

A unified semantic account of Mandarin ordinal phrases

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Mandarin ordinal phrases demonstrate an ambiguity between a definite reading and an indefinite quantity reading, first observed by Tsai (2011). However, contra Tsai (2011)'s lexical-ambiguity view, this paper presents a compositionally unified semantic analysis of the ambiguity of Mandarin ordinal phrases. Specifically, the ambiguity of Mandarin ordinals under discussion is derived from the semantic application of type-shifting rules and the pragmatic restriction on the domain of the ordinal morpheme *di* (which is reminiscent of the in-situ approach to the ambiguity of superlatives), coupled with the semantic requirements of *di*; therefore, a unified semantics of the ordinal morpheme *di* is maintained under either reading. Furthermore, this paper suggests two important felicity conditions in general on the use of an ordinal phrase in discourse. Besides theoretical contributions, this paper also presents empirical discoveries showing that some generalizations in Tsai (2011) are not entirely correct. For instance, it is false that all ordinal phrases in Mandarin Chinese *must* denote a singular entity (contra Tsai 2011). Instead, the semantics of classifiers matters for the denotation of an ordinal phrase: a Mandarin ordinal phrase *can* denote a plural entity when a group classifier is used. Furthermore, the presence of measure classifiers or certain predicates such as *sheng* 'give birth' is not a reliable diagnostic for teasing apart the two readings; the role of contexts and world knowledge in determining the (un)availability of a given reading is identified and discussed. Finally, this paper illustrates how the proposed analysis explains three puzzling properties of Mandarin ordinal phrases: (a) why the indefinite quantity reading is missing in the subject position; (b) why the indefinite quantity reading is missing when the experiential aspect marker *guo* occurs; and (c) why an ordinal phrase with canonical sortal classifiers has to denote a singular entity.

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1. Introduction

Mandarin Chinese has both cardinal expressions and ordinal expressions. However, to convey the meaning of ordinals, the ordinal morpheme *di* is required. Consider the contrast between (1) and (2):

- | | |
|--|--------------------|
| (1) <i>San ke pingguo</i>
Three CL apple
‘Three apples’ | (Cardinal phrases) |
| (2) <i>Di-san ke pingguo</i>
Di-three CL apple
‘The/A third apple’ | (Ordinal phrases) |

Intriguingly, ordinal phrases in Mandarin Chinese demonstrate an ambiguity between a definite reading and an indefinite quantity reading, first observed by Tsai (2011). For example, (3) is ambiguous: on the definite reading, it conveys that *Zhangsan* bought a house and that house was the third in a row; by contrast, on the indefinite quantity reading, it conveys that *Zhangsan* already had two houses and he bought another one.

- (3) *Zhangsan mai-le di-san dongfangzi.*
Zhangsan buy-ASP di-three CL house
 Definite reading: ‘Zhangsan bought the third house (in the row).’
 Indefinite quantity reading: ‘Zhangsan bought a third house.’ (Tsai 2011: (7))

As far as I know, Tsai (2011) is the first formal study of the ambiguity of Mandarin ordinals mentioned above. According to Tsai (2011), the ambiguity under discussion is a case of lexical ambiguity and the distribution of the two readings is governed by the following condition:

- (4) “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 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.” (Tsai 2011: (52))

Four remarks are in order. First, positing multiple lexical entries for a single morpheme is undesirable on both empirical and theoretical grounds. A unified semantic account, if attainable, is always preferable due to the principle of Modified Occam's Razor (i.e., senses are not to be multiplied beyond necessity). Second, there is good empirical evidence that the indefinite quantity reading does *not* rely on counting the event-realizations (contra Tsai (2011)'s suggestion). In fact, if we look at all the examples discussed in Tsai (2011), they all involve numerals that are more than one (such as *di san dong fangzi* 'the/a third house'), which may be the source leading Tsai (2011) to the formulation in (4). More importantly, as pointed out by one anonymous reviewer in Tsai (2011), examples like (5) can have both the definite reading and the indefinite quantity reading, but the house-buying event is crucially realized only once.

- (5) *Akiu mai-le di-yi dong fangzi.*
 Akiu buy-ASP **di**-one CL house
 'Akiu bought the/a first house.'

The same point can be further illustrated in (6): the house-buying event is realized only once, but the indefinite quantity reading remains.

- (6) *Akiu zhongyu mai-le rensheng-zhong di-yi dong fangzi.*
 Akiu finally buy-ASP life-in **di**-one CL house
 'Akiu finally bought a first house in life.'

Even worse, the house-buying event may never be actualized, but the indefinite quantity reading still remains, as evidenced by (7). Note that the definite reading and the indefinite quantity reading are both available in (7), but there is no actual realization of any house-buying event (and it may well be the case that Akiu will never be able to buy a house in his lifetime).

- (7) *Akiu zheng zai jihua mai di-yi dong fangzi.*
 Akiu right PROG plan buy **di**-one CL house
 'Akiu is planning to buy the/a first house.'

Third, according to Tsai (2011)'s lexical-ambiguity view, the definiteness of ordinals (on the definite reading) is ascribed to the fact that the ordinal morpheme *di* is a [+strong] determiner and the indefiniteness of ordinals (on the indefinite quantity reading) is attributed to the fact that the ordinal morpheme *di* is a [-strong] determiner. To put it in semantic terms, these two claims essentially amount to saying that one ordinal morpheme *di* encodes the iota operator (responsible for the definiteness) while the other ordinal morpheme *di* encodes an existential quantifier (responsible for the indefiniteness). If this is the case, then it becomes extremely puzzling and unclear how the semantic computation should

work when two iota operators are stacked up (as evidenced by (8)) and when two existential quantifiers are stacked up (as evidenced by (9)).¹

- (8) *Zhe di-si ge xuesheng shi shei?* (The definite reading)
 This di-four CL student be who
 ‘Who is this fourth student?’
- (9) *You di-si ge xuesheng tongguo kaoshi le.* (The indefinite quantity reading)
 Have di-four CL student pass exam SFP
 ‘There is a fourth student who passed the exam.’

