

ON CHINESE ORDINAL CONSTRUCTIONS *

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ABSTRACT

A Chinese ordinal construction in the form [*di* + Num + Cl + N] is ambiguous between a definite construal and an indefinite quantity construal. The morpheme *di* heads a DP, and the two readings of the ordinal expression can be attributed to the lexical ambiguity of the morpheme *di*. On the one hand, if the event is realized once, and there is an ordered set of objects in a single space within which the context of a sentence can verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [+strong] determiner giving rise to a definite reading. On the other hand, if the event is carried out more than once, no such an ordered set of objects is present in a single space, and the context of a sentence cannot verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [-strong] determiner with an additive function and results in an indefinite quantity reading.

* Various working versions of this paper have been presented at the 4th Workshop of the International Research Project on Comparative Syntax and Language Acquisition held by Nanzan University in July 2009 and Tsinghua-CUHK-Nanzan Joint Workshop on Comparative Syntax and Language Acquisition hosted by Nanzan University in September 2008. I would like to thank the audiences there, especially Mamoru Saito, Keiko Murasugi, Hideki Kishimoto, Yuji Takano, Thomas Lee, Miyamoto Yoichi, Tzong-Hong Jonah Lin, Tomohiro Fujii, Ken Takita and Yasuki Ueda, for their stimulating questions and suggestions. I am also indebted to Ning Niina Zhang, Miao-Ling Hsieh, Shigeru Miyagawa, and Chung-Yu Yang, Rui-Heng Huang, Johanna Katchen, Andrew Bennett, Livy Chiu, Kikushima Kazunori, Xin-Xian Yu, Erica Hu, Yi-Shun Chen, Hui-Yu Huang, Pei-Yi Hsiao, Stella Yeh, Helen Yang, Maohsun Chen, and Juiyi Chung, and especially Wei-Tien Dylan Tsai and Chen-Sheng Luther Liu for their penetrating comments as well as constructive suggestions. Additionally, I would like to express my gratitude to the anonymous reviewers. Finally, I am responsible for all potential errors.

Key words: noun phrase structure, ordinal construction, definite, indefinite, quantity

1. INTRODUCTION

The syntax and semantics of nominal expressions in Chinese have been widely studied (cf. Cheng & Sybesma (1998, 1999, 2005); Chierchia (1998); Li (1998, 1999, 2009); Tang (1990); Tsai (2001) among many others). Most of the discussions focus on bare noun phrases or number expressions in the form [Num + Cl + N] in (1).¹ However, the ordinal construction with the pattern of [*di* + Num + Cl + N], such as (3), is less discussed.² In Chinese, numbers are followed by classifiers to form number expressions, expressing the notion of quantity in (1); in English, the combination of numbers and nouns in (2) forms the same pattern. To represent the sense of ordering, the morpheme *di* is followed by number expressions in Chinese; while English uses *the* and *-th* to do so, as exemplified in the pair of (3) and (4).

Number expression:

- (1) liu-ben shu
six-CL book
'six books'

- (2) six books

Ordinal expression:

- (3) di liu-ben shu
di six-CL book
'the sixth book'

- (4) the sixth book

¹ Abbreviations used in this paper are as follows: CL: classifier; DE: verbal suffix or marker for modifying phrases like genitive phrases, relative clauses; ASP: aspect marker, and SFP: sentence-final particle.

² In what follows, the term "ordinals" will be used to refer to the pattern of [*di* + Num + Cl + N].

In comparing the number expression in (1) with the ordinal expression in (3) in Chinese, one may be led to postulate that the ordering construal is derived from the morpheme *di*. The first question we shall ask is: is this a tenable assumption?

In terms of distribution, ordinal expressions pattern differently from number expressions in that the former are allowed in the subject position, while the latter are disallowed, as illustrated by the contrast below:³

- (5) a. *Di liu-ge xuesheng qu-guo Taipei.*
Di six-CL student go-ASP Taipei
'The sixth student has had the experience of going to Taipei.'
b. **Liu-ge xuesheng qu-guo Taipei.*
Six-CL student go-ASP Taipei
'Six students have had the experience of going to Taipei.'

In the analysis of Hurford (1987), ordinals are inherently definite and select a specific point from an ordered sequence of objects set within a certain context. One may thus argue that the ordinal phrase can occur in the subject position because of its definite meaning. However, this analysis is challenged by the following data.

- (6) *Fangui! Qiuchang shang you di shier-ge qiuyuan.*
Foul! Field on have di twelve-CL player
'Foul! There is a twelfth player on the football field.'
(In American football, only eleven players can be on the field during play.)
- (7) *Zhangsanmai-le di san-dong fangzi.*
Zhangsanbuy-ASP di three-CL house
a. 'Zhangsan bought a house, and that house was the third in a row.' [definite]
b. 'Zhangsan already had two houses, and he bought another one.' [indefinite quantity]

³ Actually, number expressions can occur in subject positions with the escort of *you* 'have/exist' or in modality constructions (cf. Lee (1986); Tsai (1996, 2001); Li (1996, 1998) among others). Tsai (2001) further suggests that modality constructions involve V-to-Mod raising, and can thus license cardinal subjects, on the basis of the Extended Mapping Hypothesis (cf. Tsai (1999)).

Here the ordinal phrase *di shier-ge qiuyuan* in (6) is interpreted as an indefinite quantity, pointing out a non-specific redundant player on the field. In (7), the ordinal construction *di san-dong fangzi* is ambiguous between a definite reading and an indefinite quantity reading. For its definite construal, there is only one unique house, which is the third in order of at least three in a row. For its indefinite quantity construal, it can be understood by the following scenario: the speaker knew that Zhangsan had already bought two houses, and he/she knew that Zhangsan had bought another one. These two readings correspond to (8a) and (8b) in English, respectively.

- (8) a. Zhangsan bought the third house.
b. Zhangsan bought a third house.

The ambiguity of the ordinal phrase in turn begs the second question: how do we interpret ordinal expressions in Chinese and how is the semantics of ordinals related to, or derived from, the syntactic structure of nominal expressions in a proper theory of syntax-semantics interface? In addition, when ordinals denote an indefinite quantity reading, the third question arises: what is the distinction between indefinite quantity-denoting ordinals and normal number expressions? Any theory about nominal expressions should be able to account for the above questions.

The purpose of this paper is to discuss the syntax and semantics of ordinal expressions in Chinese, especially the function that the morpheme *di* performs in this type of construction. I argue that the morpheme *di* heads a DP projection, and an ordering construal is denoted by a Num head. Moreover, the ambiguity of the ordinal expression in question is due to the dual status of *di*. On the one hand, if the event is realized once, and there is an ordered set of objects in a single space within which the context of a sentence can verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [+strong] determiner and gives rise to a definite reading. On the other hand, if the event is carried out more than once, no such an ordered set of objects is present in a single space, and the context of a sentence cannot verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [-strong] determiner with an additive function and yields an indefinite quantity reading.

