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Acquisition of the Non-interrogative Uses of the Wh-Element Na in Child Mandarin

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Abstract

The present study focuses on the acquisition of non-interrogative interpretations of the wh-element na in child Mandarin. Previous L1 acquisition studies have focused primarily on the universal and existential indefinite readings of a restricted set of the Chinese wh-words, with limited attention devoted to their free choice reading. Building on existing research, this study takes the Chinese interrogative wh-element na as a case study to explore the early acquisition of the three non-interrogative usages of the wh-words na-CL-NP "which", nar and nali "where" in child Mandarin through a corpus study. This study suggests that na-CL NP "which" has the same various non-interrogative readings as nar or nali "where". Moreover, the findings reveal the existence of a developmental order in the acquisition process. The negative context, which elicits the existential indefinite readings, is acquired earliest, while the free-choice usage is acquired later. Additionally, there is no significant correlation between the adult input and the output of children.

Keywords

Non-interrogative wh-words, licensing environments, first language acquisition

1. Introduction

Chinese *wh*-pronouns such as *shenme* "what", *shei* "who" and *nar* or *nali* "where" not only play a role in forming *wh*-question as in (1) but also exhibit non-interrogative readings including the existential indefinite reading, the universal interpretation, and the free choice reading in the corresponding licensing contexts (Chao, Y. R., 1968).

(1) Zhangsan chi le shenme?
Zhangsan eat asp what
"What did Zhangsan eat?"

Shenme "what" in (2) receives an existential indefinite meaning rather than having interrogative interpretations as in (1). With the help of the Chinese marker *dou* "all" which is also a universal quantifier, the sentence including *wh*-pronoun *shenme* "what" in (3) is licensed as a statement with a universal reading. *Shenme* "what" in (4) has a free choice interpretation which means *Zhangsan* is able to choose a book within a set (e.g., Zhangsan can read a novel or a textbook).

(2) Zhangsan meiyou chi shenme dongxi
Zhangsan not eat what food
"Zhangsan did not eat anything."
(3) Zhangsan shenme dou chi
Zhangsan what all eat
"Zhangsan eats everything."

(4) Zhangsan shenme shu dou keyi du
Zhangsan what book all can read
"Zhangsan can read any book."

The various interpretations of Chinese *wh*-pronouns have led many analyses to consider the Chinese *wh*-words pattern with English polarity items which can either be licensed as negative polarity items (NPIs) or free choice items (FCIs) in the specific linguistic contexts due to their comparable distributions. For example, in the contrast of (1) and (2), it seems that *wh*-words *shenme* "what" can be interpreted as a NPI in the negation. Li observes that the occurrence of *wh*-indeterminates, which only exhibits the existential indefinite reading in negative sentences instead of affirmative linguistic contexts, in Chinese is licensed by certain semantic and syntactic constraints. On the one hand, Li generalizes the environments that the existential *wh*-phrases are allowed to appear into three different types by the truth value of the proposition: first, the typical negative polarity contexts including negation, questions, and conditionals; secondly, sentences consist of non-factive verbs like *renewed* "believe" which the truth value of its complement clause is not asserted directly; thirdly, the truth value is not fixed contexts such as sentences with circumstantial *le*. On the other hand, Li also emphasizes the syntactic constraints of *wh*-indeterminates in the sentence to achieve the existential indefinite meaning that the indefinite *wh*-phrases must be c-commanded by the *wh* licensor at S-structure (Li, Y. H. A., 1991).

Subsequently, Lin summarizes the licensing conditions of Chinese existential indefinite *wh*-phrases (EPWs) into three types, including standard English negative polarity items licensing contexts consisting of negation, questions, and if-clauses, epistemic modality environments involving epistemic adverbs like *keneng* "maybe", some future environments such as sentence involving *hui* "will". To make a comprehensive summary of the semantic characterization of Chinese existential *wh*-phrases, Lin follows Huang's proposal of LF movement that if a scope-bearing element c-commands another scope-bearing element at S-structure, then the former has scope over the latter at LF. For example, in sentence (5), the A-not-A licensor does not have scope over the *wh*-subject at LF, thus the A-not-A licensor does not c-command the *wh*-subject *shei*"who" at S-structure, and this sentence is ungrammatical (Lin, J. W., 1998; Huang, C.-T.J., 1982).