Neither (8) nor (9) is semantically anomalous. Assuming that a demonstrative (e.g. *zhe* ‘this’) semantically encodes an iota operator (see e.g. Jenks 2018; Ahn 2022; Jenks & Konate 2022), the co-occurrence of *zhe* ‘this’ and the ordinal morpheme *di* on the definite reading in (8) raises a non-trivial issue for the semantic computation of stacking two iota operators over the same noun phrase. A similar point can be made for (9): assuming that the morpheme *you* ‘have/exist’ is an existential quantifier (see e.g. Liao 2011, 2018; Wu & Li 2021), the co-occurrence of *you* ‘have/exist’ and the ordinal morpheme *di* on the indefinite quantity reading raises a non-trivial issue for the semantic computation of stacking two existential quantifiers over the same noun phrase.

Fourth, although Tsai (2011) attributes the ambiguity to two different lexical entries of the ordinal morpheme *di*, there are no explicit semantic representations of *di* provided in the work.

Given the above considerations, in this paper, contra Tsai (2011)’s lexical-ambiguity view, I propose a compositionally unified semantic analysis of Mandarin ordinal phrases, where the ambiguity under discussion is reduced to the pragmatics of domain restriction taken by the ordinal morpheme *di*, which is reminiscent of the absolute-relative ambiguity witnessed in superlatives (see e.g.

1. In English the definite article *the* (which encodes an iota operator) cannot co-occur with a demonstrative such as *that*, which semantically encodes another iota operator. Consider (i):

(i) #that the student

Among other possibilities, one natural semantic explanation for (i) is that the noun *student* is of type $\langle e, t \rangle$ (i.e., $\lambda x.\text{student}(x)$) and the resulting definite expression *the student* is of type $\langle e \rangle$ (i.e., $\iota x.\text{student}(x)$). Therefore, there is no way for the iota operator encoded in the semantics of the demonstrative *that* to bind the variable x again. This is the situation where we have a stacking of two iota operators while the variable x is already bound by the first iota operator (i.e., by the definite article *the*). In the end, a type-mismatch exists between the demonstrative *that* and the definite expression *the student*. The same semantic issue applies to the stacking of two existential quantifiers as well.

Heim 1985, 1999; Szabolcsi 1986; Farkas & Kiss 2000; Sharvit & Stateva 2002), coupled with the semantic requirements imposed by the ordinal morpheme *di*.

Although Tsai (2011: (52))’s formulation may not be completely correct; she has provided many valuable empirical observations on the ambiguity of Mandarin ordinal phrases, which we shall see shortly in §2.

Overall, this paper makes contributions at two levels. On the empirical level, as far as I can tell, the research on ordinals has received little attention (compared to the enormous number of studies on cardinal expressions), thus remaining an important gap in the literature. This paper fills in the gap and provides a more detailed and nuanced documentation of empirical facts concerning Mandarin ordinal phrases. On the theoretical level, to my knowledge, this paper is the first study proposing a compositionally unified semantic account of Mandarin ordinals with respect to the observed ambiguity. It is worth pointing out that the same issue of lexical ambiguity also holds for the English ordinal morpheme *-th* in ordinal phrases such as *the fourth book* vs. *a fourth book*: How many lexical entries of the English ordinal morpheme *-th* do we need to posit in our linguistic theory? Beyond Mandarin and English, the ambiguity under discussion may potentially also hold for ordinal morphemes in other natural languages. Seen from this perspective, this paper makes significant contributions to not only the field of Chinese linguistics specifically but also more generally, how to model the ambiguity of ordinal phrases under discussion in our linguistic theory.

The rest of the paper proceeds as follows. §2 takes Tsai (2011) as our point of departure, while presenting novel facts showing that some of Tsai (2011)’s empirical generalizations are not correct. §3 spells out the details for a unified analysis of Mandarin ordinal phrases. Specifically, §3.1 introduces some important assumptions endorsed in this paper, serving as the theoretical background for the semantic analysis to be proposed in §3.2–§3.4, which illustrate how the empirical facts (in §1 and §2) are captured under the proposed analysis. §4 concludes the paper.

2. More on the ambiguity of Mandarin ordinal phrases

First, Tsai (2011:94) observes that ordinal phrases involve some presuppositions on ordering information, while cardinal expressions do not. Consider Example (10):

- (10) a. *Zhangsan hui mai di-san dongfangzi.*
 Zhangsan will buy *di*-three CL house
 a. ‘Zhangsan will buy the third house (in the row).’
 b. ‘Zhangsan will buy a third house.’ (Tsai 2011: (13))

- b. *Zhangsan hui mai san dongfangzi.*

Zhangsan will buy three CL house

‘Zhangsan will buy three houses.’

(Tsai 2011: (13))

In (10), the cardinal expression *san-dong-fangzi* ‘three houses’ refers to a quantity of houses; by contrast, however, the ordinal phrase *di-san-dong-fangzi* ‘the/a third house’ refers to the house with the ordinal value three, which involves an ordering relation between the house under discussion and other contextually relevant houses in a given discourse.²

Second, Tsai (2011: 96) observes that there is a subject-object asymmetry with respect to the (un)availability of the two readings of Mandarin ordinals. Specifically, only the definite reading is available in the subject position; for the indefinite quantity reading to surface in the subject position, the morpheme *you* ‘have/exist’ is required:

- (11) Subject position and the definite reading

Di-san ge xuesheng kaoshang Tsinghua daxue.

Di-san CL student pass Tsinghua University

‘The third student passed the test to enter Tsinghua University.’

(Tsai 2011: (15))

- (12) Subject position and the indefinite quantity reading

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.’

(Tsai 2011: (16))

By contrast, both readings of Mandarin ordinal phrases are perfectly natural in the object position. Example (3) is repeated below as (13).

- (13) Object position and the ambiguity of Mandarin ordinals

(=(3))

Zhangsan mai-le di-san dongfangzi.

Zhangsan buy-ASP di-three CL house

Definite reading: ‘Zhangsan bought the third house.’

Indefinite quantity reading: ‘Zhangsan bought a third house.’

(Adapted from Tsai 2011: (7))

2. When discussing the presupposition, Tsai (2011: (13)) considers only the indefinite quantity reading. However, as a matter of fact, not only the indefinite quantity reading but also the definite reading involves an ordering relation; it is an important semantic hallmark of ordinal phrases that they all involve some ordering relation in semantics. We shall return to this point in §3.2, where the details of the proposed analysis are spelled out.

