Interpretation of Bare and Demonstrative Noun Phrases in the Acquisition of Mandarin*

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Mandarin nominals may appear bare or non-bare in various positions with different interpretations. Questions arise as to how Mandarin-speaking children interpret bare nominals, given that bare nominals can have various interpretations. On the other hand, how do they interpret non-bare nominals, such as demonstrative nominals? This experimental study tested the interpretation of nominals among Mandarin-speaking children and adults and found that nominal types and age have significant effects on interpretation. The findings include the following. (i) Children distinguish between bare and demonstrative nominals by assigning more generic interpretations to bare nominals. (ii) Children, like adults, have both generic and existential definite readings for bare nominal subjects. (iii) A clear discrepancy exists between children's and adults' interpretation of demonstrative nominals. Children assigned a considerable amount of generic interpretation to Mandarin demonstrative nominals, which lack such readings in adult grammar. With respect to the non-target generic reading of demonstratives, individual analysis was conducted to further examine this finding. Via such analysis, correlations were found between the generic reading for demonstratives and that for bare nominals, which suggests that those assigning more generic reading to demonstrative nominals are more likely to assign this reading to bare nominals. In addition, as part of the experimental design, two variables are found to play a role in the interpretation of nominals: the presentation order of nominals and a property of the predicates. The overall findings accord with the research hypothesis and predictions based on the Nominal Mapping Parameter, the Semantic Subset Principle, and other studies.

Key words: bare nouns, demonstratives, interpretation, language acquisition, Mandarin Chinese

1. Introduction

Mandarin bare nominals can appear in various positions, such as subject, object, or predicate, and can receive generic, predicative, or existential (indefinite or definite) interpretations.[1] Which

[1] Abbreviations used in this paper: A: affirmation question particle *a*, arg: argument, CL: classifier, D: determiner, DE: pre-nominal modification marker or postverbal resultative marker *de*, Def.: definite, Dem: demonstrative,

interpretation they receive depends on their syntactic position and the predicate they appear with. In contrast to bare nominals, which can have either generic or existential interpretations in argument positions, the demonstrative nominals (there is no definite article in Mandarin) receive only the definite interpretation in adult grammar.

The goal of this study is to examine how children interpret bare and demonstrative nominals in Mandarin—specifically, whether the interpretation that young children assign to bare and demonstrative nominals coincides with how adults interpret them or diverges from these interpretations in a systematic way in particular contexts. This study will investigate the interpretation of bare and demonstrative nominals in the subject position with a characterizing statement, without any aspect markers, by following the experimental paradigm developed by Pérez-Leroux and colleagues (2004). A detailed investigation of preschool Mandarin-speaking children's comprehension of noun phrases was conducted.

In the following, sections 2 and 3 briefly introduce the linguistic characteristics and the acquisition background of bare, definite, and demonstrative nominals. The research questions and hypotheses will be discussed in section 4. Section 5 will present details of the experiment and the results. The last sections will consist of the conclusion and discussion.

2. Linguistic background on nominal subjects

The first part of this section will discuss the nominals (focusing on count nouns) in the subject position of characterizing statements in English and Mandarin, including some comparison with Spanish examples.[2] The second part will briefly discuss Chierchia's (1998) Nominal Mapping Parameter (NMP), which may account for the form-meaning differences of nominals in these languages.

English bare nominals (mass or bare plural count nouns +/– modifiers) and in/definite nominals (*a/an/the* + singular count noun) may have a generic interpretation when appearing with a characterizing statement, as illustrated in (1)–(3a).

(1)　a.　**Dogs** eat meat.　　　　　　　　　　　　　　　　(Gen.)
　　　b.　***Dog** eats meat.

(2)　**A grapefruit** contains a lot of vitamin C.　　　　　　　(Gen.)

(3)　a.　**The hummingbird** gets its energy from sugar.　　　(Gen. or Ext., ILP)
　　　b.　**The hummingbird** drinks from the bird feeder in my yard.　(Ext., SLP)
　　　c.　**The hummingbirds** do not drink a lot.　　　　　　(Ext.)

DP: Determiner Phrase, Ext.: existential, Gen.: generic, ILP: Individual-Level Predicate, MA: yes/no question particle *ma*, N: Noun, NMP: Nominal Mapping Parameter, NP: Noun Phrase, PL: plural, pred: predicate, PROG: progressive marker *zai-*, Sing.: singular, SLP: Stage-Level Predicate, SSM: Semantic Subset Maxim, SSP: Semantic Subset Principle, UG: Universal Grammar.

[2]　Spanish data are introduced since Spanish definite plurals, like Mandarin bare nominals, may be ambiguous between generic and existential definite readings. Since English bare plurals and definite plurals do not have ambiguous readings, such Spanish data are needed to compare with the Mandarin data.

In characterizing statements, bare count nouns in subject position must be plural to be acceptable in English, as exemplified in (1a)–(1b). An indefinite singular count nominal can also express genericity, as in (2). English definite singular nominals may be ambiguous between generic and existential readings, given an individual-level predicate, as in (3a), while only the existential reading is possible for those appearing with stage-level predicates, as in (3b). Definite plural nouns (3c) always refer to specific entities.

There are various nominal constructions in Mandarin that can have a generic interpretation (Jiang 2012; Li 1998; Li 2011; Liao 2011; Tsai 2001). Bare nominals are the most common form of generic nominals in Mandarin, as shown in (4).

(4) **gou** chi rou   (Gen. or Ext.)
     dog   eat meat
     'Dogs eat meat.'
     'The dogs eat meat.'
     'The dog eats meat.'

However, in contrast to the English bare plural subject that receives a generic/habitual reading in a present-tense characterizing statement, Mandarin bare subjects can be interpreted as either generic or existential (Cheng & Sybesma 1999), given a characterizing statement without any aspect markers. In addition, Mandarin does not have plural morphology, and bare nominals can be interpreted as either singular or plural.[3] Therefore, the bare count noun in (4) can be translated in English as a bare plural, a definite plural, or a definite singular. The experiment in this study is controlled in such a way that only the plural reading of Mandarin bare nominals will be felicitous.

As for definite nominals, which can be interpreted generically in some languages, Mandarin does not have definite articles. In Mandarin, the determiner that is the closest to the definite article is the demonstrative, as has been noted in the literature (Huang 1999; Tao 1999). Regardless of their differences, demonstrative and definite nominals are similar in that they are both definite expressions and are presupposed to denote uniquely identifiable entities (Gundel et al. 1993, 2001, cited in Abbott 2010). Studies have also revealed that Mandarin demonstratives are developing into definite articles although they have not been fully grammaticalized into definite articles yet (Chen 2004; Huang 1999). Mandarin demonstratives and the English definite article share some similar functions (Wu 2004:167). Due to the lack of definite articles in Mandarin, this study contrasts Mandarin bare subjects (two possible readings) with demonstrative subjects (one possible reading in the experimental context).

With respect to demonstratives, English demonstratives are able to convey some kind of generic reading, which refers to certain types of entities, as shown in (5). The type reading of demonstratives is not a concern of this study since Mandarin plural demonstratives and singular demonstratives with a classifier receive only existential and entity-referring readings, even though

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[3] The suffix –*men* is arguably a definite plural marker in Mandarin; however, it can only be used as the suffix of nouns denoting humans, such as *laoshi-men* 'teachers', and not with other common nouns, such as **zuozi-men* 'tables'. For more information about –*men*, please see Li (1999) and Munn et al. (2009).

the predicates are characterizing statements that may contribute to the generic interpretation of the subject nominals, as shown in (6a)–(6b). In Mandarin, the classifier *zhong* 'type' must appear to express the generic 'type' reading, as in (6c). The Mandarin nominal that is similar to English plural and singular demonstratives, allowing both existential and type readings, would be the singular demonstrative nominal appearing without classifiers, as shown in (6d).[4] In this study, only the plural demonstrative nominals with existential readings, as in (6a), will be examined.

(5) a. **These cars** are very sturdy.   (Ext. or type reading)
     b. **This car** is very sturdy.   (Ext. or type reading)

(6) a. **zhexie   che**   hen   naiyong
         these   car   very   sturdy
         'These cars are very sturdy.'   (Ext.)

     b. **zhe-liang   che**   hen   naiyong
         this CL   car   very   sturdy
         'This car is very sturdy.'   (Ext.)

     c. **zhe-zhong   che**   hen   naiyong
         this type   car   very   sturdy
         'This type of car is very sturdy.'   (type reading)

     d. **zhe   che**   hen   naiyong
         this   car   very   sturdy
         'This car is very sturdy.'   (Ext.)
         'This type of car is very sturdy.'   (type reading—very marginal)

Unlike English and Mandarin, Spanish bare nominals cannot be interpreted as generic, and definite articles are required to construct generic nominals, as in (7) (Contreras 1986; Pérez-Leroux et al. 2004). Spanish definite nominal subjects, similar to Mandarin bare nominal subjects, can have generic or existential readings depending on the context.