(5) *shei mai-bu-mai zhe-ben shu
who buy-not-buy this-CL book
*"Does someone buy this book or doesn't someone buy this book?"

Moreover, *wh*-phrases must be associated with the Chinses marker *dou* which is equivalent to *every* to get a universal interpretation. Nevertheless, universal *wh*-phrases are allowed only in the scope of the quantifier marker by fronting to the marker *dou* (Cheng, L. L. S., 1994).

As (6) illustrates, *shenme* "what" on the right side of marker *dou* is out of its scope, therefore cannot receive a universal interpretation like (7).

(6) Zhangsan dou kan shenme shu
Zhangsan all read what book
"What book does Zhangsan read?"

Cannot mean: "Zhangsan reads every book."

(7) Zhangsan shenme shu dou kan
Zhangsan what book all read
"Zhangsan reads every book."

Aside from being treated as negative polarity items, Chinese *wh-phrases also* have free-choice interpretation in specific licensing contexts like (4). Giannakidou claims that FCIs have more restrictive distributions that are only allowed to appear in the non-veridical and non-episodic contexts which do not refer to an exact or particular event, distinguishing FCIs from negative polarity items. Therefore, Chinese *wh*-elements are allowed to be interpreted as FCIs in non-episodic contexts containing modal verbs such as *keyi* "may" (Giannakidou, A., 2001).

Giannakidou and Cheng point out the obligatoriness of *dou* of the free-choice interpretation. Without the help of *dou*, FCIs only receive an interrogative reading with the modal verb such as (8) (Giannakidou, A. & Cheng, L. L. S., 2006).

(8) shei keyi chi shuiguo
who can eat fruit
"Who can eat fruit?"

Apart from the licensing contexts, Chinese FCIs are also subject to specific syntactic constraints that *wh*-elements are unacceptable in the object position with modal verb while without the marker *dou* such as (9).

(9) ta na-ben shu dou key jie
He which-CL book all can borrow
"He can borrow any book."

Moreover, Giannakidou and Cheng also propose that Chinese *wh*-phrases can be divided into three types in terms of the core characteristic of FCIs that free choice items are unacceptable in episodic context: bare *wh*-words like *nar* or *nali* "where", *na*-CL NP "which" and *the* NPs. The difference between bare *wh*-elements and *na*-CL NP "which" is that the latter is not allowed to appear in contexts involving episodicity and thus can only be treated as FCIs while treating bare *wh*-elements as both NPIs and FCIs is possible. Therefore, *na*-CL NP "exhibits more restrictive distributions since it is unacceptable in typical episodic environments including episodic questions and negation. However, this conclusion is inconsistent with the present study's findings, which will be described in detail later.

Previous studies about the acquisition of Chinese *wh*-phrases were conducted in terms of two aspects: the order of Mandarin-speaking children's acquisition of *wh*-words and their sensitivity to different licensing contexts of *wh*-elements' non-interrogative readings. Fan believes that in children's initial production, the contexts of non-questioning usage that appear are single and only in negative sentences. The non-interrogative meaning expressed is also basically single, that is, existential indefinite reading. The development of children's non-questionable knowledge can be reflected in the increasing use of non-questioning *wh*-words in non-negative contexts (Fan Li, 2012).

More recently, researchers have contributed various experimental studies investigating whether children are sensitive to the different licensing contexts of *wh*-elements' non-interrogative uses. Zhou conducted two studies on children's acquisition of the Mandarin *wh*-adjunct *zenme* "how", which can be used to question the manner or cause of an event. The findings reveal that 4-year-olds access both interpretations, but they prefer the manner of reading. At 5 years old, children can use syntactic cues to disambiguate the readings, while 3-year-olds are still working on mapping syntax to semantics (Li J. & Zhou P., 2020).

Yang, Goodhue, and Lidz investigated 3-year-old children's knowledge of *wh*-words' indefinite and universal readings by Question-Statement Task, pointing out that children already have sophisticated knowledge thus setting a new upper bound on the age of acquisition (Yang, Goodhue & Li D Z., 2020).