This paper proceeds as follows. Section 2 is devoted to the syntax and semantics of ordinals in Chinese; this discussion will help us to formalize the questions addressed in this paper. In Section 3, some previous literature on nominals will be reviewed. Section 4 provides some background as a preliminary of my analysis, and Section 5 provides the details of my proposal. Finally, the concluding remarks are stated in Section 6.

2. THE SYNTACTIC AND SEMANTIC PROPERTIES OF ORDINAL PHRASES IN CHINESE

In comparing ordinal constructions with number expressions, some significant properties of the former can be highlighted as follows. First, ordinals can occur freely in the subject position or topic position, as indicated in (9); yet, this is not possible for number expressions, as shown by the ungrammaticality in (10).⁴

- (9) a. Di liu-ge xuesheng qu-guo Taipei.
Di six-CL student go-ASP Taipei
'The sixth student has had the experience of going to Taipei.'
b. Di liu-ge xuesheng, wo zhidao qu-guo Taipei.
Di six-CL student I know go-ASP Taipei
'The sixth student, I know he has had the experience of going to Taipei.'
- (10) a. *Liu-ge xuesheng qu-guo Taipei.
Six-CL student go-ASP Taipei
'Six students have had the experience of going to Taipei.'
b. *Liu-ge xuesheng, wo zhidao qu-guo Taipei.
Six-CL student I know go-ASP Taipei
'There are six students; I know they have had the experience of going to Taipei.'

Second, the interpretation of ordinals differs from that of number expressions, as vindicated by the following tests: co-reference and binding. Ordinal constructions in the subject position conveying definite

⁴ It is widely observed that number expressions can appear as subjects under certain conditions. Please refer to Note 2.

individuals can not only co-refer to the pronoun in (11a), but also bind the pronoun in (12a). In contrast, number expressions fail to do so because they do not refer to entities or individuals in the discourse, as shown in (11b) and (12b) (cf. Li (1998)).

- (11) a. Di san-ge ren_i tai-bu-dong zhe-jia gangqin.
 Di three-CL person lift-not-move this-CL piano
 ta_i de liliang tai xiao.
 he DE strength too small
 'The third person cannot lift up this piano. His strength is too weak.'
- b. *San-ge ren_i tai-bu-dong zhe-jia gangqin.
 Three-CL person lift-not-move this-CL piano
 tamen_i de liliang tai xiao.
 Their DE strength too small
 'Three people cannot lift up this piano. Their strength is too weak.'
- (12) a. Zhangsan_i zhidao di san-ge ren_j yiding
 Zhangsan know di three-CL people certainly
 ban-de-dong ziji_{ij} de gangqin.
 move-able-move self's DE piano
 'Zhangsan knows that the third person certainly can move self's piano.'
- b. Zhangsan_i zhidao san-ge ren_j yiding
 Zhangsan know three-CL people certainly
 ban-de-dong ziji_{i/*j} de gangqin.
 move-able-move self's DE piano
 'Zhangsan knows that three people certainly can move self's piano.'

Third, ordinal expressions involve a certain presupposition, while number expressions do not, as illustrated by the following contrast:

- (13) a. Zhangsan hui mai di san-dong fangzi.
 Zhangsan will buy di three-CL house
 (a) 'Zhangsan will buy the third house (in the row).'
 (b) 'Zhangsan will buy a third house.'

- b. Zhangsan hui mai san-dong fangzi.
Zhangsan will buy three-CL house
'Zhangsan will buy three houses.'

It is worth noting that the interpretation of the ordinal phrase *di san-dong fangzi* in (13a) is ambiguous, but only an indefinite quantity-denoting construal relevant to my discussion is concerned here. Interestingly, the ordinal construction in (13a) is uttered in the context that the speaker knew that Zhangsan had already bought two houses, and that he was going to buy another one. The number expression in (13b), however, does not require speakers to have any background knowledge about the number of houses that Zhangsan had already bought.

Fourth, indefinite quantity-denoting ordinals can refer to only one entity, while number expressions can denote plural entities, as exemplified by the contrast between (14a) and (14b).

- (14) a. *Zhangsan zuotian mai-le liang-ben shu, jintian
Zhangsan yesterday buy-ASP two-CL book today
mai-le yi-ben shu. Ta zonggong mai-le di
buy-ASP one-CL book. He totally buy-ASP di
san-ben shu.
three-CL book.
'Zhangsan bought two books yesterday and one book today. He
has bought a third book in total.'
- b. Zhangsan zuotian mai-le liang-ben shu,
Zhangsan yesterday buy-ASP two-CL book
jintian mai-le yi-ben shu. Ta zonggong mai-le
today buy-ASP one-CL book. He totally buy-ASP
san-ben shu.
three-CL book.
'Zhangsan bought two books yesterday and one book today. He
has bought three books in total.'

Since ordinal expressions denote only one entity, it is not plausible for them to be the sum of the separate numbers. The ungrammaticality of (14a) is thus explained. In turn, this suggests that an indefinite quantity reading of ordinals is not derived from quantification over individuals. Further details will be discussed in Section 5.

Fifth, ordinals pattern differently in the subject and object position. If ordinals are in the subject position, the default interpretation is definite; yet, with the presence of the morpheme *you* ‘have/exist’, an indefinite quantity reading is obtained, as illustrated in (15) and (16), respectively.

- (15) Di san-ge xuesheng kaoshang Tsinghua daxue.
Di three-CL student pass Tsinghua University
‘The third student passed the test to enter Tsinghua University.’
- (16) You di san-ge xuesheng kaoshang Tsinghua daxue.
Have di three-CL student pass Tsinghua University
‘There is a third student who passed the test to enter Tsinghua University.’

If ordinals are in the object position, there will be various possibilities for their interpretations: some are ambiguous, but some are not. Specifically, the denotations of ordinals are affected by the following elements, for example, aspectual markers, predicate types, and measure words within sentences.

When ordinals occur with the verbal *le*, a sentence is ambiguous between a definite construal and an indefinite quantity construal, as in (17).

- (17) Zhangsan he-le di san bei pijiu.
Zhangsan drink-ASP di three glass beer
a. ‘Zhangsan drank the third glass of beer (in a row).’
b. ‘Zhangsan drank a third glass of beer.’

For a definite construal, the ordinal phrase *di san-bei pijiu* indicates that the beer Zhangsan drank is the third one in a row. For an indefinite quantity construal, it can be uttered in a context that the speaker knew that Zhangsan had a third glass of beer at the speech time in addition to the previous two glasses of beer at a prior time.