(7) *(**Los**) **tigres** comen carne.   (Gen. or Ext.)
     'The tigers eat meat.'

Like English demonstratives, Spanish demonstratives may convey the existential reading or the 'type' reading, as illustrated in (8).

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4   Native speakers accepting the type reading of (6d) indicate that such a reading is very marginal and they prefer using (6c) to express 'types of objects'. Although the capability of *zhe che* 'this car' in (6d) to allow both the existential and the type reading is unclear, it is possible that it may be the abbreviated form of either *zhe liang che* (6b) or *zhe zhong che* (6c) and thus capable of conveying the meaning of these two forms.

(8) a. **Este coche** es muy firme.   (Ext. or type reading)
         'This car is very sturdy.'
     b. **Estos coches** son muy firmes.   (Ext. or type reading)
         'These cars are very sturdy.'

As mentioned earlier, the current study will focus on plural readings to avoid the ambiguity of Mandarin nominals, which can have plural or singular readings. Summarized below are the semantic mappings of bare, definite, and demonstrative (plural) subject nominals in sentences with characterizing statements in English, Spanish, and Mandarin.

Table 1: Interpretation of subject nominals with characterizing statements[5]

	English	**Spanish**	**Mandarin**
Bare (plural)	generic	*	generic/existential definite
Definite (plural)	existential definite	generic/existential definite	*
Demonstrative (plural)	type/existential definite	type/existential definite	existential definite

One possible explanation for the distinct form-meaning distributions in these languages lies in Chierchia's (1998) NMP. Chierchia proposes two features [±arg] and [±pred], which can provide a classification of nouns in different languages.

English is an [+arg, +pred] language. English mass nouns are [+arg] and thus can appear as bare arguments. Count nouns are [+pred], but given the available type-shifting in English, count plurals can be mapped into arguments. Chierchia (following Carlson 1977) argues that bare arguments are kind-referring by default; therefore, English bare mass nouns and bare count plurals can function as generic expressions. However, why can definite plurals not be kind-referring in English, just like in Spanish (as shown in Table 1)? Chierchia (1998) argues that a principle of economy, Avoid Structure, will force the selection of generic bare plurals over generic definite plurals in English. Avoid Structure says that when a bare nominal and a determiner + nominal have the same meaning (e.g. when both *tigers* and *the tigers* can potentially denote the kind 'tigers'), the simpler structure will be chosen. In English, the generic reading of definite plurals is blocked by the bare plural, as summarized in Table 1.

In contrast, Romance languages are [–arg, +pred]. In these types of languages, nouns always denote predicates and bare nouns are prohibited in argument positions; therefore, the absence of bare plurals allows the definite plurals to include both the generic and the existential definite readings, as presented in the Spanish example in (7), and in Table 1. Chierchia (1998:392) suggests that the Romance definite nominals readily admit the generic reading when appearing with plural or mass nouns in generic sentences or sentences with kind-level predicates.

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[5] In the English, Spanish, and Mandarin experiments discussed in this article, given the plural context and the experimental stories, 'the existential definite reading' refers to an existential and anaphorically definite reading. For the clarity of discussion and to avoid confusion with the 'definite reading' of the regular definite-articled nominals, 'the existential definite reading' will be used for the purpose of this study.

Mandarin is an [+arg, –pred] language, allowing bare nouns to appear freely in argument positions. Chierchia (1998:401) suggests that all Mandarin nouns start out as kind-denoting. This easily accounts for the fact that Mandarin bare nominals may have generic references. The type-shifting operation and blocking principle can account for Mandarin bare nominals' capability of obtaining various readings.

The crucial point is that, in the subject position, English bare plurals can receive a generic reading, but never an existential definite reading, while Mandarin bare nominals, as well as Spanish definite plurals, can be interpreted as generic or existential definite. English definite plurals and Mandarin demonstrative plurals only have existential definite readings (see Table 1). This research will examine whether children interpret Mandarin bare subjects and demonstrative subjects differently.

3. Acquisition background

3.1 Acquisition of generic and definite expressions

Various studies have found that children produce and comprehend generic utterances very early. This shows that children have some knowledge about the nature of being a member of a kind (e.g. Gelman & Raman 2003; Gelman & Tardif 1998; Keil 1989; Pappas & Gelman 1998). There are two studies concerning genericity in Mandarin. Gelman and Tardif (1998) collected free-speech production data of English- and Mandarin-speaking adults and children, although only adult speech data are analyzed in the paper. The experimental and elicited production research in Tardif et al. (2012) finds that adults and children distinguish between generic (bare nominals) and quantified expressions (nominals with *suoyou* 'all' and *youde* 'some'). However, no production studies are available concerning Mandarin generic expression in child natural speech, or comprehension studies contrasting the ambiguous interpretations of bare nominals with non-bare nominals conveying a non-ambiguous reading. According to the studies mentioned above and the free-production data below, children, including Mandarin-speaking children, have knowledge of generic expressions. This provides the premise for testing their distinction between generic and existential definite readings in this research. The examples below show that a Mandarin-speaking two-year-old is able to combine a bare subject nominal and a characterizing statement to form generic sentences. The example below was extracted from Chang's (2011) corpora, which consist of six-month longitudinal free-speech data of Mandarin-speaking children recorded at their home.

(9)   Context: The adult and Didi were reading a book about animals. Didi talked about many animals according to his opinion. Some of the animals were not present in the book and some of his statements are not true. (Didi, age: 2;10.23; Chang 2011: corpora).

Didi: laohu   gan   youyong
          tiger   dare   swim
          'Tigers dare to swim.'
Adult: laohu   gan   youyong   o
          tiger   dare   swim   oh
          'Oh! Tigers dare to swim!'

Didi:	dui,	xiao	laohu	gan	youyong
	right	small	tiger	dare	swim
	'Right! Small tigers dare to swim.'				

Adult:	ni	fan-guoqu	kan	xia	yi-ge	shi	shenme	hao-bu-hao
	you	turn-over	read	next	one–CL	be	what	good-not-good
	'You turn to the next page to see what is next, ok?'							

Adult:	maomaochong
	caterpillar
	'Caterpillars!'

Adult:	maomaochong	hui	bian	shenme
	caterpillar	will	become	what
	'What will caterpillars become?'			

Didi:	maomaochong	ye	hui	youyong
	caterpillar	also	can	swim
	'Caterpillars can swim, too.'			

Adult:	maomaochong	ye	hui	youyong	a
	caterpillar	also	can	swim	A
	'Caterpillars can swim, really?'				

Didi:	hudie	ye	hui	youyong
	butterfly	also	can	swim
	'Butterflies can swim, too.'			

Didi kept mentioning many animals that can or cannot swim, dare or not dare swim: snails, tigers, spiders, crocodiles, camels, mice, foxes, rhinos, flamingos. Then, he suddenly switched the topic to animals that can walk.

Didi:	kangaroo	ye	shi	yong	zou	de
	kangaroo	ye	be	use	walk	DE
	'Kangaroos walk, too.'[6]					

Didi:	daxiang	ye	shi	yong	zou	de
	elephant	also	be	use	walk	DE
	'Elephants walk, too.'					

Adult:	deng	yi-xia,	kangaroo	bu	shi	yong	zou	de
	wait	one-moment	kangaroo	not	be	use	walk	DE
	kangaroo	yong	tiao	de				
	kangaroo	use	jump	DE				
	'Wait a second. Kangaroos do not *walk*. Kangaroos *jump*.'							

Didi:	tiao	de
	jump	DE
	'Jump.'	

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[6] *Shi . . . de* is an emphatic construction. This is the first mention of *kangaroo* and *zou* 'walk' in the discourse. Thus, it is infelicitous to use *ye* 'also' here. The child used *kangaroo* here, not the Chinese *daishu* 'kangaroo'.

Given that Mandarin subject bare nouns are ambiguous between generic and existential readings, it is the context that prompts the listener to interpret the sentences as generic. In (9), the adult and Didi both used generic statements to respond to each other and the nominal subjects clearly had a generic meaning.

As for definite noun phrases, children also produce nominals with definite articles at a relatively young age. In the Brown (1973) corpora, English-speaking children use definite articles around age 1;6 to 2;7, as shown in (10a)–(10c). There are no articles in Mandarin; however, demonstratives like *zhe* 'this' and *na* 'that' can be found as early as at age two, as shown in (10d)–(10e).