Huang, Haiquan, Peng Zhou, and Stephen Crain investigated the possibility that FCIs are negated, not canceled, by external negation (Huang, Haiquan, Peng Zhou, & Stephen Crain, 2020).

Based on a Truth Value Judgment Task, Zhou conducted an experiment on children's comprehension of *wh*-words' existential indefinite reading and universal reading in two distinct linguistic contexts. Zhou investigates Mandarin-speaking children aged between 03;06 and 04;09 and points out that children are able to assign a universal interpretation to the *wh*-words c-commanded by *dou* while assigning an indefinite reading to the *wh*-elemnets under the scope of negation *meiyou* "not". Zhou also proposes that children are innately sensitive to the licensing conditions of non-interrogative uses since they have a variable-binding mechanism to distinguish different interpretations (Zhou Peng, 2010).

Although previous theoretical and acquisition studies lay a solid foundation for the present study, there are some limitations that still exist. The present researches about children's sensitivity to different licensing contexts provide only limited insight into the acquisition of *wh*-words' non-interrogative usages, investigating restricted interpretations. Most of the studies concentrate on the universal reading and the existential indefinite reading while research on free choice inference lacks investigation. Limited *wh*-words and linguistic contexts are investigated. Back to *na*, its more various forms (i.e., *near* or *nali* "where" and *na*-CL-NP "which") compared to other *wh*-words, and the different interpretations that each form is allowed to have made it harder for children to acquire.

Therefore, in the following sections, the current research will first discuss the non-questioning usage of *wh*-element *one's* two forms, and comprehensively examine children's knowledge of non-interrogative uses of *wh*-words through a corpus study.

2. The non-interrogative usage of wh-element na

Chinese *wh*-words *na* has two variations compared with other *wh*-pronouns: bare wh-words *nar* or *nali* "where" and *na*-CLNP "which" such as *na-ge xuesheng* "which student".

Nar or *nali* "where" patterns with bare *wh*-words that can be interpreted as either negative polarity items or free choice items in different licensing environments. Therefore, all the non-interrogative readings including the existential indefinite interpretation, universal reading, and free choice meaning are possible for *nar* or *nali* "where" in the corresponding licensing contexts as illustrated in the following sentences.

(10) (a) Zhangsan mei qu nali
Zhangsan does not go where
"Zhangsan did not go anywhere."
(b) Zhangsan qu nali le ma
Zhangsan goes where ASP Q (question marker)
"Did Zhangsan go anywhere?"
(11) nali dou you zhe-ben shu
where all have this-CL book
"Everywhere have this book."
(12) xuexiao nali dou keyi you zhe-ben shu
school where all may have this-CL book
"This book can be found anywhere in school."

Cheng proposes that *na*-CL NP is only allowed to be treated as FCI. However, the present study finds that *na*-CL-NP "which" is similar to *nar* or *nali*"where" in terms of distributions and is allowed to have existential indefinite, universal, and free-choice interpretations in different licensing environments. The distribution of *na*-CL NP "which" is not strictly restrictive that can only appear in a limited context of free choice items such as modalized sentences, but is not allowed to appear in the typical environments of NPIs. In some cases, *na*-CL NP "which" is allowed to appear in negations and questions such as (13) and (14), playing the same role as *wh*-indefinite (Cheng, L. L. S., 2018).

(13) meiyou na-ge difang zai kai yanchanghui
not where-CL the place is hosting concert
"There are no concerts going on anywhere."
(14) (a) Zhangsan xiang chi na-ge shuiguo ma
Zhangsan wants to eat which-CL fruit Q (question marker)
"Does Zhangsan want to eat any fruit?"
(b) Zhangsan shi-bu-shi qu le na-ge xuexiao
Zhangsan is-not-is go ASP which-CL school
"Did Zhangsan go to any school?"

Na-CL NP "which" in (13) is licensed by negation *meiyou* and obtains the existential indefinite reading, referring to a place that might have a possibility of holding a concert. Besides, *na*-CL NP also demonstrates the same property as *wh*-indefinite which refers to something that cannot be explicitly stated in yes/no questions and A-not-A questions as (14a) and (14b) illustrate.