Similarly, if the sentence final particle *le* is involved, ordinal expressions are also ambiguous.

- (18) Zhangsan he di san bei pijiu le.
Zhangsan drink di three glass beer SFP
a. 'Zhangsan started drinking the third glass of beer (in a row).'
b. 'Zhangsan was drinking a third glass of beer.'

In (18), we can infer that Zhangsan started drinking the third glass of beer in a row for certain reasons. However, we can also infer that Zhangsan had finished two glasses of beer previously, and that the one he was drinking at the speech time can be counted as a third one, namely, that Zhangsan was on his third glass of beer.

Insofar as the aspectual marker *guo* is concerned, we only obtain a definite reading.

- (19) Zhangsan kan-guo di san-ben shu.
Zhangsan read-ASP di three-CL book
'Zhangsan has had the experience of reading the third book.'

Quite unexpectedly, contra to (17), sentences with the verbal *le* only reveal an indefinite quantity reading, if containing creation predicates or measure words, as demonstrated in (20) and (21), respectively.⁵

- (20) Xiaomei zuotian sheng-le di san-ge xiaohai.
Xiaomei yesterday give birth to-ASP di three-CL child
'Xiaomei gave birth to a third child yesterday.'

- (21) Zhangsan chi-le di san bang yingtao.
Zhangsan eat-ASP di three pound cherry
'Zhangsan has eaten a third pound of cherries.'

In brief, there are more interpretations involved in Chinese ordinals than allowed for in the observations of Hurford (1987). In what follows, I shall discuss how the semantics of the ordinal expression in question is mapped to its syntactic structures. Before going further into my proposal, it is instructive to review current analyses of the structures of nominals in Chinese.

⁵ The measure words here refer to those which are conventionalized and fixed as a rule for measuring the scale conveyed by an adjective, for example, *gongjin* 'kilogram', *bang* 'pound', and *gongsheng* 'liter'.

3. PREVIOUS STUDIES

In the literature, much work has been done to derive the architecture of nominal expressions in Chinese, and two papers among them will be reviewed, those of Li (1998) and Cheng and Sybesma (1999).

3.1 Li's (1998) Analysis

Li (1998) discusses the properties of a number expression in the form [Num + Cl + N] in Chinese to argue for a DP analysis and also the existence of a NumP projection. This expression can allow for the following two readings: a quantity-denoting one, represented by a NumP in (22), and a non-quantity-individual-denoting one, represented by a DP with an empty D in (23).

- (22) [_{NumP} san ge xuesheng] [Li (1998)]
 three CL student

- (23) [_{DP} D [_{NumP} san ge xuesheng]] [Li (1998)]
 three CL student

Li (1998) contends that the NumP in (22) does not have a projection of DP, thus the problems of (in)definiteness and of the need for lexical government are avoided (cf. Longobardi (1994)). That is, the NumP denoting a quantity can occur in any position. On the contrary, the indefinite individual-denoting expression in (23) with a null D can only occur in lexically-governed positions in the sense of Longobardi (1994).⁶ Given that, Li's proposal can regulate and account for interpretational and distributional differences in (24) and (25).⁷

- (24) [Wu-ge xiaohai] chi-bu-wan shi-wan fan. [Li (1998)]
 Five-CL child eat-not-finish ten-bowl rice
 'Five children cannot finish ten bowls of rice.'

⁶ The default interpretation of a null D is an existential operator.

⁷ Tsai (2001) also discusses relevant issues based on the Extended Mapping Hypothesis.

- (25) *[San-ge xuesheng] zai xuexiao shoushang le. [Li (1998)]
Three-CL student at school hurt SFP
'Three students were hurt at school.'

Li (1998) points out that an interpretation of the nominal expression in (24) differs from that in (25): the former concerns "quantity", while the latter is mainly about the existence of some individuals. Given this, *wu-ge xiaohai* 'five-CL child' in (24) projects a NumP and can occur in the subject position; *san-ge xuesheng* 'three-CL student' in (25) projects a DP with a null D, and thus cannot occur in the non-lexically governed subject position.

With this view in mind, let us see whether the configuration proposed by Li (1998) can represent the intrinsic properties of Chinese ordinal constructions in question. If the number expression *wu-ge xiaohai* 'five-CL child' in (24) is replaced by the ordinal phrase *di wu-ge xiaohai*, it results in a definite individual-denoting construal, as illustrated in (26).

- (26) Di wu-ge xiaohai chi-bu-wan shi-wan fan.
Di five-CL child eat-not-finish ten-bowl rice
'The fifth child cannot finish ten bowls of rice.'

On the basis of Li (1998), one may argue that the individual-denoting ordinal phrase in (26) projects a DP, and *di* is D. Since the head D is filled by *di*, ordinals can occur in the non-lexically governed subject position. However, this position is challenged by my observation in Section 2 that ordinal expressions may also assume an indefinite quantity reading, as shown in (6) (repeated as (27)).⁸

⁸ One of the anonymous reviewers argues that (27) can be explained by the following theoretical accommodation of Li's (1998) proposal: An ordinal expression in (27) projects a DP with an empty D. The empty D with the default existential interpretation can be lexically governed in object positions, and an indefinite quantity reading is therefore derived. However, what needs special attention here is that nominal expressions with indefinite quantity construals, as Li (1998) suggests, project NumPs rather than DPs with an empty D. In addition, the analysis proposed by the reviewer will result in a subject/object asymmetry in regard to the structures of quantity-denoting nominal expressions. Namely, *wu-ge xiaohai* 'five-CL child' projects NumPs in subject positions in (i), but projects DPs with an empty D, as the reviewer argues, in object positions in (ii). To the best of my knowledge, this is not assumed by Li (1998).

- (27) Fangui! Qiuchang shang you di shier-ge qiuyuan.
Foul! Field on have di twelve-CL player
'Foul! There is a twelfth player on the football field.'
(In American football, only eleven players can be on the field during play.)

If one then assumes that the ordinal expression in (27) projects a NumP, the problems still exist. It is unclear why denotations of ordinals are affected by aspect markers and predicate types, as indicated in (28) and (29), respectively.

- (28) Zhangsan kan-guo di san-ben shu.
Zhangsan read-ASP di three-CL book
a. 'Zhangsan has had the experience of reading the third book.'
b. #'Zhangsan has had the experience of reading a third book.'
- (29) Xiaomei zuotian sheng-le di san-ge xiaohai.
Xiaomei yesterday give birth to-ASP di three-CL child
a. 'Xiaomei gave birth to a third child yesterday.'
b. #'Xiaomei gave birth to the third child yesterday.'