Third, according to Tsai (2011:97), with the experiential aspect marker *guo*, only the definite reading is obtained (i.e., the indefinite quantity reading becomes unavailable). Consider (14):

- (14) The experiential aspect marker *guo*
Zhangsan kan-guo di-san ben shu.
 Zhangsan read-ASP di-three CL book
 'Zhangsan has had the experience of reading the third book.'
 (Adapted from Tsai 2011: (19))

Fourth, according to Tsai (2011:97), the definite reading is unavailable when the predicate *sheng* 'give-birth' or a measure classifier such as *bang* 'pound' is used in the sentence. That is, only an indefinite quantity reading is detected in these cases, as shown in (15) and (16):

- (15) *Xiaomei zuotian sheng-le di-san ge xiaohai.*
 Xiaomei yesterday give.birth-ASP di-three CL child
 'Xiaomei gave birth to a third child yesterday.' (Tsai 2011: (20))
- (16) *Zhangsan chi-le di-san bang yingtao.*
 Zhangsan eat-ASP di-three pound cherry
 'Zhangsan has eaten a third pound of cherries.' (Tsai 2011: (21))

I disagree with Tsai (2011) on this generalization; it seems too hasty to jump to the conclusion that the definite reading of Mandarin ordinals is never compatible with the mentioned predicate and measure classifiers. For example, according to Chris Kennedy (p.c.) and Niina Ning Zhang (p.c.), (15) (and its English counterpart) can be felicitously uttered in a science-fiction scenario where people can have pictures of children or a list of children in front of them and choose one to give birth to. If so, what do we learn here? It shows that beyond syntactic environments, contexts and world knowledge also play a key role in determining whether the definite reading is available. Note that even Tsai herself (2011: 115) resorts to world knowledge in explaining the absence of the definite reading in (15). Another piece of evidence that contexts and world knowledge also play a key role in determining the (un)availability of a certain reading is shown in Example (17) below, where the definite reading is absent in an out-of-the-blue context:

- (17) *Akiu nadao di-san mian jin-pai le!*
 Akiu get di-three CL gold-medal SFP
 'Akiu has got a third gold medal!'

The absence of the definite reading in (17) can be expected: gold medals, given our world knowledge, are not ordered in terms of the spatial sequence under normal circumstances. Note that we can manipulate the context to resurrect the definite

reading in (17), but this again emphasizes the importance of contexts and world knowledge in determining the interpretation of an ordinal phrase.

Turning to the case of measure classifiers, we find natural examples where the definite reading of ordinals is available, despite the presence of the measure classifier *bang* ‘pound’:

- (18) *Zhe shi di-yi bang yingtao, zhe shi di-er bang yingtao, zhe shi di-san bang yingtao; Ni xiang chi na-yi-bang yingtao?*
 This be **di**-one pound cherry this be **di**-two pound cherry this be **di**-two pound cherry you want eat which-one-pound cherry
 ‘This is the first pound of cherries, this is the second pound of cherries, and this is the third pound of cherries; Which group of cherries do you want to eat?’

Example (18) can be felicitously uttered when the speaker takes out one pound of cherries sequentially and in the end, she puts three different groups of cherries (with each group weighing one pound) on the table, asking the hearer to decide which group of cherries he wants to eat. Again, what do we learn from this discussion? The lesson here is that the presence of measure classifiers is not a reliable linguistic diagnostic for teasing apart the two readings. More specifically, it is certainly false that the definite reading of ordinals is never compatible with measure classifiers.

Last but not the least, by comparing ordinal phrases with cardinal phrases, Tsai (2011:95) claims that Mandarin ordinal phrases can only denote a singular entity but cardinal phrases may denote a plural entity. Examples (1) and (2) are repeated below as (19) to illustrate her point:

- (19) a. *San ke pingguo* (Cardinal phrases)
 Three CL apple (=1)
 ‘Three apples’
 b. *Di-san ke pingguo* (Ordinal phrases)
 Di-three CL apple (=2)
 ‘The/A third apple’

I believe that the generalization here is not entirely correct and needs to be further refined. It is not true that ordinal phrases cannot refer to a plural entity. Consider (20), where the ordinal phrase involves the group classifier *zu* ‘group’:

- (20) *Di-san zu xuesheng yingde-le Aolinpiya Shuxue Jingsai.*
 Di-three group student win-ASP Olympia Mathematical Competition
 ‘The third group of students has won the International Mathematical Olympiad.’

Assuming that a group of students consists of at least two students, the most natural reading for the ordinal phrase *di-san-zu-xuesheng* ‘the third group of students’ would be a plural entity. So, what do we learn here? The above contrast indicates that the semantics of classifiers matters for the denotation of an ordinal phrase: canonical sortal classifiers deliver singular entities while group classifiers yield plural entities.³ For purposes of this paper, I shall restrict my attention only to the case of canonical sortal classifiers, though I see no insurmountable obstacle in applying the analysis (to be spelled out in §3.2) to a case involving group classifiers.

In sum, (21) presents the properties that any analysis of Mandarin ordinal phrases must explain:

- (21) a. Ordinal phrases involve an ordering relation (i.e., an ordered sequence of objects).
 b. Mandarin ordinals demonstrate an ambiguity between the definite reading and the indefinite quantity reading.
 c. There is a subject-object asymmetry with respect to the distribution of the two readings: both readings are available in the object position; by contrast, in the subject position, the definite reading is available without further ado, but the indefinite quantity reading requires the presence of the morpheme *you* ‘have/exist’.
 d. With the experiential aspect marker *guo*, only the definite reading is obtained.
 e. With canonical sortal classifiers, ordinal phrases have to denote a singular entity.

3. A unified semantic analysis

This section proceeds as follows. §3.1 introduces the assumptions on the semantics of bare nouns and sortal classifiers (e.g. Krifka 1995; Chierchia 1998, 2010, 2015) and the in-situ approach to superlatives (e.g. Farkas & Kiss 2000; Sharvit & Stateva 2002). §3.2 spells out the details of the unified analysis: In particular, following the insights from the in-situ approach to superlatives, I suggest that the observed ambiguity of Mandarin ordinals results from the pragmatic restriction on the domain which the ordinal morpheme *di* semantically operates on. Further-

3. According to Chierchia (1998; 2010; 2015)’s view of Mandarin cardinal expressions, sortal classifiers deliver a set of atomic individuals (i.e., singular entities) and the pluralization of atomic individuals is encoded in the semantics of numerals. Readers are referred to Chierchia’s work for more details.

more, I propose a unified semantics of the ordinal morpheme *di* under the two readings and suggest two important felicity conditions in general on the use of an ordinal phrase in a discourse. § 3.3 and § 3.4 illustrate how the proposed analysis accounts for the empirical facts discussed in § 2.

