing Research*, *49*(4), 771-792.

Connor, C., Craig, H., Raudenbush, S., Heavner, K., Zwolan, T. (2006). The Age at Which Young Deaf Children Receive Cochlear Implants and Their Vocabulary and Speech-Production Growth: Is There an Added Value for Early Implantation? *Hear & Hearing*; 27(6), 628-644.

Dandurand, F. & Thomas, R.T. (2011). A fresh look at the vocabulary spurt. *Presented at the annual meeting of the Cognitive Science Society (CogSci 2011), Boston, MA, July 20 - 23, 2011.*

Dimling, M. L. (2010). Conceptually Based Vocabulary Intervention: Second Graders' Development of Vocabulary Words. *American Annals of the Deaf*, 155 (4), 425-448.

Goldfield, B., & Reznick, J. S. (1990). Early lexical acquisition: Rate, content, and vocabulary spurt. *Journal of Child Language, 17*, 171-183.

Honig, S. A. (2007). Oral language development. *Early Child Development and Care*, 177 (6-7), 581-613.

James, D., Rajput, K., Brinton, J. & Goswami, U. (2007). Phonological Awareness, Vocabulary, and Word Reading in Children Who Use Cochlear Implants: Does Age of Implantation Explain Individual Variability in Performance Outcomes and Growth? *Journal of Deaf Studies and Deaf Education*, 13(1), 117-137.

Joseph, K. L., Serratrice, L. & Conti-Ramsden, G. (2002). *Development of copula and auxiliary BE in children with Specific Language Impairment and younger unaffected controls*. First Language, 22, 137-172.

Leigh, J., Dettman, S., Dowell, R. & Briggs, R. (2013). Communication development in children who receive a cochlear implant by 12 months of age. *Otology and Neurotology*, 34(3), 443-50. doi:10.1097/MAO.0b013 e3182814d2c.

Lieven, E., Salomo, D. & Tomasello, M. (2009). Two year old children's production of multiword utterances: A usage based analysis. *Cognitive Linguistics, 20, 3, 481- 508*.

MacWhinney, B. (2000). *The CHILDES Project: Tools for Analyzing Talk. 3rd Edition*. Mahwah, NJ: Lawrence Erlbaum Associates.

Nazzi, T., & Bertoncini, J. (2003). Before and after the vocabulary spurt: two modes of word acquisition? *Developmental Science, 6*(2), 136-142.

Nicholas, G. J. & Geers, E. A. (2003). Hearing Status, Language Modality, and Young Children's Communicative and Linguistic Behavior. *Journal of Deaf Studies and Deaf Education*, 8 (4), 422-437.

Ouellet, C., Le Normand, M. & Cohen, H. (2001). Language Evolution in Children with Cochlear Implants. *Theoretical and experimental neuropsychology (TENNET XI)*; 231-235.

Pascoe, M., Randall-Pieterse, C. & Geiger, M. (2013). Speech and literacy development in a child with a cochlear implant: Application of a psycholinguistic framework. *Child Language Teaching and Therapy*, 0(0) 1–16. DOI: 10.1177/0265659012467197.

Plunkett, K. (1993). Lexical segmentation and vocabulary growth in early language acquisition. *Journal of Child Language, 20*, 1-19.

Santrock, J. W. (2010). *Lifespan Development (13th Ed.).* New York: McGraw-Hill.

Schafer, G., & Plunkett, K. (1998). Rapid word learning by fifteen-month-olds under tightly controlled conditions. *Child development*, *69*(2), 309-320.

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Are you a good fit for us?: the key question in picking the right PhD program

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Soon after or just before completing a master's degree, one may start dreaming of a PhD program at a respected university. But wishing for acceptance per se may not be enough to assure future satisfaction in research. The purpose of this paper, addressed to PhD applicants, is to outline a number of warnings and recommendations concerned with choosing a PhD program congruent with your expectations.

What do you need to do before putting together an application? First, after you review the content of your target graduate programs in terms of courses offered and requirements to graduate, your habit of emailing and skyping could come in mighty handy, and the same holds, mutatis mutandis, for choosing your potential supervisor with whose research interests you should already be familiar. Many professors attach importance to communication skills, and this proactive approach seems to be common and appreciated in US academia so the professor may encourage you to send a research proposal, which would determine your further correspondence. This takes us to the second point, finding a good match.

You can save time by referring to journal articles as a point of departure. You may want to contact academics whose research interests mesh well with yours at least to some extent. At this point, it is definitely not advisable to try getting their opinion about your chance of being accepted. All you can do is to ask them to consider your desired research field and to say whether the research topic sounds interesting enough to excite them and is within the scope of their specialization. The issue of your being a good fit is a cine-qua-non for ensuring a good supervision service for you, and will play a pivotal role in your motivation and self-actualization while writing your dissertation.

Choosing a PhD program based on your potential supervisor may raise a question: "What if I cannot find a suitable program at a top university like Harvard?" I would advise sticking to the supervisor-oriented method, and ask instead: "What if I get acceptance from Harvard but I do not get a supervising service par excellence?" Barres (2013) argues the importance of mentorship along with tips for choosing an excellent mentor. Along similar lines, I would like to give my advice: "Choose your program and possible supervisor, and just let this university be your Harvard!"

The bottom line is that you do not have to be a rocket scientist to choose the right PhD program. What you especially need is to know what you will and can do, videlicet, your research interests. It goes without saying that all of the above-mentioned attempts will require a great deal of work, but it is definitely worth it to take your time so as not to regret it in the future. Lastly, these practical tips could be noted by advisors who do not adopt the let-them-go-and-see-things-for-themselves philosophy.

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Reference
Barres, B. A. (2013). How to Pick a Graduate Advisor. *Neuron*, *80*(2), 275-279. doi: http://dx.doi.org/10.1016/j.neuron.2013.10.005