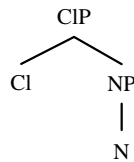
This in turn suggests that Li's (1998) analysis may not be able to subsume all of the properties of ordinal constructions. In what follows, the proposal of Cheng and Sybesma (1999) is discussed.

3.2 Cheng and Sybesma's (1999) Analysis

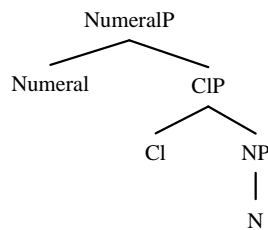
Cheng and Sybesma (1999) (henceforth C&S) propose that bare nouns in Chinese have two interpretations: definite and indefinite. Definite bare nouns have the structure in (30); indefinite bare nouns have the structure in (31) (Numeral P means NumP).

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- (i) Wu-ge xiaohai chi-bu-wan shi-wan fan. [Li (1998)]
Five-CL child eat-not-finish ten-bowl rice
'Five children cannot finish ten bowls of rice.'
- (ii) Zhangsan kandao wu-ge xiaohai.
Zhangsan see five-CL child
'Zhangsan saw five children.'

(30) CIP



(31) Numeral P



One question that comes to mind in connective with the current discussion is: how is a definite construal obtained? Following the spirit of Chierchia (1998), a definite interpretation for languages without definite articles, like Chinese, is resort to the ι operator. C & S further claim that the ι operator is the equivalent of a definite article, and that N-to-Cl movement is a necessary step for the implementation of the ι operator.⁹

In terms of an indefinite construal of bare nouns, it stems from the projection of a Numeral P, as C&S assume, with the effect of undoing definiteness.

⁹ Wu and Bodomo (2009) argue against Cheng and Sybesma's analysis on empirical grounds, appealing to syntactic, semantic and functional viewpoints. Wu and Bodomo (2009) point out that classifiers are contentful morphemes, while definite articles are functional morphemes. Semantically, classifiers are morphemes used to indicate the semantic classes of nouns; hence, they often carry information beyond that carried by their associated nouns. Yet, definite articles are devoid of semantic content and solely contribute definite status to their associated nouns. Also, Wu and Bodomo illustrate that it is not correct to propose, as C&S do, that determiners are deictic in nature (noted by a reviewer).

Following the analysis of C&S, Sio (2008) indicates that it is impossible for one to allocate elements that appear to the left of classifiers (e.g., demonstratives, modifiers). For example, in (32) the presence of modifiers may alter the referential properties of the noun phrases. The adverb *suibian* ‘randomly’ can be used to distinguish the following two sentences (cf. Zhang (2006)).

- (32) a. Zhangsan suibian zhao-le san-ge [Zhang (2006)]
 Zhangsan randomly look for-ASP three-CL
 [dong yingwen de] xuesheng.
 know English DE student
 ‘Zhangsan randomly looked for three students who knew English.’
 b. *Zhangsan suibian zhao-le [dong yingwen de]
 Zhangsan randomly look for-ASP know English DE
 san-ge xuesheng.
 three-CL student
 ‘Zhangsan randomly looked for three students who knew English.’

When the modifier follows *san-ge* ‘three-CL’ in (32a), the nominal expression conveys a non-specific reading and can co-occur with the adverb *suibian* ‘randomly’. On the contrary, when the modifier precedes *san-ge* ‘three-CL’ in (32b), the nominal expression denotes a specific reading and therefore is incompatible with the adverb *suibian* ‘randomly’.

In the same vein, C&S’s (1999) theory can not account for interpretations of ordinal constructions. As is well-known, structures of ordinals with the form of [*di* + Num + Cl + N] are more complicated than the data provided by C&S. Aside from the numeral projection, we have the morpheme *di* in ordinal constructions. Thus, it is unjustifiable to derive indefinite quantity-denoting ordinals simply from NumPs. In addition, the operation of N-to-Cl movement may not be sufficient to include cases which the ι operator has an influence on. As illustrated by the data in the previous section, interpretations of ordinals rely not only on syntactic factors, but also on aspectual markers, predicate types, and measure words within sentences.

In light of the above discussion, although Li (1999) and C&S’s (1999) analyses are both insightful, they can not reflect either the intrinsic

characteristics of ordinals, such as functions of the morpheme *di*, or the ambiguity of ordinals. I thus attempt to provide my analysis in the following section.

4. PRELIMINARIES: THE STRUCTURE OF NOMINALS IN CHINESE

Before I enter into the details of my proposal, some assumptions about the status of classifiers and numerals should be elaborated first. Then, I will provide answers to the two questions raised in Section 1: (i) what is the source of an ordering construal of the ordinal construction?, (ii) what are the distinctions between indefinite quantity-denoting ordinals and normal number expressions?

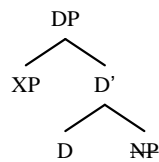
4.1 Status of a Classifier

Insofar classifiers are concerned; I follow tradition in assuming that a classifier heads an independent projection, as first proposed by Tang (1990) (cf. C&S (1999); Li (1998) among others). In addition, Saito, Lin and Murasugi (2008) provide an argument of N'-ellipsis to support this point of view.

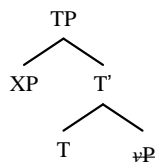
Saito and Murasugi (1990) and Lobeck (1990) provide generalizations for three well-known deletion phenomena: N'-ellipsis, VP-ellipsis, and sluicing, as shown in (33). They argue that these deletion structures all involve functional heads (D, T, C), and that the deletion of the complement is permissible only when the Spec position is filled.

(33)

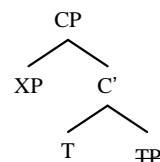
a. N'-ellipsis



b. VP-ellipsis



c. sluicing

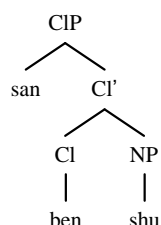


As observed by Saito, Lin and Murasugi (2008), Chinese nominals allow N'-ellipsis, as shown in (34).

- (34) Zhangsan mai-le [san-ben shu], Lisi mai-le [wu-ben ~~shu~~]
 Zhangsan buy-ASP three-CL book Lisi buy-ASP five-CL book
 'Zhangsan bought three books, and Lisi bought five.'

Given this, Saito, Lin and Murasugi (2008) propose the following structure for nominals in Chinese.¹⁰

- (35) Chinese



Simply put, a classifier heads an independent projection, and its complement NP can be elided when the numeral occupies the Spec position. The parallel phenomenon in ordinal constructions also supports the analysis that a classifier is a head, as shown in (36).