Moreover, the universal interpretation can be obtained by *na*-CL NP "which" with the permission of *dou* such as (15).

(15) na-ge xiaopengyou dou qu tushuguan le
which-CL child all go library ASP
"Every child went to the library."

The free choice interpretation of *na*-CL NP also requires the licenses of *dou*. But the permission of *dou* alone does not suffice for *na*-CL NP to be licensed as an FCI, and it needs to be used with modal verbs like *keys* "may" and *bixu* "must".

(16) na-ge xiaopengyou dou bei yunxu chi shuiguo
which-CL child all is allowed to eat fruit
"Any child is allowed to eat fruit."

As reviewed above, young Mandarin-speaking children are able to access the existential indefinite reading and the universal interpretation of bare *wh* words like *shenme* "what" at the earliest 3 years old. However, the existing research on the first acquisition of non-interrogative *wh*-words does not provide a comprehensive description of the *wh*-element *na*, especially the differences in terms of children's acquisition of three non-interrogative readings. The present study will provide a corpus study to investigate the initial level of production that children have regarding the usage of non-questioning *na*.

3. Corpus study of wh-element na's non-interrogative interpretations

3.1 Methodology

To investigate children's production of the non-interrogative *wh*-element *na* including bare *wh*-phrase *nar* or *nali* and *na*-CL NP, a corpus of Mandarin-speaking children's utterances has been analyzed in the present study, and three of these corpora are included in the Child Language Data Exchange System (CHILDES): Zhou 3, Tong and TCCM. Since the individual differences between children in Taiwan Corpus of Child Mandarin (TCCM), we selected Chou's production as the subject. The information on the three corpora is shown in Table 1.

Table 1. Information on the Investigated Mandarin-speaking children

Subjects	Gender	Age of observation
Zhou3	Female	0;08;00-4;05;00
Zhou2	Female and male	3;00;00-6;00;00
TCCM (Chou)	Male	2;01;00-3;04;00
Tong	Male	1;07;00-3;04;00

We excluded various types of children's utterances including when the child repeated or imitated all or part of adults' utterances when they were singing songs, reciting poems, or retelling stories, and the unintelligible utterance (i.e., transcribed "xxx" in the corpus). The criteria that we adopted for determining children's spontaneous production are: there is no occurrence of their care-takers using the same interrogative word and the same syntactic frame within the first five utterances of a child's speech, and it is not a simple imitation of other people's speech by children. The information on children's production is illustrated in Table 2.

Table 2. Information on Children's Non-interrogative Production

children	utterances involving the non-interrogative bare *wh* phrase *nar* or *nali*	utterances involving the non-interrogative *na*-CL NP
Zhou3 (Xue'er)	4 (2;06;00)	1 (4;04;00)
TCCM (Chou)	0	1 (3;01;00)
Tong	1 (2;04;16)	0
Total	5	2

3.2 Children's early production of wh-element one's non-interrogative usages

As Table 2 illustrates, children from those corpora produced more utterances of non-interrogative *nar* or *nali*, which indicates places of differences. Based on the present data, we can conduct further analysis in terms of its universal reading, existential indefinite reading, and free-choice reading which is demonstrated in Table 3.

Table 3. The Number of Utterances Involving Non-interrogative nar or nali

children	The number of utterances involving non-interrogative nar or nali					
	Universal Reading		Existential Indefinite Reading		Free-Choice Reading	
	Affirm context	Negative context	Affirm context	Negative context	Affirm context	Negative context
Zhou3 (Xue'er)	0	1 (2;06;00)	2	1	0	0
TCCM (Chou)	0	0	0	0	0	0
Tong	0	0	0	1 (2;04;16)	0	0
Total	0	1	2	2	0	0

Based on Table 3, we can conclude that:

Firstly, children's production of the non-questionable *wh*-word *nar* or *nali* exhibits individual differences as Xue'er in Zhou3 produced more utterances than Chou in TCCM.

Secondly, as for the time of children's earliest spontaneous production, the non-interrogative usage of *nar* or *nali does* not appear until around 2;00;00.