3.1 Theoretical background

First, I assume with Krifka (1995) and Chierchia (1998) that Mandarin bare nouns are kind terms. Furthermore, there is a systematic correspondence between kinds and properties: kinds can be shifted to properties via the process of predication (the up operator \cup , a predicativizer) and properties can be shifted to kinds via the process of nominalization (the down operator \cap , a nominalizer). Finally, following Chierchia (1998; 2010; 2015), the semantic contribution of Mandarin sortal classifiers is to take a kind term and return a set of atomic instances of the kind. For illustrative purposes, (22) presents the semantics of the Mandarin bare noun *fangzi* ‘house’ (the subscript k is to indicate the status of kind terms) and (23) the composition of the classifier *dong* with the noun *fangzi* (see also Chierchia 2010: (81)).

$$(22) \llbracket fangzi \rrbracket = \text{HOUSE}_k$$

$$(23) \begin{array}{ll} \text{a.} & \llbracket dong \rrbracket = \lambda k \lambda x. \text{Atom}(x)(k) \\ \text{b.} & \llbracket dong fangzi \rrbracket = \lambda x. \text{Atom}(x)(\text{HOUSE}_k) \end{array}$$

Second, I assume with the studies on modified numerals that bare numerals are degree terms (e.g. Hackl 2001; Nouwen 2010; Kennedy 2015; Buccola & Spector 2016; Jackson & Penka 2017; Bylinina & Nouwen 2018). Therefore, the semantics of the bare numeral *san* ‘three’ denotes the numerical value 3 (of type d), as shown below.

$$(24) \llbracket san \rrbracket = 3_d$$

Third, it is well-known that superlatives demonstrate an ambiguity between an absolute reading and a relative reading (see e.g. Szabolcsi 1986; Heim 1985, 1999; Farkas & Kiss 2000; Sharvit & Stateva 2002; Herdan 2008). For example, (25) is ambiguous: in an absolute reading, it means that Adam climbed Mount Everest (i.e., the mountain higher than all other mountains in the world); by contrast, in a relative reading, it means that Adam climbed a higher mountain than anyone else did.

$$(25) \text{Adam climbed the highest mountain.}$$

One approach to the above ambiguity of superlatives is the so-called in-situ approach (see e.g. Farkas & Kiss 2000; Sharvit & Stateva 2002, among others). Leaving the details aside, the leading idea behind the in-situ approach is that the observed ambiguity of superlatives results from the contextual restriction on the domain (i.e., the comparison class) of the superlative morpheme *-est*. For example, as illustrated in (26), on the absolute reading, the contextual value of the domain *C* is a set of mountains of a certain height; by contrast, on the relative reading, the contextual value of the domain *C* is a set of mountains that are of a certain height and climbed by some relevant individual in the given discourse.⁴

- (26) a. Absolute reading: $C = \{x: \exists d. \text{mountain}(x) \wedge \text{high}(x) \geq d\}$
 b. Relative reading: $C = \{x: \exists d \exists z. \text{mountain}(x) \wedge \text{high}(x) \geq d \wedge z \text{ climbed } x\}$

In this paper, I follow the insights of the in-situ approach and suggest that the observed ambiguity of Mandarin ordinal phrases also result from the contextual restriction on the domain which the ordinal morpheme *di* semantically operates on.

The next section proposes a unified semantics of the ordinal morpheme *di* and spells out the felicity conditions in general on the use of an ordinal phrase in a discourse.

3.2 Proposal

Let us recall that the semantic hallmark of ordinal phrases is that they involve a certain ordering relation which leads to a sequence of ordered objects, in contrast to cardinal phrases. This in turns means that the semantics of the ordinal morpheme should encode some sort of ordering relation. To capture these intuitions,

4. An alternative to the in-situ approach is the so-called movement approach (e.g. Heim 1999; Hackl 2001). It has been an ongoing debate in the literature on which approach is the best way to capture the ambiguity of superlatives. However, a recent consensus seems to be that both approaches are required in natural language (see e.g. Tomaszewicz 2015; Wilson 2021). Readers are referred to Wilson (2021) and references therein for greater detail. In this paper, I remain neutral in the debate. Although the proposed analysis can be recast in terms of the movement approach, there are two key reasons why the illustration here adopts the in-situ approach. First, it is well-known that Mandarin Chinese is a scope-rigid language since Huang (1982); the putative scope-taking movement may require further empirical justification. Second, domain restriction is a general linguistic phenomenon that is not unique to superlatives or ordinals. As we shall see shortly in §3.3, on the proposed semantic-pragmatic analysis, the two readings of Mandarin ordinal phrases under discussion are derived from the semantic application of type-shifting rules (e.g. iota or existential type-shifting) together with the pragmatic adjustment of domain restriction.

I propose that the ordinal morpheme *di* has the unified semantics in (27), under both the definite reading and the indefinite quantity reading:

$$(27) \llbracket di \rrbracket = \lambda n \lambda C \lambda R_c \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < n \rightarrow R_c(y, x)].$$

$$\mu_{\text{ORD}}(x) = n$$

According to (27), the ordinal morpheme *di* takes a numeral n (the ordinal value), a domain argument C , a contextually-given precedence relation R_c , and an individual x as arguments, and returns true iff the individual x has the ordinal value n , with the semantic presuppositions satisfied. Note that R_c represents a contextually-given ordering relation (which can be at least a spatial precedence relation or a temporal precedence relation); More importantly, the ordinal morpheme *di* encodes a semantic presupposition on the ordering relation R_c between x and other relevant individuals y : $\forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < n \rightarrow R_c(y, x)]$, which requires that for all individuals y , if y is contextually relevant, non-identical to x and has an ordinal value less than n , then y precedes x with respect to the ordering relation R_c .⁵ Thus, the semantic presupposition imposes a restriction on the sequence of ordered objects in a given discourse. To better appreciate what this semantic presupposition does, consider the Mandarin ordinal phrase *di-san ke pingguo* ‘the/a third apple’: Given the ordinal morpheme *di* and the ordinal value 3, the semantic presupposition requires that for all contextually relevant individuals y if y is non-identical to x and has an ordinal value less than 3, then y precedes x with respect to R_c . This in turn leads to the inference that only two apples (i.e., the first and the second) that outrank the third apple with respect to R_c .