- (36) Zhangsan mai-le [di san-ben shu],
 Zhangsan buy-ASP di three-CL book
 Lisi mai-le [di wu-ben ~~shu~~]
 Lisi buy-ASP di five-CL book
 a. 'Zhangsan bought the third book, and Lisi bought the fifth.'
 b. 'Zhangsan bought a third book, and Lisi bought a fifth.'

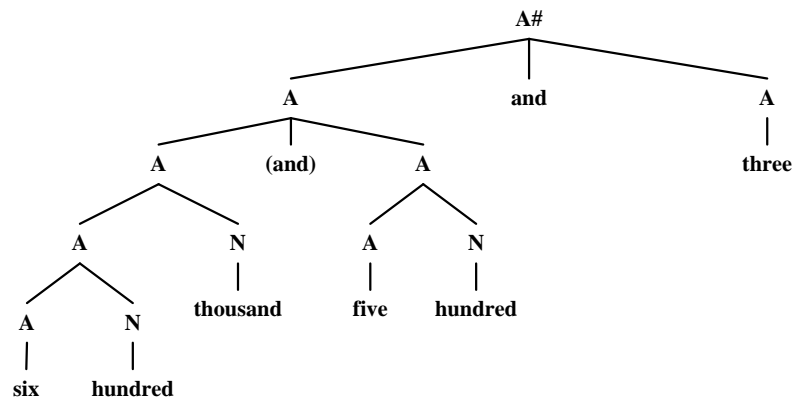
¹⁰ Saito, Lin and Murasugi (2008) also indicate the possibility that Num heads an independent structure. The number projection can be maintained with a null head and the numeral is in its Spec position. Then, if Cl adjoins to Num, the ellipsis can be analyzed as the deletion of CIP within the Num projection, as shown in (i).

(i) [_{NumP} san [_{Num} [_{Num} e] [_{CIP} [_{Cl} ben] [_{NP} shu]]]]

4.2 Status of a Num

As for the structure of numeral expressions, the internal structure of number expressions [Num+Cl+N] and that of ordinal phrases [*di*+Num+Cl+N] constitute a straightforward piece of evidence for the projection of NumPs. On the basis of Hurford (1987), Ionin and Matushansky (2004), and Zabbal (2006), numeral expressions can be built up in syntax and project NumPs because of their transparent compositional semantics. Specifically, they can be constructed in syntax by two structures below: multiplicative structure and additive structure. Take ‘six hundred thousand five hundred and two’ as an example.¹¹

(37) six hundred thousand five hundred and two (600,503)



Turning to number expression in Chinese, the operations of multiplication and addition are employed, as illustrated in (38).

(38) liang bai qi shi = [2x100 + 70]
two hundred seven ten
'two hundred and seventy'

Under this account, then, the ordinal expression in (39) can be constructed in syntax as well, since the Num *liang bai qi shi* ‘270’ shares

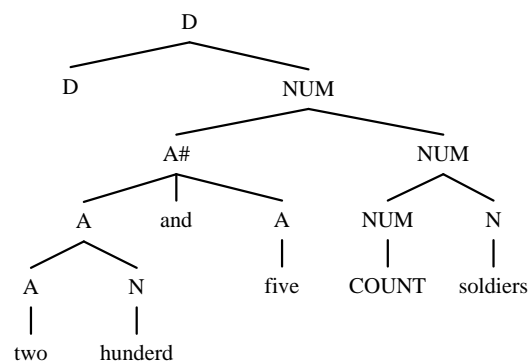
¹¹ Zabbal (2005, 2006) indicates that complex numbers, namely, numbers with more than one morphological item, are adjectival. Thus, the node in (37) is termed by A.

the same form in the number and ordinal expressions.

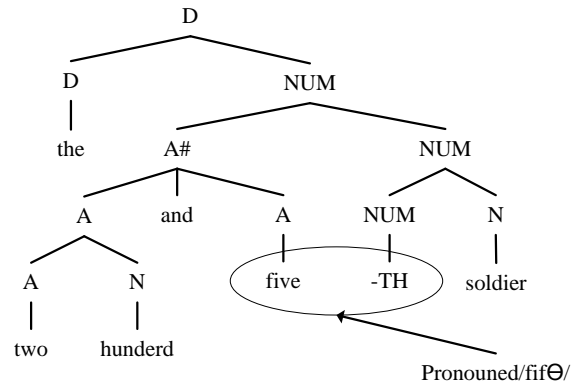
- (39) di liang bai qi shi-ge houxuanren
 di two hundred seven ten-CL candidate
 ‘two hundred and seventieth candidate’

One may wonder how we can distinguish number expressions from ordinal ones in Chinese. Actually, this can be ascribed to the operator of a Num head along the lines of Zabbal (2006). He suggests that cardinals and ordinals are constructed by using the same lexical items in exactly the same multiplicative and additive patterns, regardless of the difference in meaning between cardinals and ordinals. He thus proposes a categorical projection NumP, and the head Num is an operator, denoting the locus of interpretation for cardinals or ordinals. The number or ordinal expressions stay in [Spec, NumP], as illustrated in (40) and (41), respectively.

- (40) Cardinals:



(41) Ordinals:



Significantly, the ordinal operator –TH in (41) presupposes an ordering and picks out one entity that is associated with the position in the ordering indicated by the value of the numeral. This can account for the case that Chinese ordinals refer to only one individual. In addition, it is reasonable that the demonstrative expression *na yi-dong fangzi* ‘that house’ in the second conjunct can refer to the entity denoted by the ordinal phrase *di san-dong fanzi* ‘a/the third house’ in the first conjunct of (42).

- (42) Zhangsan mai-le di san-dong fangzi.
 Zhangsan buy-ASP di three-CL house
 Na yi-dong fangzi hen gui.
 That one-CL house very expensive.
 a. ‘Zhangsan bought the third house in a row (of houses), and that house was very expensive.’
 b. ‘Zhangsan already had two houses, and he bought another one, which was very expensive.’

In fact, the above discussion provides answers to the questions raised in Section 1. First, an ordering construal of ordinal phrases is derived from a Num head instead of from the morpheme *di*. Second, indefinite quantity-denoting ordinals differ from normal number expressions in that the former can refer to only one entity.

Regarding the internal structure of the NumP, following Li (1998) and Shlonsky (2004), I argue that the numeral expression does not stay in a Num head but rather in [Spec, NumP], as substantiated by the comparison between Chinese and Russian. A Chinese numeral expression, unlike the Russian example in (43), lacks the assignment of case within a complex number.

- (43) Russian
četyre tysjači knig
four 1000-Gen-sg book-Gen-pl

In (43), the case on *thousand* depends on the preceding number, while the case on *books* is assigned by its sister number *thousand*.