(10)   The emergence of English articles: *the*   (Brown 1973: corpora)
    a.   Adam write the paper   (Adam 2;3.4)
    b.   read the puzzle   (Eve 1;6)
    c.   in the house?   (Sarah 2;7.5)

    The emergence of Mandarin demonstratives: *zhe* 'this', *na* 'that' (Chang 2011: corpora)
    d.   mama   wo   yao   zhe   yizi   (Nana 2;2.21)
       'Mom,   I   want   this   chair.'

    e.   zai   na   difang   (Didi 2;10.23)
       'at   that   place'

Despite the early emergence of definites, children do not use them in the adult way. At least two problems can be found in children's use of definite articles. First, studies of different languages find that preschool children overuse the definites in contexts that do not meet the uniqueness requirement of definites (e.g. Karmiloff-Smith 1979; Maratsos 1976; Wexler 2011). For instance, in one of Maratsos's (1976) experiments where several identical objects are present, over half of the four-year-olds mistakenly used *the*, while *a* was expected. Second, children treat definites as non-referential or generic—comparable to definites in Spanish, which have generic interpretation (de Villiers & Roeper 1995; Pérez-Leroux et al. 2004). It is as if children underspecify definites and allow them to have the generic interpretation, as in English and Spanish; or as de Villiers and Roeper (1995:73, 101) suggest, children start out with the default assumption that all nominals are projected as NPs only, and the D is absent in the early child grammar structure due to the Economy of Projection. Thus, they would treat definites as non-referential, like expletives.

In summary, generic and definite nominals appear at an early age in child languages, but the full grammar, including usage and semantic mapping, of definites has not been acquired yet at this point. Definites may be used in inappropriate contexts or misinterpreted as non-referential.

3.2 Bare and definite nominal contrasts

In comparing bare nominals with definite nominals, Gelman and Raman (2003) conducted a study on the interpretation of English bare and definite plurals. They tested two- to four-year-olds on their ability to use determiners as a cue to nominal interpretation. The children would be shown a picture of two penguins and asked either a question with a bare subject (*Do birds fly?*) or a

question with a definite subject (*Do the birds fly?*). The data reveal that the children appropriately differentiated between the generic and definite questions most of the time, interpreting bare plurals as generic and definite plurals as existential. However, the children did exhibit errors, which occurred in both directions: definite questions received generic responses between 5% and 10% of the time, and generic questions received existential responses between 16% and 27% of the time. As stated by Gelman and Raman (2003), the existential reading is the more salient one in this task, since it is supported by a picture of the specific referents. The saliency of the existential reading in comparison to the generic reading may explain why the children were more accurate when answering definite questions than generic questions. Based on the results, Gelman and Raman conclude that children have begun to distinguish between generic (bare plurals) and non-generic phrases (definite plurals) from a very young age. Although as treated in Gelman and Raman's study the generic responses for English definite plurals are errors, the next study, Pérez-Leroux et al. (2004), illustrates that the generic reading for definite nominals is actually allowed in child English.

Pérez-Leroux and colleagues (2004) designed a comprehension task to examine young children's interpretation of definite plurals, in contrast to bare plurals, in English and Spanish. Based on Chierchia (1998), the definite article is semantically the same in both languages—definite plurals should be able to have generic or existential definite interpretations. However, in English the bare plural blocks the generic reading of the definite plurals. Adopting Chierchia, Pérez-Leroux and colleagues (2004) hypothesized that if English-speaking children have problems deciding which form can be interpreted as generic, they will allow definite plurals to have a generic interpretation. In addition, the percentage of definite plurals being interpreted as generic was expected to be lower for English-speaking children than for Spanish-speaking children, given that this is a grammatical interpretation in Spanish.

In Pérez-Leroux and colleagues' (2004) comprehension task, eight stories were created, each containing two atypical members of a kind (e.g. two vegetarian tigers) and one observer, member of another kind (e.g. a rabbit). The presentation of prompts were counterbalanced for determiners (bare vs. definite) and order of presentation (immediate vs. delayed). A sample set of experiment items is illustrated below.

Fredi the tiger and Pepi the tiger only eat vegetables. Look, they're eating carrots. The rabbit is happy because he won't get eaten. Now let me ask you some questions.

Figure 1: An English experiment set

(11) a. Immediate question: **Do the tigers eat meat?**   (Yes: Gen.; No: Ext. Def.)

      b. Positive distracter: Do the tigers have stripes?

      c. Negative distracter: Do you have stripes?

      d. Delayed question: **Do tigers eat carrots?**   (Yes: Ext. Def.; No: Gen.)

      e. Demonstrative follow-up questions:

          How about those tigers? **Do those tigers eat carrots?** (Yes: Ext. Def.; No: Gen.)

The research participants were presented with yes/no questions about the atypical characters, as in (11). Each story was followed by four questions: one immediate question, two distracters (one positive, one negative), and a delayed question. The delayed question was introduced to evaluate whether the presentation order (distance from a discourse antecedent) plays a role in nominal interpretation: after listening to a story that introduces two atypical animals, a higher percentage of existential definite readings for the nominal subject in the immediate question was expected, compared to the delayed question. If a child assigned the incorrect generic interpretation to definites, then a demonstrative question was asked right after the delayed question. The demonstrative question was introduced to see if the children would choose the generic interpretation for definites based on their linguistic or non-linguistic knowledge. If the error was due to a non-linguistic factor, such as real-world knowledge, the children should also choose the incorrect generic reading for demonstratives. If the children correctly assigned the existential definite reading to demonstratives—that is, interpreted definites and demonstratives differently—this would suggest that the generic error for definites may have resulted from their interpretation of the nominal type itself, rather than from a non-linguistic factor.

The answers to the questions indicate the participants' interpretation of the target noun phrases. Affirmative answers to questions about the canonical property of the kind (yes to '*tigers eat meat*', (11a)) and negative answers to questions about the non-canonical property (no to '*tigers eat carrots*', (11d)–(11e)) would indicate acceptance of a generic reading of a noun phrase.[7]

The result of the first experiment of Pérez-Leroux et al. (2004), in which all sentences were in the present tense, shows that English bare plurals received high rates of generic readings in all age

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[7] As mentioned in §2, generic 'type' reading is possible for English and Spanish demonstratives, but not for Mandarin demonstratives in general. If the generic 'type' reading of English and Spanish demonstratives was counted in the experiment results, would it result in a high percentage of generic reading of demonstratives? Since the 'type' reading was not counted in the result, it is not a concern here. In the English and Spanish studies of Pérez-Leroux et al. (2004) and the current Mandarin study, the generic reading is defined as accepting a canonical sentence like (i) and rejecting a non-canonical sentence like (ii), as presented in bold below. Therefore, the 'type' reading is excluded.

  (i)   Do these tigers eat meat?   **Yes:** **generic (true to the kind 'tiger' in the real world)**;

                               No: Ext. Def. (true to the tigers in the context) or Gen. 'type' (true to the special subtype of tigers in the context).

  (ii) Do these tigers eat carrots? Yes: Ext. Def. (true to the tigers in the context) or Gen. 'type' (true to the special subtype of tigers in the context);

                               No: **Gen. (true to the kind 'tiger' in the real world).**

groups, including both children and adults (~80–95%). (Bare plurals are ungrammatical in Spanish and were not tested in the study.) On the contrary, the result for definite determiners is much more unexpected: English-speaking children assigned generic reading to definites 70%, and to demonstratives 13%, of the time, while adults provided almost no generic reading for definites (and, hence, no demonstrative follow-up questions for adults). The different semantics assigned to definites and demonstratives by English-speaking children illustrate that they interpreted the two determiners differently based on their linguistic knowledge about them. Spanish-speaking children assigned generic reading to definites 80–95% (older and younger groups), and to demonstratives 17–20% (older group) and 18–42% (younger group), of the time. There are no adult data available. There was no effect of presentation order (immediate or delayed mention) or of a property of the predicate (canonicity '*tigers eat meat*' or non-canonicity '*tigers eat carrots*') found in the English results. In the Spanish results, there was also no effect of canonicity, but there was a significant effect of presentation order.

Besides nominal structures, tense plays a role in the nominal interpretation as well. Since English present tense may force a generic/habitual interpretation and Spanish present tense is ambiguous between a generic/habitual and a progressive reading of the sentence, Pérez-Leroux and colleagues (2004) conducted another experiment to examine the effect of tense, either present or past, on definite noun phrase interpretation. The results show an overall lower proportion of generic responses for definites cross-linguistically compared to that in the present-tense-only experiment. In the Spanish study, there is a major reduction in children's generic reading of the definite plurals in past-tense sentences (40–50%) in comparison to that in present-tense sentences (60–70%). The effect of tense is significant in interpreting Spanish definite plurals. On the contrary, there is no significant effect of past vs. present tense on the interpretation of definite noun phrases in English. Regardless of tense, English-speaking children assigned generic reading to definites 40–50% of the time, whereas adults did not interpret definites as generic.

Based on the findings, Pérez-Leroux and colleagues (2004) propose that the generic interpretation of nominals is one of the basic readings for definites across languages in the given context, and English-speaking children, like Spanish-speaking children, have a grammar of definites that allows the possibility of generic readings.