Now, for the moment, let us set aside the semantic details of the ordinal morpheme *di*. In general, there are two important felicity conditions on the use of an ordinal phrase in discourse:

- (28) $\llbracket di-n \rrbracket(C)(\llbracket NP \rrbracket)(x)$ is defined if and only if
- $S = \{z \in D_e \mid \llbracket NP \rrbracket(z) \wedge C(z)\}$ such that $|S| \geq n$ ⁶
 - $\forall m[m \neq n \wedge m < n \rightarrow \exists z[\llbracket NP \rrbracket(z) \wedge C(z) \wedge \mu_{\text{ORD}}(z) = m]]$ ⁷

5. Note that the ordering relation R_c here can be understood and alternatively formalized as a comparison relation (between individuals) based on a contextually-supplied gradable predicate G . See Greenberg (2016; 2018) for a gradability-based analysis of English *even* with respect to the phenomenon of scalarity.

6. Similar considerations can also be found in Bylinina et al. (2015), though the details of formalization are different.

7. Whether the number zero should be included as an ordinal value may depend on the context; I leave open the possibility and make no stipulation here. Note that the issue of the number zero is similarly raised in the case of cardinal expressions (see e.g. Bylinina & Nouwen 2018).

In (28), condition (a) indicates that it would be impossible to use an ordinal phrase to refer to the n -th individual, if there are only $n-1$ individuals in the discourse; condition (b) indicates that when an ordinal phrase is used to refer to the n -th individual, there must exist some individuals that satisfy the denotation of the noun and has the $n-1$ ordinal value and so on in the discourse. Crucially, condition (b) guarantees that there is a correspondence between ordinal values and the relevant entities in the domain.

Finally, it is worth pointing out that the value of the domain argument C is pragmatically restricted (as in the ambiguity of superlatives; see §3.1). Thus, in a Mandarin sentence *Akiu mai-le di-san dong fangzi* 'Akiu bought the/a third house', the domain C on the definite reading is a set of houses in the row, while on the indefinite quantity reading it is a set of houses bought by *Akiu*. This point is illustrated in (29):

- (29) The pragmatic restriction on the domain C of ordinals
- a. Definite reading: $C = \{y: y \text{ is a house in the row}\}$
 - b. Indefinite quantity reading: $C = \{y: y \text{ is a house bought by Akiu}\}$

Note that by embracing the insights of the in-situ approach to superlatives (see e.g., (26)), the two readings of Mandarin ordinal phrases under discussion are now reduced to different contextual values of domain restriction. In particular, in parallel with the relative reading of (25) where the domain C is a set of mountains climbed by some individuals (i.e., $C = \{x: \exists d \exists z. \text{mountain}(x) \wedge \text{high}(x) \geq d \wedge z \text{ climbed } x\}$; see (26b)), the domain C on the indefinite quantity reading of the Mandarin ordinal sentence *Akiu mai-le di-san dong fangzi* 'Akiu bought the/a third house' denotes a set of houses bought by *Akiu* (i.e., $C = \{y: y \text{ is a house bought by Akiu}\}$; see (29b)).⁸

Now, we are in a position to see how and why the ambiguity of Mandarin ordinal phrases arises, along with their intriguing properties discussed in §1 and §2.

8. One may wonder whether Mandarin ordinal phrases can be reanalyzed as an event quantifier on the indefinite quantity reading, given that the reading is intuitively related to the verbal meaning. As far as I can see, we would encounter two issues on this alternative route. First, we would encounter a syntax-semantic mismatch, where ordinal phrases are nominal-internal syntactically but they can quantify over events (i.e., being an event quantifier), which is apparently the semantic job of adverbs (e.g. quantificational adverbs such as *always*). Second, we would run into another lexical ambiguity of Mandarin ordinal phrases (which is no better than Tsai 2011) and have a non-uniform semantics for Mandarin ordinal phrases: the ordinal morpheme *di* is an event quantifier on the indefinite quantity reading, but it is *not* an event quantifier (i.e., anything but an event quantifier) on the definite reading.

3.3 Explaining the ambiguity of Mandarin ordinal phrases

To begin with, let us consider the paradigm example in Tsai (2011), where the ordinal phrase occurs in the object position and both readings are available, as shown in (30). The semantic derivation of the definite reading in (30) along with its LF is illustrated in (31), ignoring the semantics of tense and aspect for simplicity.

(30) *Akiu mai-le di-san dong fangzi.*

Akiu buy-ASP di-three CL house

Definite reading: 'Akiu bought the third house (in the row).'

Indefinite quantity reading: 'Akiu bought a third house.'

(31) The definite reading of (30):

a. LF: [*Akiu* [*mai-le* [[*di-san*]-C *dong fangzi*]]]

b. $\llbracket \textit{fangzi} \rrbracket^C = \text{HOUSE}_k$

c. $\llbracket \textit{dong} \rrbracket^C = \lambda k \lambda x. \text{Atom}(x)(k)$

d. $\llbracket \textit{dong fangzi} \rrbracket^C = \lambda x. \text{Atom}(x)(\text{HOUSE}_k)$

e. $\llbracket \textit{di} \rrbracket^C = \lambda n \lambda C \lambda R_c \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < n \rightarrow R_c(y, x)].$

$\mu_{\text{ORD}}(x) = n$

f. $\llbracket \textit{di-san} \rrbracket^C = \lambda C \lambda R_c \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)].$

$\mu_{\text{ORD}}(x) = 3$

g. $C = \{z: z \text{ is a house in the row}\}$ By the pragmatics of domain restriction

h. $\llbracket [\textit{di-san}]\text{-}C \rrbracket^C = \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)].$

$\mu_{\text{ORD}}(x) = 3$

Composing with C and R_c (a spatial precedence relation) by Function Application

i. $\llbracket [[\textit{di-san}]\text{-}C \textit{dong fangzi}] \rrbracket^C = \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)]. \mu_{\text{ORD}}(x) = 3 \wedge \text{Atom}(x)(\text{HOUSE}_k)$

Composing with the classifier phrase by Predicate Modification

j. $\llbracket [[\textit{di-san}]\text{-}C \textit{dong fangzi}] \rrbracket^C = \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)]. \mu_{\text{ORD}}(x) = 3 \wedge \text{Atom}(x)(\text{HOUSE}_k)$

By the application of the iota operator

k. $\llbracket \textit{mai-le} \rrbracket^C = \lambda y \lambda x. \text{buy}(x, y)$

l. $\llbracket (30) \rrbracket^C = 1$ on the definite reading iff

$\text{buy}(Akiu, \iota x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)]. \mu_{\text{ORD}}(x) = 3 \wedge \text{Atom}(x)(\text{HOUSE}_k))$

According to (31), the definite reading of (30) is true iff *Akiu* bought the unique house with the ordinal value 3 in the row. Crucially, (31g) is obtained by the pragmatics of domain restriction (as we have seen in §3.1); (31h) is obtained by plugging the domain argument C (i.e., a set of houses in the row) and the

contextually-given precedence relation R_c (i.e., a spatial precedence relation) into the semantics of the ordinal morpheme *di*;⁹ (31i) is derived by Predicate Modification (Heim & Kratzer 1998); (31j) is derived by the application of the iota type-shifting (see e.g. Partee 1987; Chierchia 1998; Dayal 2004).