All in all, on the basis of N'-ellipsis, a classifier heads an independent structure. I also provide an extra argument in support of a category of NumP: the transparent compositional semantics of number and ordinal expressions in Chinese. Moreover, an ordering construal of ordinal phrases comes from a Num head (cf. Zabbal (2006)). Furthermore, quantity-denoting ordinal expressions differ from normal number expressions in that the former can refer to only one entity. In what follows, I will provide a proposal which aims to account for the ambiguity of the ordinal construction in question.

5. ANALYSIS

In a nutshell, I assume that the morpheme *di* heads a DP, and the dual interpretations of ordinal expressions are due to the lexical ambiguity of the morpheme *di*. I propose the following condition to specify and predict the strength of the morpheme *di*:

- (44) If the event is realized once, and there is an ordered set of objects in a single space within which the context of a sentence can verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [+strong] determiner. If the event is carried out more than once, no such an ordered set of objects is present in a single space, and the context of a sentence cannot verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [-strong] determiner with an additive function. For

other contexts, *di* can be ambiguous between a [+strong] or [-strong] determiner.

5.1 The Syntactic Status of the Morpheme *Di*

I first argue that the morpheme *di* heads a DP projection on the basis of the following evidence. First, my discussions in Section 2 indicate that ordinals pattern differently from number expressions in that only ordinals can occur in non-lexically governed positions without restrictions, as exemplified by the following pairs.

- (45) a. *Di san-ge xuesheng qu-guo Taipei.*
Di three-CL student go-ASP Taipei
'The third student has had the experience of going to Taipei.'
b. **San-ge xuesheng qu-guo Taipei.*
Three-CL student go-ASP Taipei
'Three students have had the experience of going to Taipei.'
- (46) a. *Di san-ge xuesheng, wo zhidao qu-guo Taipei.*
Di three-CL student I know go-ASP Taipei
'The third student, I know he has had the experience of going to Taipei.'
b. **San-ge xuesheng, wo zhidao qu-guo Taipei.*
Three-CL student I know go-ASP Taipei
'Three students, I know they have had the experience of going to Taipei.'

Simply put, ordinals contain the head D filled by the morpheme *di*, and can therefore occur in the non-lexically governed subject or topic position (cf. Longobardi (1994)). However, the analysis that *di* is D is not sufficient (cf. Section 3.1), and a more detailed feature analysis of the morpheme *di* will be further presented in Section 5.2.

Second, the morpheme *di* is incompatible with the so-called plural (or collective) morpheme *-men*, as demonstrated by the ungrammaticality of (47).

- (47) **Di san-ge xuesheng men qu-guo Taipei.*
Di three-CL student men go-ASP Taipei

Simply put, Li (1999) contends that *-men* stays in D, and it is suffixed to a common noun only when the noun moves to D. A quantity expression [Num+Cl] therefore cannot precede N-*men* according to the phrase structure [D [Num [Cl [N]]]]. The ungrammaticality of (48) is thus expected.

- (48) *Wo dui san-ge xuesheng-men tebie hao. [Li (1999)]
 I to three-Cl student-men especially good
 'I am especially nice to three students'

In view of this, if *-men* appears with the ordinal expression, *-men* and *di* will compete for the same position. The ungrammaticality of (47) is thus explained.

The third piece of evidence that substantiates the status of the morpheme *di* comes from derived ordinals with the pattern [N + Num], as shown in (49).¹²

- (49) *liju liu*
 example six
 'example sixth'

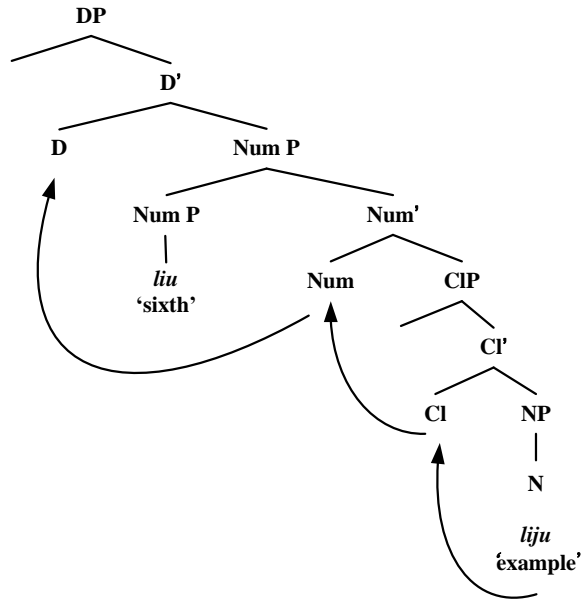
As is well known, the surface word order of noun phrases in Chinese is head-final. In (49), the head noun, in contrast to its normal position, is followed by the number, and it seems reasonable to suggest that (49) is derived by applying successive N movements through various functional projections (cf. Abney 1987, Ritter 1988, Travis 1984, Longobardi 1994), as visualized in the following diagram.^{13,14}

¹² This kind of construction is considered as a residue of archaic Chinese (cf. Ohta (1957), He (2001)).

¹³ It is assumed that an operator in the Num without a phonetic form does not block movement.

¹⁴ In terms of semantics, derived ordinals behave like definite descriptions or proper names with context dependent references. For instance, *liju liu* 'example sixth' refers to a specific example with the number code of six. I thus assume that the substitution of N into the D position occurs under the condition that *di* is a [+strong] determiner. Please refer to Section 5.2 for details.

(50)



Also, the above N-to-D raising analysis of (49) correctly predicts the ungrammaticality of (51), because it violates the head movement constraint (cf. Travis 1984):

- (51) *liju liu ge
 example six CL
 intended: 'example sixth'

The interim conclusion is as follows: The proposal that the morpheme *di* heads a DP projection can explain (i) distributional distinctions between ordinal expressions and number expressions, (ii) the incompatibility of ordinal phrases and the plural (or collective) marker *-men*, and (iii) the derivation of derived ordinals. However, the syntactic analysis of the morpheme *di* is not sufficient to subsume the semantic properties of ordinal expressions. For example, it is still unclear how dual readings of ordinal phrases integrate into syntax, and I will

explore this in the next subsection.

5.2 The Feature Analysis of the Morpheme *Di*

As shown in the previous discussion, the morpheme *di* heads a DP, and in this section I further adopt a straightforward lexical semantics, in which certain basic semantic properties are represented as lexical features. For example, *di* can be either a [+strong] or [-strong] determiner, responsible for a definite reading and an indefinite quantity reading, respectively. I thus propose the following condition to determine the strength of the morpheme *di*:

- (52) If the event is realized once, and there is an ordered set of objects in a single space within which the context of a sentence can verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [+strong] determiner. If the event is carried out more than once, no such an ordered set of objects is present in a single space, and the context of a sentence cannot verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [-strong] determiner with an additive function. For other contexts, *di* can be ambiguous between a [+strong] or [-strong] determiner.