4. Research questions and hypotheses

As discussed in §2, Mandarin bare nominals are ambiguous between generic and existential definite (singular or plural) readings in the subject position. In contrast to bare nominals, Mandarin demonstrative nominals, which allow only the existential definite reading, will also be examined in the study. The main research question for this study is: What is Mandarin-speaking children's interpretation of bare and demonstrative nominals? Specifically, do children distinguish between bare and demonstrative nominals by assigning different interpretations to them? Which interpretation do they prefer for bare and demonstrative nominals in particular contexts—generic or existential definite? Do children, like adults, have both generic and existential definite readings for bare nominal subjects but never interpret demonstrative nominals as generic? In addition, if children's interpretation of bare and demonstrative nominals in the subject position is different from that of adults,

what are the variables that may affect their interpretation? The last question will be investigated as part of the experimental design. To answer these questions, the following hypotheses and predictions are proposed.

First, the null hypothesis is that, with respect to general language acquisition, if Mandarin-speaking children's grammar is adult-like, they will allow both generic and existential definite interpretations for bare nominal subjects but only existential definite interpretation for demonstrative nominals. Assuming type-shifting is automatic and innate, as Chierchia (1998) suggests, it should be possible for children to assign either a generic or existential definite reading to bare nominals according to the context.

The second hypothesis is based on Chierchia (1998), Crain et al. (1994), Notley et al. (2012, 2015), and other relevant studies—de Villiers & Roeper (1995), Pérez-Leroux et al. (2004), and Vergnaud & Zubizarreta (1992). Assuming Chierchia's NMP, I hypothesize that all Mandarin nouns start out as mass and kind-denoting, can function as bare arguments, and can freely shift between indefinite and definite readings. The most economical way for Mandarin-speaking children to inter-pret bare nominals seems to be in reference to kinds, since kind-denoting is the default interpretation and does not require paying attention to the discourse. For this reason, the kind reading should be preferred whenever possible. Accordingly, younger Mandarin-speaking children, like English-speaking children, should prefer the generic reading for bare nominal subjects with characterizing statements. Older Mandarin-speaking children's generic interpretation for bare nominal subjects will decrease and diverge from that of English-speaking children. English-speaking children should always have the generic reading for bare nominal subjects since this is the only acceptable reading given a characterizing statement. In brief, I predict that children will at first allow generic readings of bare nominal subjects in Mandarin as much as what is evidenced in English.

Another assumption that predicts the generic preference for bare nominal subjects is based on Crain et al. (1994) and Notley et al. (2012, 2015). The Semantic Subset Principle (SSP) of Crain et al. argues for the following (1994:455).

> If the interpretative component of UG makes two interpretations, A and B, available for a sentence, S, and if interpretation A makes S true in a narrower range of circumstances than interpretation B does, then interpretation A is hypothesized before B in the course of language development.

For example, in the current experiment stories involving atypical animals, sentence (12) has two possible interpretations. The generic interpretation 'Tigers eat carrots' entails the existential definite one, 'Those tigers eat carrots.' In that case, the entailment goes from the more general read-ing to the more specific one. In other words, the circumstance in which the generic interpretation is true also makes the existential definite interpretation true.

(12) **laohu** chi hongluobo.
     tiger   eat carrot
    a.   'Tigers eat carrots.'
    b.   'The/Those tigers eat carrots.'

In the spirit of a more recent version of the SSP—that is, Semantic Subset Maxim (SSM) in Notley et al. (2012, 2015)—another way to contrast (12a)–(12b) is that the generic interpretation is the strong reading of sentence (12), while the existential definite interpretation is the weak reading. The difference between SSP and SSM is that the former predicts a complete presence/absence of a reading in the child's grammar at the initial stage of language development, while the latter predicts a default preference for the stronger reading of sentences. In accordance with SSP and SSM, it is predicted that despite the ambiguous readings of Mandarin bare nominal subjects, children will initially prefer the generic reading for bare subjects in the acquisition of Mandarin.

Regarding predictions for the interpretation of demonstratives, due to the lack of such studies in child language acquisition and the similarity between Mandarin demonstratives and definites of other languages (see §2), studies about the interpretation of definites and demonstratives are assumed to formulate predictions for the current study. de Villiers and Roeper (1995:73, 101) claim that children initially assume the NP as the maximal projection for complex nominals until a DP projection is justified. Therefore, children may treat English definites as non-entity-referring, as per the generic definites in Spanish when there is no DP projection, or in line with Roeper (2006), when the English definite article has not been put in the target (i.e. the D) position. The presumption of de Villiers & Roeper's (1995) study is that entity-referring nominals must be projected as DPs (Abney 1987; Longobardi 1994). Following Huang et al. (2009) and Longobardi (1994), I also assume that only nominals with DP projections, not NP projections, can be object-denoting in Mandarin. According to the DP/NP assumption and the study of de Villiers & Roeper (1995), it is anticipated that children may initially project NP, not DP, for Mandarin demonstrative nominals and assign the non-entity-referring generic reading to them, as if the demonstrative is transparent to them.

Vergnaud and Zubizarreta (1992) argue that the kind-referring reading is one of the possible readings for definites across languages, which is attested in the acquisition of English and Spanish definite nominals in Pérez-Leroux et al. (2004). As discussed in §3.2, Pérez-Leroux and colleagues (2004) find that both English- and Spanish-speaking children assigned the generic reading to definites and demonstratives. If Mandarin-speaking children treat demonstratives similarly to how English- and Spanish-speaking children treat definites and demonstratives, they may accept the generic reading as part of the semantics of demonstratives. Based on de Villiers & Roeper (1995), Vergnaud & Zubizarreta (1992), and Pérez-Leroux et al. (2004), children are predicted to allow generic readings for demonstrative nominals in Mandarin.

The third hypothesis proposes that the existential definite reading for Mandarin bare arguments is preferred. This prediction is consistent with the studies of Maratsos (1976:63) and Karmiloff-Smith (1979:71–72). Both studies bring forth the egocentric theory to account for the overuse of English and French definites in places where indefinites are expected. For example, in Maratsos' (1976) cave story experiment, preschool children were told about a group of boys and girls stuck in a cave because of rain, where eventually one goes outside to see whether it is still raining. When asked 'Who do you think went outside?' many children responded with an incorrect egocentric answer, such as 'The girl went out', even though no particular girl had been introduced to the listener, and 'a girl' should be used. Based on egocentric theory, it is possible that Mandarin-speaking children, while at the egocentric stage, will have difficulties considering the listener's viewpoint. Therefore, in the Mandarin story of carrot-eating tigers, when asked 'Do tigers eat meat?' they will answer 'No, (the) tigers do not eat meat', interpreting the bare nominal as existential definite, even though meat-eating tigers are not introduced in the context and children should normally consult their

real-world or linguistic knowledge to interpret the ambiguous Mandarin bare nominals. Mandarin demonstrative nominals only have an existential definite interpretation. In accordance with egocentric theory, it is predicted that Mandarin-speaking preschoolers, while at the egocentric stage, will interpret demonstrative nominals (or various types of nominals) as existential definite. Accordingly, it is predicted that children will prefer existential definite readings of bare and demonstrative nominals in Mandarin. Predictions about children's interpretation of Mandarin nominals are summarized below.

(13) a. Prediction based on the availability of an adult-like grammar (null hypothesis):
          Young children will have both generic and existential definite interpretations for bare nominal subjects but only an existential definite interpretation for demonstrative nominals.
      b. Prediction based on the NMP, SSP, SSM, and some others:
          Young children will have generic readings for bare and demonstrative nominals.
      c. Prediction based on egocentric theory:
          Young children will have existential definite readings for bare and demonstrative nominals.

5. A comprehension experiment on the contrast between bare and demonstrative nominals

The experiment in this study was adapted, with some changes, from its English version created by Pérez-Leroux and colleagues (2004). Due to the lack of obligatory number morphology in Mandarin, bare nominals can have either singular or plural interpretations. To avoid this ambiguity, in the current study all Mandarin bare nominals have a plural interpretation in the context and may be interpreted as generic or existential definite, and all demonstrative nominals appear with the plural demonstrative *zhexie* 'these'. All Mandarin test sentences appear without any aspect morphology and with characterizing statements only. The English/Spanish (Pérez-Leroux et al. 2004) and Mandarin experiments are basically identical, except for the following changes. First, both definites and demonstratives are tested in the English (*the*/*those*) and Spanish (*los*/*esos*) studies. Mandarin does not have articles; thus, only the plural demonstrative *zhexie* 'these' is tested. Second, instead of only one observing animal, as per the pictures used in the experiment by Pérez-Leroux and colleagues (2004), there are two observing animals of the same kind in the pictures in the Mandarin task to make all visual stimuli have a clear plural reading (Mandarin does not have obligatory plural morphology). Third, in Pérez-Leroux et al. (2004), the animals in the present-tense study have proper names, but the animals in the past vs. present tense study do not have proper names. The Mandarin study introduces the stories without naming the animals.