Next, let us shift our attention to the other reading. The semantic derivation of the indefinite quantity reading in (30) along with its LF is illustrated in (32), ignoring the semantics of tense and aspect again for simplicity. Note that the indefinite ordinal phrase undergoes the quantifier-raising to a higher position, in the fashion of Heim & Kratzer (1998).

(32) The indefinite quantity reading of (30):

- a. LF: $[[\exists [di-san]-C \text{ dong fangzi}] [\lambda 1 [Akiu [mai-le t_1]]]]$
- b. $[[fangzi]]^C = \text{HOUSE}_k$
- c. $[[dong]]^C = \lambda k \lambda x. \text{Atom}(x)(k)$
- d. $[[dong fangzi]]^C = \lambda x. \text{Atom}(x)(\text{HOUSE}_k)$
- e. $[[di]]^C = \lambda n \lambda C \lambda R_c \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < n \rightarrow R_c(y, x)].$
 $\mu_{\text{ORD}}(x) = n$
- f. $[[di-san]]^C = \lambda C \lambda R_c \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)].$
 $\mu_{\text{ORD}}(x) = 3$
- g. $C = \{z: z \text{ is a house bought by Akiu}\}$
 By the pragmatics of domain restriction
- h. $[[di-san]-C]^C = \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)].$
 $\mu_{\text{ORD}}(x) = 3$
 Composing with C and R_c (a temporal precedence relation) by Function Application
- i. $[[[di-san]-C \text{ dong fangzi}]]^C = \lambda x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)]. \mu_{\text{ORD}}(x) = 3 \wedge \text{Atom}(x)(\text{HOUSE}_k)$
 Composing with the classifier phrase by Predicate Modification
- j. $[[\exists [di-san]-C \text{ dong fangzi}]]^C = \lambda Q. \exists x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)]. \mu_{\text{ORD}}(x) = 3 \wedge \text{Atom}(x)(\text{HOUSE}_k) \wedge Q(x)$
 By the application of \exists type-shifting
- k. $[[mai-le]]^C = \lambda y \lambda x. \text{buy}(x, y)$
- l. $[(30)]^C = 1$ on the indefinite quantity reading iff
 $\exists x: x \in C \wedge \forall y[y \in C \wedge y \neq x \wedge \mu_{\text{ORD}}(y) < 3 \rightarrow R_c(y, x)]. \mu_{\text{ORD}}(x) = 3 \wedge$
 $\text{Atom}(x)(\text{HOUSE}_k) \wedge \text{buy}(Akiu, x)$

9. Note that as shown in (i), the definite reading of Mandarin ordinals may involve a temporal precedence relation, based on which the sequence of customers is ordered.

(i) *Di-yibai wei guke nadao-le yi zhang mianfei canquan.*
 Di-one.hundred CL customer get-ASP one CL free coupon
 ‘The 100th customer got a free meal coupon.’

According to (32), the indefinite quantity reading of (30) is true iff *Akiu* bought a house whose ordinal value is 3 in the set of houses bought by *Akiu* with respect to the temporal precedence relation. Crucially, (32g) is obtained by the pragmatics of domain restriction (see §3.1); (32h) is obtained by plugging the domain argument *C* (i.e., a set of houses bought by *Akiu*) and the contextually-given precedence relation R_c (i.e., a temporal precedence relation) into the semantics of the ordinal morpheme *di*; (32i) is derived by Predicate Modification; (32j) is derived by the application of the existential type-shifting (see e.g. Partee 1987; Chierchia 1998; Dayal 2004).

Three remarks are in order. First, the apparent requirement of counting event-realizations formulated in Tsai (2011) is now derived from the pragmatics of domain restriction (i.e., a set of houses bought by *Akiu*), coupled with the semantic presupposition imposed by the ordinal morpheme *di* on the ordering information (i.e., a temporal precedence relation). Crucially, given that no mechanism of counting event-realizations is involved here, the current analysis has successfully avoided those issues about the presence of the indefinite quantity reading without any actual realizations of events (see e.g., (5), (6) and (7) in §1). Second, neither an iota operator (the definiteness) nor the existential quantification (the indefiniteness) is hard-wired into the semantics of the ordinal morpheme *di*; therefore, the current analysis has successfully maintained a unified semantics of the morpheme *di* and avoided the semantic issue of stacking two iota operators (see e.g., (8)) or stacking two existential quantifiers (see e.g., (9)). Third, it is worth pointing out that there is a fundamental distinction between the two readings of ordinals with respect to their discourse properties: the definite reading of ordinals is like a definite description (via the iota operator) that the speaker uses to refer to the unique individual with some ordinal value in the discourse; by contrast, the indefinite quantity reading of ordinals is similar to using an indefinite phrase introducing a new discourse referent (see Karttunen 1976) via the existential quantification (Heim 1982). This general contrast between definiteness and indefiniteness explains the intuition behind Tsai (2011: (52))'s formulation: whether the entity referred by the ordinal phrase has existed in the discourse.

Before closing this section, I would not only like to point out that the discourse itself would influence the preference for one of the two readings (i.e., adjusting the value of domain restriction), but also that the modification in ordinal phrases plays a role as well. For instance, with the modification of *rensheng* 'in life' in the ordinal phrase, (33) strongly favors the definite reading.¹⁰ Crucially, by

10. I am greatly indebted to an anonymous reviewer for drawing my attention to this modification effect in Mandarin ordinal phrases.

contrast, without the modification, such preference disappears, as witnessed by (34).

- (33) *Akiu nadao-le rensheng de di-san-mian jin-pai.*
 Akiu get-ASP life MOD di-three-CL gold-medal
 ‘Akiu has got the/a third gold medal in life.’