This analysis can be exemplified by the following sentences. First, consider the ambiguous cases. Ordinal phrases with the verbal *le* assume a definite construal and an indefinite quantity construal, as illustrated in (53).

- (53) Zhangsan mai-le di san-dong fangzi.
Zhangsan buy-ASP di three-CL house
a. 'Zhangsan bought a house, which was the third in a row.'
b. 'Zhangsan already had two houses, and he bought another one.'

Lin (2003), following Xunning Liu (1988), argues that the verbal *le* is a "realization aspect" instead of being a perfective or completion marker.¹⁵ In (53), the case that Zhangsan bought the third house in a row

¹⁵ Lin (2003) gives a formal generalization for the verbal *le* in terms of Bohnmeyer and Swift's (2001) idea of event realization: requiring that an event *e* denoted by *P* is realized if and only if a subevent *e'* of *e* that also falls under *P* is included within the

is an instance of the realization of the event. Since a presupposed referential existence for the denotation of *di san-dong fangzi* is verified by the context, *di* is a [+strong] determiner and results in a definite construal. It is noticeable that the verbal *le* does not exclude the possibility that a house-buying event was realized before. For example, it is possible that Zhangsan bought two houses before, each at a different time, and also possible that Zhangsan bought two houses before, both at the same time. If the house-buying event is carried out again by Zhangsan, in addition to the previous two houses Zhangsan bought, this house will be counted as a third one. Since this context does not provide us with details about an ordered set of houses in a single space, let alone provide enough information for us to verify a presupposed referential existence for the denotation of *di san-dong fangzi*, *di* is a [-strong] determiner. This also indicates that a [-strong] *di* performs an additive function: the house referred to by the ordinal phrase is added to the previous two houses. An indefinite quantity reading is thus borne out.¹⁶

topic time. Topic time refers to the time adverb in the sentences, and the topic time is now if there is no overt time adverb.

¹⁶ One of the anonymous reviewers indicates that the condition in (52) seems to predict that if the event is carried out once, it can only yield a definite reading. He/she argues against this by suggesting that (i) can have both definite/indefinite interpretations.

- (i) Zhangsan mai-le di yi-dong fangzi.
Zhangsan buy-ASP di one-CL house

I have consulted ten informants, and they all agree that the most prominent reading of (i) in the out-of-the-blue context is definite: Zhangsan bought the first house (in a row). They can not get an indefinite quantity reading in (i).

Since the reviewer provides no information for the indefinite construal in (i), let us try to interpret this reading by considering (53a) (repeated as iia) in the following context: Zhangsan bought the third house, and this house happened to be his first house.

- (ii) Zhangsan mai-le di san-dong fangzi.
Zhangsan buy-ASP di three-CL house
a. 'Zhangsan bought the third house in a row.'
b. 'Zhangsan already had two houses, and he bought another one.'

Actually, the above context is a special case for a definite-denoting ordinal phrase in (iia): the third house that Zhangsan bought happened to be Zhangsan's first house.

Second, sentences with the sentence final particle *le* are also ambiguous between a definite reading and an indefinite quantity reading, as shown in (54).

- (54) Zhangsan chi di san-ke pingguo le.
Zhangsan eat di three-CL apple SFP
a. 'Zhangsan ate a third apple.'
b. 'Zhangsan started eating the third apple.'

Traditionally, the sentence final particle *le* has been viewed as a marker signaling inchoativity or change of state (cf. Teng (1975); Chao (1968); Zhu (1982)). On the one hand, the situation that Zhangsan started eating the third apple of three (or more) in a sequence involves one kind of change of state: from not eating to eating. In this way, *di* is a [+strong] determiner because a presupposed referential existence for the denotation of *di san-ke pingguo* is verified in this context. A definite reading is thus derived. On the other hand, it is plausible that the apple-eating event has been done before. For instance, Zhangsan ate two apples in total either in one or two apple-eating events before. If the apple-eating event is carried out again by Zhangsan, this apple will be counted as a third one. It is worth noting that the process of adding up the amount of apples which Zhangsan ate can be viewed as one kind of change of state. In addition, given that no ordered set of apples is present in a single space, and no presupposed referential existence for the denotation of *di san-ke pingguo* is available, *di* is a [-strong] determiner. This also substantiates the case that a [-strong] *di* performs an additive function: the apple referred to by the ordinal phrase is added to the previous two apples. An indefinite quantity reading is therefore expected.

Third, ordinals with the aspectual marker *guo* only have a definite reading, as illustrated in (55).

By the same token, one may challenge an indefinite quantity-denoting ordinal phrase in (iib) by providing the following context: Zhangsan bought two houses in the row, and then Zhangsan bought another house, which was the third one in the row. In effect, this is also a special case for the ordinal phrase with an indefinite quantity reading under the condition that the house, accumulated as a third one bought by Zhangsan, happened to be the third one in a row.

- (55) Zhangsan kan-guo di san-ben shu
Zhangsan read-ASP di three-CL book
a. 'Zhangsan has had the experience of reading the third book.'
b. #'Zhangsan has had the experience of reading a third book.'

According to Lin (2005) and Wu (2005), *guo* requires the eventuality to be repeatable. If one wants to repeat a book-reading event, it presumes the existence of a book. Since a presupposed referential existence for the ordinal phrase *di san-ben shu* is provided by the context, *di* is [+strong] and results in a definite reading.

Fourth, an ordinal expression can only have a quantity reading if creation predicates, such as *sheng* 'give birth to' are involved, as demonstrated in (56).

- (56) Xiaomei zuotian sheng-le di san-ge xiaohai.
Xiaomei yesterday give birth to-ASP di three-CL child
'Xiaomei gave birth to a third child yesterday.'

As shown by the previous discussion of the properties of the verbal *le* in the sentence in (53), Sentence (56) should be ambiguous. However, the definite construal of (56) is ruled out for the following reason. According to the lexical semantics of creation predicates, such as *giving birth to*, the child can not be present unless the action denoted by the predicate is performed. For instance, when one is giving birth to a baby, it is impossible to have the existence of a definite or specific baby to whom one can choose or select to give birth. Since the context of a sentence can not verify a presupposed referential existence for the ordinal phrase *di san-ge xiaohai*, *di* cannot be a [+strong] determiner. Actually, the sentence in (56) is felicitous in the context that Xiaomei had had the experience of having given birth to a baby before. It is possible that she gave birth to a baby twice or gave birth to twins once; namely, she has had two babies. When she gives birth to a baby again, this baby is counted as a third one that she has had. Provided that the baby-giving birth event is implemented more than once, and the context of a sentence can not verify a presupposed referential existence for the ordinal phrase *di san-ge xiaohai*, *di* is thus a [-strong] determiner with an additive function: the baby referred to by the ordinal phrases is added to the two babies in the previous baby-giving birth event(s). An indefinite quantity reading is therefore expected.