5.1 Stimuli and procedure

There were eight stories, and each had two atypical members of a kind and two observers. The eight target stories were about spotted zebras (no stripes), monkeys that eat grass (not bananas), cats that love to take a bath (not to stay dry), tigers that eat carrots (not meat), three-legged horses

(not four-legged), birds that live in caves (not in nests), dragons that breathe bubbles (not fire), and lions that live on boats (not on savannah). Each story was told alongside a laptop screen showing a full-sized picture of the two atypical animals and two observers. The picture was presented continuously until the participants had finished answering all the questions. The child participants were tested individually while adults were tested in groups, both by a native Mandarin-speaking experimenter. They watched pictures via a projected slideshow and circled the answers on an answer sheet. Four yes/no questions were asked in each story—two target questions and two distraction questions. (One of the two distraction questions asked for a positive response, and the other a negative.) There were a total of 32 questions—16 targets and 16 distracters. Additionally, 24 filler questions were tested—either yes/no questions or questions that had two answer options to choose from. There were two versions of the experiments, A and B, and the test questions were counterbalanced across stories in the presentation order (immediate or delayed mention), canonicity (typical or atypical properties), and determiners (bare or demonstrative). Within each version, half of the stories started with the canonical question, and the other half started with the non-canonical question. The entire experiment lasted about 12 minutes, depending on the participants' pace. A sample task is presented in the following. The participants' potential replies based on their interpretation of the subject phrase are indicated in italics.

zhe liang-zhi laohu zhi chi qingcai. Ni kan, ta-men zai-chi hongluobo. Zhexie tuzi hen gaoxing, yinwei laohu bu hui chi ta-men. Xianzai rang wo wen ni.

(These two tigers only eat vegetables. See, they're eating carrots. The rabbits are happy because they won't get eaten. Now let me ask you.)

Figure 2: Mandarin experiment example sets

(14) Version A:

Immediate, canonical, demonstrative
a. **zhexie laohu** chi rou ma?
   these   tiger   eat meat MA
   'Do these tigers eat meat?'
   (Yes: Gen.; No: Ext. Def.)

Filler questions
b. zhexie laohu you tiaowen ma?
   these   tiger have stripe MA
   'Do these tigers have stripes?'

(15) Version B:

Immediate, canonical, bare
a. **laohu** chi rou ma?
   tiger eat meat MA
   'Do tigers/the tigers eat meat?'
   (Yes: Gen.; No: Ext. Def.)

Filler questions
b. laohu you tiaowen ma?
   tiger have stripe MA
   'Do tigers/the tigers have stripes?'

c. ni   you   tiaowen   ma?
   you   have   stripe   MA
   'Do you have stripes?'

c. ni   you   tiaowen   ma?
   you   have   stripe   MA
   'Do you have stripes?'

Delayed, non-canonical, bare

d. **laohu**   chi   hongluobo   ma?
   tiger   eat   carrot   MA
   'Do tigers/the tigers eat carrots?'
   (Yes: Ext. Def.; No: Gen.)

Delayed, non-canonical, demonstrative

d. **zhexie**   **laohu**   chi   hongluobo   ma?
   these   tiger   eat   carrot   MA
   'Do these tigers eat carrots?'
   (Yes: Ext. Def.; No: Gen.)

As briefly mentioned in §4, the experiment was designed in order to investigate possible variables that may affect the interpretation of nominals. Pérez-Leroux and colleagues (2004) examined two such variables—presentation order of the nominal (i.e. distance from a discourse antecedent [immediate or delayed mention]), and a property of the predicate (i.e. part of real-world knowledge [canonicity '*tigers eat meat*' vs. non-canonicity '*tigers eat carrots*']). Although no significant effects were found in the English and Spanish data, except for the variable of presentation order in the Spanish data, there are good reasons to assume these two variables may have significant effects in Mandarin speakers' interpretation of nominals. Mandarin lacks in/definite articles and number morphology and relies on the context to make proper referential and number interpretation. Therefore, Mandarin is argued to be a discourse-oriented language (Huang 1984:549–551; Tsao 1977). The context, such as the presentation order or a property of the predicate, should consequently have more effects on Mandarin than it has on languages with articles, such as English and Spanish.
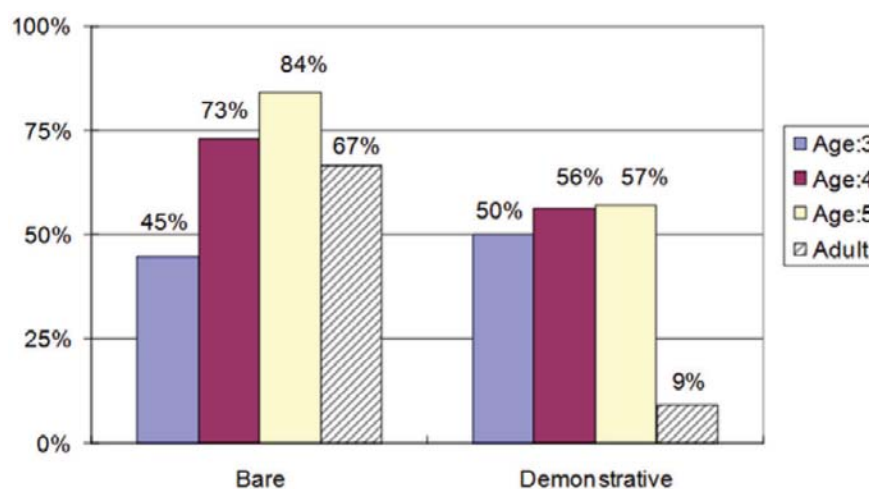
5.2 Participants and results

The Mandarin native-speaking participants in the version A experiment consisted of 31 children and 21 adults. Version B tested another group of participants with 32 children and 26 adults. Since no significant effect was found in the variable of version, the results of the two versions were combined (mixed-design ANOVA, $F(1, 94) = .047$, $p = .829$). The results presented here are from a total of 110 participants—63 preschoolers and 47 undergraduates—divided into four different age groups (see Table 2).

Table 2: Participants of the experiment

Age group	Subjects	Mean age	Standard deviation
Three	17	3;8	0;3
Four	23	4;5	0;3
Five	23	5;6	0;4
Adult	47	Undergraduates	

Figure 3 shows the mean proportions of generic responses for bare and demonstrative nominals among all four age groups. Based on a mixed-design ANOVA, there are significant effects of age ($F(3, 94) = 13.795$, $p < .001$), nominal types ($F(1, 94) = 26.639$, $p < .001$), and nominal types by age group interaction ($F(3, 94) = 9.992$, $p < .001$).

Figure 3: Mean proportions of generic responses

As shown in Figure 3, the participants generally prefer to assign the generic interpretation to bare nominals in comparison to demonstratives. The results show that children, like adults, have both generic and existential definite readings for subject bare nominals. The interpretation of bare nominals shows an A-shaped tendency: the tendency of interpreting bare nominals as generic increases from three- to five-year-olds and then decreases in the adult group. With respect to demonstratives, there is a clear discrepancy between adults' and children's interpretation (existential definite reading: 91% in adults vs. 43–50% in children). In other words, there exist non-target generic responses for demonstrative nominals among children (50–57%).

Children distinguish between bare and demonstrative nominals by assigning different interpretations. Among child participants, there is a significant difference between the interpretation of bare nominals and that of demonstrative nominals ($F(1, 51) = 4.873$, $p = .03$), and a significant effect of age ($F(2, 51) = 5.515$, $p = .007$). The distinction between nominal types can clearly be seen among four- and five-year-olds, who assign the generic reading to bare nominals 73% and 84% of the time, respectively, while they do so to demonstrative nominals 56% and 57% of the time, respectively. Among different age groups, five-year-olds behave most similarly to adults, making a significant distinction between bare and demonstrative nominals (adult: $t(92) = 8.57$, $p < .0001$; age five: $t(44) = 5.03$, $p < .0001$).

The experiment examined two variables that may influence the interpretation of nominals. The first variable is the presentation order. Table 3 presents the percentage of generic responses for nominals in the immediate- or delayed-mention sentences.

Table 3: Effect of presentation order on generic responses for bare and demonstrative nominals

Age	Three	Four	Five	Adult
Immediate mention	43%	57%	69%	34%
Delayed mention	53%	75%	70%	42%

As predicted, nominals appearing in the delayed-mention sentences generally receive more generic readings than those appearing in the immediate-mention sentences. The presentation order

has an overall significant effect on the nominal interpretation (mixed-design ANOVA, $F(1, 94)$ = 14.631, p = .000). Age also has a significant effect ($F(1, 94)$ = 17.259, p = .000). The four-year-olds are significantly affected by the presentation order when deciding which reading to assign to the nominals ($t(44)$ = –2.88, p = .006). Among different nominal groups, it is found that the presentation order has a significant effect on the reading assigned to bare nominals among all participants ($t(218)$ = –2.24, p = .0026). Presentation order also shows a significant effect on the interpretation of demonstrative nominals among all participants ($t(218)$ = –2.00, p = .0047).