- (34) *Akiu nadao-le di-san-mian jin-pai.*
 Akiu get-ASP di-three-CL gold-medal
 ‘Akiu has got the/a third gold medal.’

What is the source for the preference in (33)? I suggest that the answer lies in the addition of the modification by *rensheng* ‘in life’. According to traditional Chinese grammar, it is well-known that the modification marker *de* signals the grammatical function of *ding-yu* (定語) in a noun phrase. Along this line of thought, it should be clear that in (33) the phrase *rensheng* serves the grammatical function of *ding-yu* for the ordinal phrase. One key role for such a modification is to further restrict the reference of the noun, which in turn leads to the uniqueness condition of the definite reading (i.e., the unique gold medal in a given discourse). I submit that this is the reason why the definite reading is strongly preferred in (33).¹¹

3.4 Explaining three puzzles of Mandarin ordinal phrases

This section addresses three puzzles of Mandarin ordinal phrases: (a) why the indefinite quantity reading is missing in subject position; (b) why the indefinite quantity reading is missing when the experiential aspect marker *guo* occurs; (c) why an ordinal phrase with canonical sortal classifiers has to denote a singular entity. To start with, let us consider the puzzle of why the indefinite quantity reading is missing in the subject position. Example (11) is repeated below as (35):

11. It is not new that the presence of additional syntactic modification has a semantic effect on domain restriction. The modification effect is also witnessed by determiners (e.g. *every*) and quantificational adverbs (e.g. *always*). For instance, the sentences in (i) can be judged true by manipulating different contextual values of the domain of *every* and *always*; however, by contrast, the same sentences with further syntactic modification immediately become “unambiguous”, as shown in (ii).

- (i) a. Every student left.
 b. Adam always smokes.
- (ii) a. Every student {in this class, with long hair, etc.} left.
 b. Adam always smokes, {when he is anxious, when he works, etc.}.

- (35) *Di-san ge xuesheng kaoshang Tsinghua daxue.*

Di-san CL student pass Tsinghua University

‘The third student passed the test to enter Tsinghua University.’

(Tsai 2011: (15))

I follow Tsai (2011: 117) in suggesting that the culprit responsible for the lack of the indefinite quantity reading in subject position is the long-observed definiteness constraint in Mandarin Chinese: Noun phrases in the subject/topic position are strongly preferred to be specific or definite in their referentiality, with only a few exceptions such as quantity-denoting subjects in modal sentences andthetic subjects in presentative sentences (see e.g. Chao 1968; Li 1998; Tsai 2001; Huang et al. 2009; Tsai 2021; Wu & Li 2021). One famous exception is the presence of the morpheme *you* ‘have/exist’ (i.e., *you*-nominals in the terminology of Wu & Li 2021). The contrast in (36) illustrates this point:

- (36) a. *#Liang ge xuesheng tongguo kaoshi le.*

Two CL student pass exam SFP

Intended: ‘Two students passed the exam.’

- b. *You liang ge xuesheng tongguo kaoshi le.*

Have two CL student pass exam SFP

‘There are two students who passed the exam.’

Obedying the long-standing constraint, the indefinite quantity reading of Mandarin ordinals in the subject position thus occurs with the help of the morpheme *you*. Example (9) is repeated below as (37):

- (37) *You di-si ge xuesheng tongguo kaoshi le.* (The indefinite quantity reading)

Have di-four CL student pass exam SFP

(=9)

‘There is a fourth student who passed the exam.’

Again, obeying the long-standing constraint, the indefinite quantity reading of Mandarin ordinals in the subject position becomes available in modal sentences (in contrast to episodic sentences).

- (38) *Di-si wei guke keyi mianfei huode yi fen xiao-liwu.*

Di-four CL customer **can** for.free get one CL small-gift

‘The fourth customer can get a small gift for free.’

‘A fourth customer can get a small gift for free.’

An anonymous reviewer observes that the indefinite reading of ordinal phrases can be available in the subject position, as shown in (39).

- (39) *Dao xianzai, yijing di-san-ge xuesheng pao.lai zhao wo le.*

Up-to now already **di-three-CL student** run-come find me SFP

‘Up to now, there is already a third student running to find me.’

Crucially, however, as expected by both Tsai (2011) and the current study, the cardinal counterpart of (39) is again well-formed with the indefinite reading, as evidenced by (40).

- (40) *Dao xianzai, yijing san-ge xuesheng pao.lai zhao wo le.*
 Up-to now already **three-CL student** run.come find me SFP
 ‘Up to now, there are already three students running to find me.’

It is worth noting that both (39) and (40) constitute important apparent exceptions to the indefinite subject constraint identified in the literature, because they are not modal sentences. Any theory of the indefinite subject constraint in Mandarin Chinese must explain not only why the contrast such as (36) should exist (i.e., why indefinite subjects in Mandarin Chinese are generally degraded, in contrast to languages like English), but also why indefinite subjects can be well-formed in episodic sentences such as (39) and (40), in contrast to (36).

Summing up, we have seen that the indefinite reading of ordinal phrases patterns with cardinal phrases with respect to the indefinite subject constraint observed in the literature. However, it is beyond the scope of this paper to propose a theory of the long-standing constraint on indefinite subjects in Mandarin Chinese and account for its apparent exceptions.¹² The tentative conclusion of this

12. An anonymous reviewer points out that the indefinite reading of ordinal phrases may not object to the constraint as strictly as cardinal phrases do, by observing the contrast between (i) and (ii):

- (i) *Di-si-wei guke zhongyu lai le.* (Ordinals)
 Di-four-CL customer finally come SFP
 ‘A fourth customer finally came.’
- (ii) *#Si-wei guke zhongyu lai le.* (Cardinals)
 Four-CL customer finally come SFP
 ‘Four customers finally came.’

Although I do not have a good explanation for (i), the contrast seems restricted to the unaccusative verb *lai* ‘come’. The same contrast cannot even be replicated with other unaccusative verbs such as *zou* ‘leave/likai’ ‘leave’ and *dida* ‘reach, arrive’, as witnessed by (iii)–(vi).