Thirdly, there is an asymmetry in children's developmental trajectory of various non-interrogative uses. Among those corpora, the most productive non-interrogative usage of *nar* or *nali* is existential indefinite interpretation such as (17) while there is no related free-choice utterence; and the typical linguistic environment of children's early production is negative which is consistent with the finding of Fan (2012), indicating that children's production of non-interrogative *wh*-element *na* demonstrates a preference to negative contexts like other interrogative words.

(17) TCCM (Chou); 3; 00; 00
*CHI: wo bu zhidao zhe-ge fang nar
I do not know this put where
"I don't know somewhere can put this one."

Compared with children's output of non-interrogative *nar* or *nali*, only 2 tokens contain *na*-CL NP "which" and exhibited a universal interpretation such as (18).

(18) TCCM (Chou); 3;01;00
*CHI: na ge (ren) dou zai na qiqiu.
a which-CL person all hold the balloon
"Everyone hold a balloon."
(The NP ren "person" in this utterance is omitted by children.)

As illustrated in Table 2, children produce the non-interrogative *na*-CL NPs later than *nar* or *nali*, and they begin to produce the relevant utterance at around 3 years old. In addition, the context of their production is quite simple which is affirmative context only.

Besides, children tend to omit NP when they produce the non-interrogative na-CL NP such as (18) and (19).

(19) Xue'er; 4;04;00
*CHI: wo zhidao shi na yi ben (shu)
I know which one-CL (book)
"I know which book it is."

3.3 The relationship between Children's early production and Adult input

However, one question remains to be answered, that is whether adult input plays an important role in children's production of *wh*-words' non-interrogative usages. Take the input of Xue'er in Zhou3, a longitudinal corpus, as an example, children's related production can be analyzed as shown in Table 3.

The present study surveyed a corpus of 232 tokens of Xue'er's adult input that were contained in Zhou3. There were only 6 tokens related to the non-interrogative *nar or nali* while three of them are negative usage. Besides, there was no adult utterance containing the combination of *nar* and negation before Xue'er first production of non-

interrogative *nar or nali*, which is a universal reading in a negative context. As a result, considering the lack of relevant input, it seems unlikely that children produced the non-interrogative usages that are associated with the *wh*-word *nar or nail* on the basis of adult input.

Moreover, among 232 tokens of Xue'er's input involving the *wh*-element *na*, only 4 tokens were non-interrogative usage of *na*-CL NP "which", therefore the difference in input quantity compared to *nar* or *nali* is not significant. The subject in Zhou3 only produced one relevant utterance that appeared in the object position of the sentence. However, there was no adult output with the same syntactic frame before children's production, so there is no significant correlation between adult input and children's output based on the current data.

Taken together, the earliest ages for children's production of *one's* non-interrogative usages are largely consistent with previous reports on other *wh*-words like *shenme* "what": children produce the non-questionable *nar* or *nali* at around two years old, and master *na*-CL NP at around three years old. Based on the limited production, it seems that the primary usage for *wh*-element *na* remains to be interrogative. Existential indefinite reading is the most common non-questioning usage, while there is no production of free-choice *wh*-element *na*. In addition, negative context is the typical linguistic environment for both universal and existential indefinite usages in children's production. Additionally, in the analysis of the factors that influence children's production, the results show that there is no significant correlation between the adult input and the output of children.

4. Conclusion

In our observation, *na*-CL NP "which" can be presented in typical NPI environments and obtain more non-interrogative interpretations including existential indefinite reading and universal reading, aside from obtaining a free choice interpretation which is the only non-interrogative reading of *na*-CL-NP reported in the previous research.

The present study investigates children's knowledge of non-interrogative *wh*-element *na*, including *nar* or *nali* "where" and *na*-CL NP "which". Through corpus studies, this study discovered that non-interrogative usages of *nar* or *nali* "where" and *na*-CL NP "which" during early childhood were being less frequently produced, and were less frequent for *na*-CL NP "which" compared to *nar or nali* "where". Additionally, it was observed that adult input did not contain a syntactic structure similar to the initial output of children. These findings suggest a lack of a strong correlation between adult input and children's early production, and these compelling results are a piece of strong evidence that supports the assumption that children possess innate knowledge regarding the nature of *wh*-words as non-interrogative items.

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