The second variable is a property of the predicates. Table 4 presents the percentage of generic responses for nominals appearing in sentences with either the canonical (*tigers eat meat*) or non-canonical (*tigers eat carrots*) property.

Table 4: Effect of predicate canonicity on generic responses for bare and demonstrative nominals

Age	**Three**	**Four**	**Five**	**Adult**
Canonical	67%	66%	66%	45%
Non-canonical	29%	66%	72%	30%

As predicted, nominals appearing with the canonical property generally receive more generic interpretation than those appearing with the non-canonical property. There are overall significant effects of this property of predicates (mixed-design ANOVA, $F(1, 102)$ = 7.660, p = .007) and of age groups ($F(3, 102)$ = 17.452, p = .001). Significant effects are found in the group of three-year-olds and in the group of adults, who make a significant distinction between the reading for nominals with canonical property and those with non-canonical property (age three: $t(32)$ = 4.9, p = .0001; adult: $t(92)$ = 3.27, p = .001). Among different nominal groups, canonicity of the sentences is found to have a significant effect on the reading assigned to bare nominals among all participants ($t(218)$ = 2.95, p = .0035). Three-year-olds and adults are significantly affected by the canonicity when interpreting bare nominals (age three: $t(32)$ = 3.64, p = .0009; adult: $t(92)$ = 2.42, p = .017). Similarly, significant effects are found in the reading assigned to the demonstrative nominals appearing in either canonical or non-canonical sentences among all participants ($t(218)$ = 1.99, p = .0047) and among three-year-olds and adults (age three: $t(32)$ = 4.8, p = .0001; adult: $t(92)$ = 2.95, p = .0004).

In sum, Mandarin-speaking children, like adults, have both generic and existential definite readings for bare nominal subjects. Bare nominals obtain a higher proportion of generic reading than demonstrative nominals do. Demonstrative nominals obtain the generic reading about half of the time from children, but not from adults. Both of the variables—presentation order and predicate canonicity—examined in the study affect the interpretation of bare and demonstrative nominals. Nominals appearing in delayed mention and nominals appearing in canonical sentences generally receive more generic readings.

5.3 Individual analyses and discussion

This study discovers two types of possible interpretation biases. First, the generic bias—always choosing the generic reading regardless of bare or demonstrative nominals—involves selecting the

non-target generic interpretation for demonstratives. The generic bias was only found in children—two four-year-olds and three five-year-olds (five out of 63). Second, the existential definite bias—always choosing the existential definite reading regardless of bare and demonstrative nominals—was a grammatically plausible bias because bare nominals can be interpreted as either generic or existential definite. The existential definite bias was only found in five adults (out of 47), but not found in children.

Before examining the individual responses more closely, given the overall high percentage of generic responses for both types of nominals, I hypothesize that those who provide more generic responses for demonstratives will also have more generic responses for bare nominals because they may be biased by the story content and therefore prefer generic reading regardless of the nominal types. The prediction is that there will be a correlation between the generic reading for demonstratives and the generic reading for bare nominals—especially among the participants who prefer the generic reading for demonstratives.

Table 5, which lists the individual responses of adults, shows that adults seldom assign generic readings to demonstratives, which is ungrammatical in the target grammar. Unsurprisingly, most adult participants (89%, 42 out of 47) assign the non-target generic readings to demonstratives only zero to two times (shown in the top row of Table 5). The reading adults assign to bare nominals should depend on their decision on each question because bare nominals are ambiguous between the generic and the existential definite reading in the given context. This fact also accords with the results in Table 5—adults' generic responses for bare nominals do not reveal any interpretation tendency. However, even though no adults show the non-target generic bias, the prediction about a possible correlation between the generic reading for demonstratives and that for bare nominals can be considered true among adults. A correlation is found between adults' generic interpretation of demonstratives and that of bare nominals ($n = 47$, $r = .23$, $p = .06$). As predicted, the adults who assign a generic reading for demonstratives over half of the time (four to five times in Table 5, the prefer-generic-reading-for-demonstratives group, shown in the gray area) also prefer generic reading for bare nominals (four to six times, shown in the gray area). On the contrary, for those who prefer a generic reading for bare nominals, their interpretation of bare nominals does not predict their interpretation of demonstratives. For instance, as indicated by the arrows above Table 5, the adults who assign generic readings for bare nominals all the time (six times out of six) do not necessarily prefer generic reading for demonstratives.[8]

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[8] The experiment in this study was revised from its English version to a Mandarin version. To discover whether there are any cultural differences regarding knowledge of the target animals, a knowledge test was conducted. This test included 16 target questions (on the eight pairs of animate bare nominal subjects in the comprehension task). One pair of target questions is provided below.

(i) a. shizi zhu zai chuan shang ma?
           lion live at boat on   MA
           'Do lions live on a boat?'

      b. shizi zhu zai caoyuan li ma?
           lion live at savannah in MA
           'Do lions live in the savannah?'

Table 5: Listing of individual responses of adults

| Generic responses for demonstratives	0	0	0	0	0	0	**0**	1	1	1	1	1	**1**	2	2	2	4	5	5	
Generic responses for bare nominals	0	1	2	3	4	5	**6**	0	1	2	4	5	**6**	1	3	5	4	5	6	
Number of participants	*5*	*1*	*2*	*3*	*3*	*7*	*5*	*2*	*1*	*2*	*3*	*4*	*1*	*1*	*1*	*1*	*1*	*2*	*2*	*47*

In the three-year-olds' data, there is a significant correlation between the generic interpretation of demonstrative and of bare nominals overall ($n = 17$, $r(17) = .49$, $p = .02$).[9] The four-year-olds' data also reveal a significant correlation among the generic reading of the two types of nominals ($n = 23$, $r = .63$, $p = .00$). In the main study result (Figure 3) of the mean percentage of generic reading for each nominal type and age group, the five-year-olds' data are most puzzling. They perform the highest percentage, at 57%, of generic reading for demonstratives. After examining the five-year-olds' individual data, I find that their behavior is actually similar to that of other age groups, with an overall significant correlation ($n = 23$, $r = .44$, $p = .01$) between their generic interpretation of demonstratives and that of bare nominals. Individual participants' generic responses can be found in Figures 4 and 5.
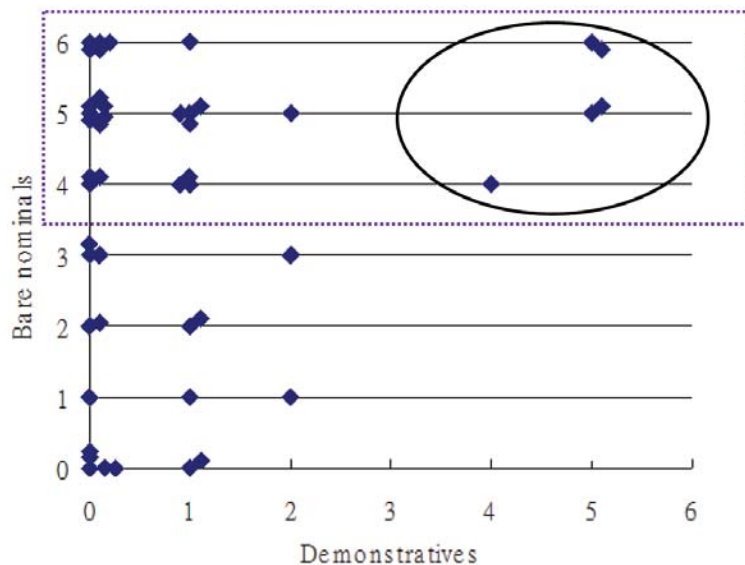
Figure 4: Individual adult's generic responses ($n = 47$, each dot represents one adult)

There were 26 fillers, including eight pairs of inanimate bare nominal subjects and 10 distracters. The participants were 13 Mandarin native-speaking adults. Their responses show that the average percentage of correct answers is 86%. *Banma* 'zebra' and *mao* 'cat' have lower percentages, 70% and 66% respectively. Excluding the responses for these two animals, the average percentage of correct answers is 93%. Therefore in the individual analysis, the responses for 'zebra' and 'cat' were not included. Only the other six animals were examined.