- (iii) *#Di-si-wei guke zhongyu {zou, likai} le.* (Ordinals)
 Di-four-CL customer finally leave SFP
 Intended: ‘A fourth customer finally left.’
- (iv) *#Si-wei guke zhongyu {zou, likai} le.* (Cardinals)
 Four-CL customer finally leave SFP
 Intended: ‘Four customers finally left.’
- (v) *#Di-si-wei xuanshou zhongyu dida zhongdian le.* (Ordinals)
 Di-four-CL player finally reach final.point SFP
 Intended: ‘A fourth player finally reached/arrived at the final point.’

study is that whatever ultimately explains the constraint should be able to explain the case of indefinite ordinal phrases discussed here. At this point, it is worth emphasizing that we would not have a convincing explanation for the distribution of Mandarin indefinite subjects until the nature of the constraint and its underlying mechanism is completely revealed. Interested readers are referred to Tsai (2021) and Wu & Li (2021) for a recent discussion on indefinite subjects in Mandarin Chinese.

Next, let us consider the puzzle why the indefinite quantity reading is unavailable when the experiential aspect marker *guo* is present. Example (14) is repeated below as (41).

- (41) The experiential aspect marker *guo* (= (14))
Zhangsan kan-guo di-san ben shu.
 Zhangsan read-ASP di-three CL book
 ‘Zhangsan has had the experience of reading the third book.’
 (Tsai 2011: (19))

It is commonly-held that the experiential aspect *guo* has a repeatability condition which requires the relevant eventuality to be repeatable (e.g. Li & Thompson 1981, among others), though researchers have different proposals on how to capture this condition (see e.g. Lin 2006, 2007; Wu 2008). Leaving aside the theoretical details, the reason why the indefinite quantity reading is incompatible with the experiential aspect *guo* has to do with the repeatability condition. Recall that in the current analysis, there is a correspondence between an ordinal value and the entity referred by an ordinal phrase. Taking (41) for example, the domain of ordinals on the indefinite quantity reading would be pragmatically restricted to a set of books read by *Zhangsan*, ordered by a temporal precedence relation with a corresponding ordinal value. The incompatibility lies in the fact that once the relevant eventuality is repeated (as required by the experiential aspect *guo*), the entity (i.e., a new discourse referent introduced by the existential quantification) involved in the repeated eventuality will not have the ordinal value 3. More specifically, the new discourse referent (on the indefinite quantity reading) involved in the repeated eventuality will not only differ from the old one in the previous discourse but also have a different ordinal value (e.g., 4). Therefore, due to the repeatability condition, the indefinite quantity reading is missing with the presence of the

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- (vi) #*Si-wei xuanshou zhongyu dida zhongdian le.* (Cardinals)
 Four-CL player finally reach final.point SFP
 Intended: ‘Four players finally reached/arrived at the final point.’

In light of the above facts, I leave the contrast between (i) and (ii) with respect to the constraint on indefinite subjects for future research.

experiential aspect *guo*. Note that the definite reading has no problem with the repeatability condition because no new discourse referent is introduced; the same entity referred to by the ordinal phrase can be involved in different (repeated) eventualities.

Finally, let us consider the puzzle of why an ordinal phrase with canonical sortal classifiers in Mandarin has to denote a singular entity. The relevant example is repeated below as (42).

- (42) *Di-san ke pingguo* (=(2))
 Di-three CL apple
 ‘The/A third apple’

Given our assumption with Chierchia (1998; 2010; 2015) that Mandarin sortal classifiers composes with a kind term and returns a set of atomic instances of the kind, it should not be surprising now that an ordinal phrase has to denote a singular entity (see (31) and (32)).¹³ However, it is certainly false that all ordinal phrases in Mandarin Chinese *must* denote a singular entity (contra Tsai 2011). Recall our discussion in §2 that the semantics of classifiers matters for the denotation of a Mandarin ordinal phrase. Therefore, the situation changes if a group classifier is instead used: an ordinal phrase in Mandarin Chinese *can* denote a plural entity (see (20)).

4. Conclusion

Mandarin ordinal phrases demonstrate an ambiguity between a definite reading and an indefinite quantity reading, first observed in Tsai (2011). However, contra Tsai (2011)’s lexical-ambiguity view, this paper has presented a compositionally unified semantic analysis of the ambiguity of Mandarin ordinal phrases. Specifically, the ambiguity of Mandarin ordinals under discussion is derived from the pragmatic restriction on the domain of the ordinal morpheme *di* (which is remi-

13. Although this paper concerns only Mandarin ordinal phrases, it is worth pointing out that regarding the locus of pluralization in Mandarin cardinal phrases, there are many ways to maintain the semantics of bare numerals as a degree term under the framework of Chierchia (1998; 2010; 2015). One way of doing this is to assume some covert measurement operator that undertakes the main job of numerals in Chierchia’s system (e.g. checking for atomicity and returning an atomic semi-lattice structure of plurals). Such covert operators mediating between numerals and nouns are not uncommon to find in the literature on comparatives (though it has many different names by different authors: e.g. *many* in Hackl 2001; M-OP in Rett 2014, 2018; *Meas* in Kennedy 2015; Solt 2015; Buccola & Spector 2016) as well as the literature on countability (e.g. Scontras 2014; Filip & Sutton 2017; Sağ 2019).

niscent of the in-situ approach to the ambiguity of superlatives), coupled with the semantic requirements of *di*; therefore, a unified semantics of the ordinal morpheme *di* is maintained under both readings. Furthermore, two important felicity conditions on the use of an ordinal phrase in a discourse have also been suggested. To my knowledge, this paper is the first study proposing an explicitly compositional unified semantic account of the ambiguity of Mandarin ordinal phrases. Besides the theoretical contributions, this paper has also presented empirical discoveries showing that some of the generalizations in Tsai (2011) are not entirely correct. For instance, it is false that all ordinal phrases in Mandarin Chinese *must* denote a singular entity (contra Tsai 2011). Instead, the semantics of classifiers matters for the denotation of an ordinal phrase: a Mandarin ordinal phrase *can* denote a plural entity when a group classifier is used. Furthermore, the presence of measure classifiers or of certain predicates such as *sheng* ‘give birth’ is not a reliable diagnostic for teasing apart the two readings; thus, the role of context and world knowledge in determining the (un)availability of a given reading is identified and discussed. Finally, this paper has illustrated how the proposed analysis explains three puzzling properties of Mandarin ordinal phrases: (a) why the indefinite quantity reading is missing in the subject position; (b) why the indefinite quantity reading is missing when the experiential aspect marker *guo* occurs; and (c) why an ordinal phrase with canonical sortal classifiers has to denote a singular entity.

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List of abbreviations

ASP	aspect
CL	classifier
MOD	modification marker
SFP	sentence final particle

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