Fifth, following the same line of reasoning, an ordinal expression also assumes an indefinite quantity reading, if sentences contain measure words, as shown in (57).

- (57) Zhangsan chi-le di san bang yingtao.
Zhangsan eat-ASP di three pound cherry
'Zhangsan has eaten a third pound of cherries.'

Simply put, in Sentence (57) the verbal *le* only assumes an indefinite quantity reading because a definite reading is incompatible with the properties of measure words. That is, measure words do not contain concrete forms or shapes. For example, there is no reference for "a third pound," and hence no such presupposed referential existence for the ordinal phrase *di san-bang yingtao* is provided. In this way, *di* can only be a [-strong] determiner and yields an indefinite quantity reading.

However, if the measure word *bang* 'pound' is replaced by a concrete massifier like *dai* 'bag', a definite reading emerges, as demonstrated in (58).

- (58) Zhangsan chi-le di san dai yingtao
Zhangsan eat-ASP di three bag cherry
a. 'Zhangsan ate a third bag of cherries.'
b. 'Zhangsan had already eaten two bags of cherries, and he ate another one.'

Sixth, for ordinals in the subject position, the default reading is definite, unless the morpheme *you* 'have/exist' is added, as revealed by the contrast below:

- (59) Di san-ge xuesheng kaoshang Tsinghua daxue.
Di three-CL student pass Tsinghua University
'The third student passed the test to enter Tsinghua University.'
- (60) You di san-ge xuesheng kaoshang Tsinghua daxue.
Have di three-CL student pass Tsinghua University
'There is a third student who has passed the test to enter Tsinghua University.'

It is well-known that subject positions in Chinese only allow specific NPs (cf. Chao (1968); Tsai (2001)). Given this, there must be a presupposed referential existence for the ordinal phrase *di san-ge xuesheng* in subject positions. Consequently the morpheme *di* is a [+strong] determiner with a definite reading.

However, if the morpheme *you* ‘have/exist’ is inserted, ordinal expressions turn out to assume an indefinite quantity reading. Existential sentences, as Huang (1990) points out, disallow definite noun phrases, and thus the context of these sentences can not verify a presupposed referential existence for the denotation of the ordinal phrase *di san-ge xuesheng*. In this way, *di* can only be a [-strong] determiner, and results in an indefinite quantity construal.

In sum, I propose that the ambiguity of the ordinal phrase in question can be attributed to the distinct strength of the morpheme *di*, and I also provide a condition to specify and predict the strength of the morpheme *di*. This analysis goes a long way toward explaining how interpretations of ordinals are affected by distributions, aspectual markers, predicate types, and massifiers.^{17, 18}

¹⁷ One of the anonymous reviewers questions how the ambiguous reading can be generated in the case that the event has never been realized, as shown in (i).

- (i) Zhangsan zhen zai zhunbei mai di yi-dong fangzi.
Zhangsan right DUR plan buy di one-CL house
‘Zhangsan is planning to buy the/a first house.’

In my analysis of the conditions in (52), the morpheme *di* can be a [+strong] or [-strong] determiner in other contexts. For instance, when the event is not realized yet, it can be considered to be realized in some sense in the virtual world under one of the following two possibilities: if the event is realized once, it results in a definite reading; if the event is realized more than once, it yields an indefinite quantity reading.

¹⁸ One of the anonymous reviewers shows that with the occurrence of possessive pronoun such as *tade* ‘his’ in the ordinal phrase, the sentence in question would always give rise to an indefinite quantity reading, as shown in (i)

- (i) Tade di san-ge xuesheng hen congming.
his di three-CL student very smart
‘A third student of his is very smart.’

The possessive pronoun plays the function of introducing an alternative set of students

6. SUMMARY

In this paper, I have argued that the morpheme *di* heads a DP in Chinese ordinal constructions and that an ordering construal is denoted by a Num head. Moreover, the ambiguity of the ordinal expression in question is due to the dual status of *di*. On the one hand, if the event is realized once, and there is an ordered set of objects in a single space within which the context of a sentence can verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [+strong] determiner and gives rise to a definite reading. On the other hand, if the event is carried out more than once, no such an ordered set of objects is present in a single space, and the context of a sentence cannot verify a presupposed referential existence for the denotation of ordinal phrases, *di* is a [-strong] determiner with an additive function and yields an indefinite quantity reading. This analysis helps us explain not only the distinctions between ordinal and number expressions but also how certain elements within sentences, such as aspectual markers, predicate types, and measure words interact with the lexical factor of the morpheme *di*, and derive correct interpretations.

(excluding a third student of his). Namely, it presupposes the existence of a least one student that is not 'his third student'. For example, 'his fifth student' is introduced in (ii), while 'Lisi's third student' is introduced in (iii).

- (ii) Tade di san-ge xuesheng hen congming,
His di three-CL student very smart
tade di wu-ge xuesheng bu tai congming.
his di five-CL student not very smart
'A third student of his is very smart, but a fifth student of his is not.'

- (iii) Tade di san-ge xuesheng hen congming,
his di three-CL student very smart
Lisi de di san-ge xuesheng bu tai congming.
Lisi DE di three-CL student not very smart
'A third student of his is very smart, but a third student of Lisi's is not.'

In view of this, the context of sentences with the possessive pronouns preceding the ordinal phrase introduces an alternative set of students rather than verifying a presupposed referential existence for the denotation of the ordinal phrase. The result that the morpheme *di* can not be a [+strong] determiner is thus borne out.

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談漢語序數結構

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漢語序數結構「第 + 數量詞 + 量詞 + 名詞」有歧義現象：定指語意與非定指數量語意。「第」投射 DP，而序數結構的兩個語意則歸因於詞素「第」的歧異。若事件發生一次，含一個排序集合存在於單一空間，且語境能從此集合認可序數結構具預設指稱存在(presupposed referential existence)時，「第」是強勢定語([+strong] determiner)，且序數結構必須解釋為定指。另一方面，若事件發生一次以上，沒有排序集合存在於單一空間，且語境無法從此集合認可序數結構具預設指稱存在時，「第」是弱勢定語([-strong] determiner)並帶有加總功能。因此，序數結構必須解釋為非定指數量語意。

關鍵字：名詞組結構，序數結構，定指，非定指，數量