[9] All child groups were examined using the same method as that for the adult group, as illustrated in Table 5. Such listing tables for the child groups are not included to maintain the brevity of the article.
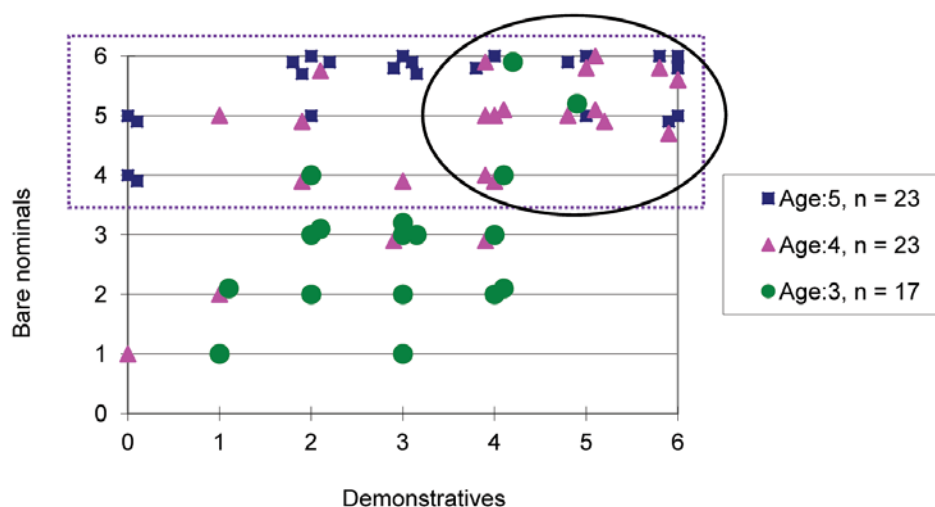
Figure 5: Individual children's generic responses (*n* = 63, each dot represents one child)

Comparing the scatter charts of each adult's and each child's responses in Figures 4 and 5, I find that the pattern in children's data is similar to that in adults' data. No data appear in the lower-right area in either figure. This supports the prediction that there is a correlation between the generic reading assigned to demonstratives and that assigned to bare nominals (the oval area in Figures 4 and 5). On the contrary, the preference of assigning generic responses to bare nominals does not predict the preferred reading of demonstratives (the dashed-line-rectangle area).

The individual analysis of those providing generic readings more than half of the time (providing four to six generic responses for either nominal type) helps to clarify the main data in Figure 3, especially the unexpected non-target generic reading for demonstratives. Figure 6 illustrates that the number of participants who prefer the non-target generic reading for demonstratives is lower in the five-year-old and adult groups, resulting in a more obvious A-shaped tendency compared to that in Figure 3.
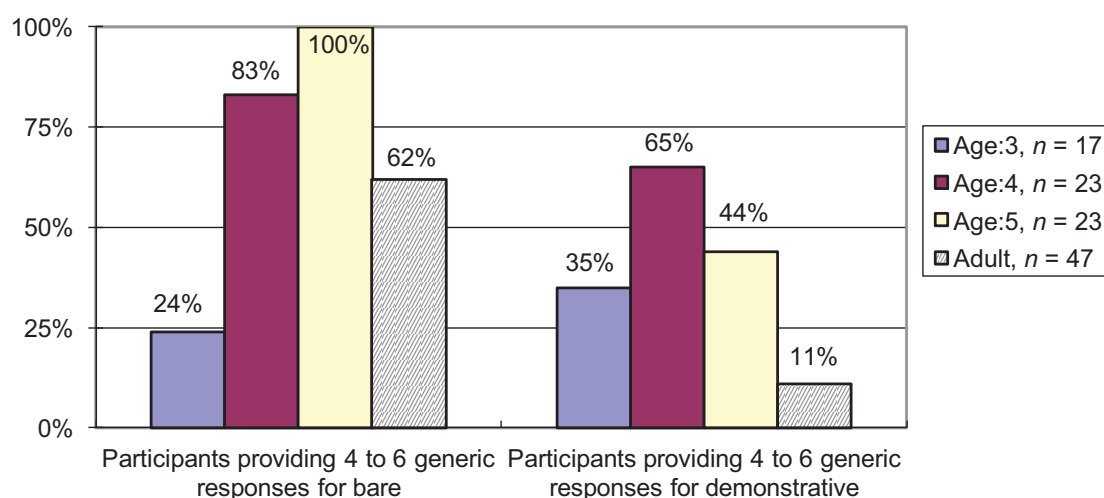
Figure 6: Percentage of participants providing generic responses over half of the time

In the adult group, 11% gave generic responses to demonstratives more than half of the time (four to six responses). Clearly, these people are the main cause for the unexpected generic responses for demonstratives in the adult group, when the majority of others assigned existential definite readings to demonstratives. The situation is similar for the five-year-olds. The high percentage of generic responses of demonstratives seems to result from 44% of the five-year-olds who have preference for generic readings. A total of 24% and 35% of three-year-olds prefer generic readings for bare and demonstrative nominals, respectively. The numbers are much lower than the three-year-olds' mean percentages of generic responses, at 45% for bare and 50% for demonstratives (Figure 3). This indicates that not many three-year-olds prefer generic readings in their overall responses. As for the number of people preferring a generic reading for bare nominals, a surprisingly high percentage in both the four- and five-year-old groups requires explanation.

6. Summary of findings and discussion

This study discovered an overall preference for generic readings among Mandarin-speaking children, even for demonstrative nominals that do not have generic readings in the adult grammar. There is a significant difference between the interpretation of bare nominals and that of demonstrative nominals, which indicates that children do differentiate between bare and demonstrative nominals although this interpretation is not fully adult-like.

For bare nominals, children—like adults—assign both generic and existential definite readings to bare nominal subjects. Children assign generic interpretations to bare nominals more than they assign existential definite readings to bare nominals. As for demonstrative nominals, unlike adults, children of all age groups assign the existential definite reading to demonstratives 43–50% of the time, which is clearly different from the 91% provided by adults. In other words, children allow the non-target generic reading for demonstrative nominals. More discussion about the interpretation of bare and demonstrative nominals will be presented in the following subsections.

As part of the experimental design, at least two variables affected the Mandarin speakers' interpretation of bare and demonstrative nominals: the presentation order of the nominal and a property of the predicates (canonicity vs. non-canonicity). Nominals appearing in delayed-mention sentences and in sentences with canonical properties received more generic readings. The findings of the significant effects of these two variables are different from the findings for English and Spanish in Pérez-Leroux et al. (2004). In the English study, both variables are non-significant; in the Spanish study, only the presentation order, not the canonicity of the predicate, has significant effects. The effect of both variables found in Mandarin, but not in the other two languages, supports the prediction that speakers of Mandarin, a discourse-oriented language, may rely more on the discourse context during comprehension, such as the presentation order and the experiment story (canonicity), than the speakers of structure-oriented languages do.

6.1 Interpretation of bare noun phrases

In adult Mandarin grammar, bare nominal subjects have a chance to be interpreted as generic about half of the time because of their ambiguity between the generic and the existential definite

interpretations. The results show that the generic reading for bare nominals in adults was 67%—that is, higher than 50%. Such a result is expected because the given context (animate objects and lack of aspect markers) would supposedly trigger more generic reading. The study found that the four- and five-year-olds had a strong preference toward generic reading for bare nominals (73–84%). In Pérez-Leroux et al. (2004), Spanish-speaking children of similar ages assigned 80–86% generic readings to the definite nominals with *los* 'the'. English bare plurals only allow generic interpretation and received 80–95% generic readings among children and adults in their study. In other words, Mandarin bare nominals are more comparable with Spanish definite nominals than with English bare nominals. This is somewhat to be expected, given that Spanish definite nominals, like Mandarin bare nominals, are ambiguous between the generic and the definite readings, as shown in Table 1.

The study results regarding the interpretation of bare nominals in child Mandarin supports the null hypothesis that, like adults, children have both generic and existential definite readings for bare nominals. The finding regarding the generic reading of bare nominals supports the hypothesis and prediction, based on Chierchia (1998), and SSP/SSM in Crain et al. (1994) and Notley et al. (2012), that children will allow generic readings of bare nominals in Mandarin. Following Chierchia's (1998) theory, it would be economical for children to interpret bare nominals as generic since Mandarin nouns start out as kind-denoting. In accordance with SSP/SSM, the generic interpretation is the default preference because it is the 'strong' reading—the circumstance in which the generic interpretation is true also makes the existential definite interpretation true. To interpret bare nominals as existential definite rather than the default generic preferences, as adults are capable of, requires reference to the discourse and is less economical.

6.2 Non-target interpretation of demonstrative noun phrases

This research discovered a non-target generic interpretation of Mandarin demonstrative nominals assigned by children (50–57%) and adults (9%). This indicates a clear divergence between adults' and children's interpretation of demonstratives. This finding regarding demonstrative nominals deviates from the common belief that demonstrative nominals, such as the ones used in the experiment following Mandarin *zhexie* 'these', should never have a generic reading referring to the natural kinds in the real world. Unlike the Mandarin result, in Pérez-Leroux et al. (2004) Spanish-speaking children of similar ages assigned 18–42% generic readings to demonstrative nominals with *esos* 'these'. Their English-speaking children interpreted demonstrative nominals based on a generic reading 13% of the time. However, this distinction among the plural demonstratives of Mandarin, Spanish, and English is reasonable given that Spanish and English plural demonstratives may be ambiguous between the type reading and the existential definite reading, while Mandarin plural demonstratives are not ambiguous. Another example of determiner phrases which is also semantically unambiguous is the English definite plural. In Pérez-Leroux et al. (2004), English definite plurals received 70% generic reading from children, and almost 0% from adults. This suggests that Mandarin demonstrative plurals are more similar to English definite plurals than to Spanish and English demonstratives in child language. This similarity is expected because only Mandarin demonstrative plurals and English definite plurals are unambiguously definite in Table 1.

Some further examination was conducted to account for the Mandarin data. First, the analysis of individual differences provides some insight in this regard. There exist correlations between the generic reading for demonstratives and that for bare nominals in the data of children and adults ($n = 110$, $r = .321$, $p = .001$). Participants who preferred the generic reading for demonstratives tended to assign generic readings to bare nominals, but not vice versa (as shown in Figures 4 and 5). A closer look at the individuals' responses also reveals that the high percentage of non-target generic responses of demonstratives is a result caused by certain participants with a strong preference for generic readings. For instance, a generic bias was found in five children, who always selected the generic reading regardless of nominal types, but no adults had such a bias. These children may have shown a generic bias but not an existential definite bias because they did not pay close attention to the experiment, resulting in answers that were strictly based on their real-world knowledge. In contrast, five adults selected the grammatical existential definite reading for both nominal types all of the time, but no children had such a bias. It seems that the adults focused more on the experiment context than the children did. In brief, individual analysis suggests that the non-target generic reading of demonstratives may result from individual preference.

Second, a possible semantic account for assigning the generic reading to demonstratives is that cross-linguistically all children allow generic readings for definite expressions for a certain period of time. Mandarin-speaking children seem to underspecify Mandarin demonstratives and treat them like the Spanish or English definites, which allow generic readings. In other words, for Mandarin-speaking children, demonstrative *zhexie* 'these' is a 'less-specified' determiner head like Spanish *los* 'the' or English *the* and includes generic interpretation as part of its grammar (Pérez-Leroux et al. 2004). After Mandarin-speaking children acquire the adult grammar of demonstratives, they should no longer interpret demonstratives as generic; thus, the generic bias is not found in adults.

Third, another possible semantic account, which would bring the findings in line with previous findings from studies of English-speaking children about definites, is that, like definite nominals in child English, demonstrative nominals in child Mandarin lack the 'uniqueness' requirement (Wexler 2011). This may explain why children assigned a generic interpretation to demonstrative nominals in the experiment. In other words, children could have been interpreting *zhexie laohu chi rou ma?* 'Do these tigers eat meat?' as whether or not 'some tigers' eat meat, and therefore provided the canonical response; that is, the generic reading. Another piece of evidence supporting this approach is that children's interpretation of Mandarin demonstrative plurals and English definite plurals are comparable, as mentioned at the beginning of this section.

Fourth, the non-target reading of demonstratives in Mandarin brings us back to a fundamental question: When do children acquire demonstratives as determiners in Mandarin? In §3, we saw that articles are produced early in English, and the same is true for demonstratives in Mandarin. In Chang's (2011) six-month longitudinal free-speech corpora, almost all the cases of demonstratives *zhe* 'this' and *na* 'that' (157 and 39 tokens respectively, out of 3248 utterances in 14-hour recordings) produced by Nana (2;0–2;6) were used as subject pronouns, except one possibly idiomatic use (16a) and one determiner use (16b).

(16) a. zhe yangzi   (possibly a fixed term for Nana at that time)
          this way/style   (Nana 2;0.8)
          'this way'

    b.   mama   wo   yao   zhe   yizi   (Nana 2;2.1)

           Mom   I   want   this   chair

           'Mom, I want this chair.'

There are no plural demonstratives in any of Nana's data. Some plural demonstrative cases—that is, *zhexie* 'these' and *naxie* 'those'—are found in the data of an older child, Didi. In fact, there are only one *zhexie* and two *naxie* cases in Didi's data (2;9–3;3, 4467 utterances in 12-hour recordings), and all these cases are used as subject pronouns. Neither the singular nor plural demonstratives are at first used as determiners by young children. Since Mandarin-speaking children do not initially produce demonstratives as determiners, but as pronouns, it is not surprising that the children in this study assigned a considerable proportion of generic readings to *zhexie*, as if they treated *zhexie*-N as an unanalyzed unit and interpreted the whole unit as generic. Mandarin-speaking children may first project *zhexie*-N as an NP, not a DP (de Villiers & Roeper 1995), and thus assign it the non-object-denoting default generic reading (Chierchia 1998).

Although the reason for the considerable proportion of generic readings assigned to Mandarin demonstratives requires more scrutiny, it is possible that Mandarin demonstrative determiners are more similar to Spanish or English definite articles than commonly expected—both are possible generic expressions. Partee (2006) mentions a common observation from Lyons (1999) and Lyons (1975) that definite articles usually derive from demonstratives. The current finding seems to support the statement that the Mandarin demonstrative is becoming a definite article and sometimes displays the properties of definite articles, as has been argued in previous literature (Chen 2004; Huang 1999).

7. Concluding remarks

This study investigates Mandarin speakers' interpretation of bare and demonstrative noun phrases. Mandarin bare nominal subjects are ambiguous between the generic and existential definite readings, while Mandarin demonstrative nominals allow only the existential definite reading. Therefore, the null hypothesis is that if Mandarin-speaking children's grammar is adult-like, they will have both generic and existential definite interpretations for bare nominal subjects and only existential definite interpretation for demonstrative nominals. Based on previous studies, two other hypotheses and predictions were also made for child Mandarin: (i) based on NMP, SSP/SSM, and other relevant studies, young children prefer generic readings for Mandarin nominals; and (ii) based on egocentric theory, young children prefer existential definite readings for Mandarin nominals. This study supports the first prediction of generic reading preference, and the null hypothesis in terms of bare nominals.

This study also finds that nominal types (bare or demonstrative) and age have significant effects on the interpretation of noun phrases. A preference for the generic interpretation is found for bare nominals, and the child participants also assigned the non-target generic interpretations to demonstrative nominals about half of the time. While a Mandarin-speaking child may produce the demonstrative nominals in her own speech as early as at age 2;2, Mandarin-speaking three- to five-year-olds in general do not associate demonstrative nominals with the adult-like existential definite

interpretation. Rather, in the given context the children associated the demonstrative nominals with the generic interpretation, which is a possible interpretation of English and Spanish definite nominals. Pérez-Leroux and colleagues (2004) found that the percentage of generic interpretations for English and Spanish definite (*the*/*los*) nominals was much smaller in their past-tense study than that in their present-tense study. Mandarin is a tenseless language. It is important to investigate whether the presence of the Mandarin perfective aspect marker –*le* will block the generic interpretation and result in the existential definite interpretation for both bare and demonstrative nominals (the only possible interpretation when the perfective marker is present). Still, the finding of the non-target generic interpretation of demonstratives awaits further investigation and explanation.

In a recent editorial, Crystal notes that 'four-fifths of what we know about children's language is still derived from English' (Crystal 2014:vi; see also Behrens 2014:i). Even though Mandarin is one of the most spoken languages in the world, what we know about child Mandarin is relatively limited (Lee 2009:134). This empirical study contributes to our understanding of the interpretation of noun phrases among Mandarin-speaking children and adults. It is hoped that more theoretical and acquisition studies using cross-linguistic data will continue to be done and further our understanding of nominal acquisition.

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兒童對漢語光桿名詞和指示詞組的理解

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漢語名詞組可以用光桿名詞或非光桿名詞的形式帶著不同含意在句子中的不同位置出現。問題是若光桿名詞可以有不同含意，漢語兒童如何理解？另外，兒童如何理解像指示詞組這樣的非光桿名詞呢？本實驗考察漢語兒童與成人對名詞組的理解，結果發現名詞類型和年齡對名詞的理解有顯著影響。研究發現 (1) 兒童能區分光桿名詞和指示詞組，光桿名詞較多地被理解為類指 (generic)。(2) 兒童和成人都允許光桿名詞被理解為類指或定指 (definite)。(3) 兒童和成人對指示詞組的理解有清楚的差異。兒童在相當次數上將指示詞組詮釋為類指。關於這個在成人語法中不被允許的對指示詞組的類指詮釋，個體分析發現對指示詞組的類指詮釋和對光桿名詞的類指詮釋具有相關性。這表明那些較多地將指示詞組詮釋為類指的受試者也更可能將光桿名詞詮釋為類指。同時經由實驗發現，名詞出現的順序和謂詞的屬性，也都會影響對名詞組的詮釋。

關鍵詞：漢語，母語習得，光桿名詞，指示詞，理解與詮釋