

Plural Morphemes, Definiteness, and the Notion of Semantic Parameter*

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According to the nominal mapping parameter proposed by Chierchia (1998a, b), Chinese and Japanese common nouns are assigned the [+argument, -predicate] features, which means that they are of type *e*. It follows from this parametric distinction that such languages have rich classifier systems and lack determiners and plural markers. It has often been pointed out, however, that these languages do indeed have plural markers, and this fact seems to be problematic to Chierchia's approach. This paper aims to defend the nominal mapping parameter, and it will be claimed that Chinese and Japanese nouns are layered in the lexicon and common nouns used with plural markers are actually [+argument, +predicate] of type $\langle e, t \rangle$, arguing that those plural markers function as definite markers.

Key words: Chinese, Japanese, the nominal mapping parameter, formal semantics

1. Introduction

In languages like Chinese and Japanese, nouns can be used in argument position without (in)definite articles or plural markers, and they are interpreted as definite, indefinite, singular or plural, depending on context, as shown in (1).

- (1) Chinese
a. Wo mai-le shu le.
 I buy-Perf book Prt
 'I bought a book/some books/the book(s).'

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Japanese

- b. John-ga hon-o yon-da.
 -Nom book-Acc read-Past
 ‘John read a book/some books/the book(s).’

It is also well known that those languages have rich classifier systems. When the number of the individuals that a noun denotes is indicated, the number is not attached directly to the noun but it is used with a classifier, as shown in (2).¹

(2) Chinese

- a. liang-ge xuesheng *liang xuesheng
 two-Cl student two student

Japanese

- b. ni-satsu-no hon *ni hon
 two-Cl-Gen book two book

These facts contrast with languages in which plural morphemes are productive and nouns are used with (in)definite articles. In order to capture the systematic differences with respect to nominal systems, Chierchia (1998a, b) proposes the semantic parameter called the Nominal Mapping Parameter, as given in (3).

(3) The Nominal Mapping Parameter: $N \Rightarrow [\pm\text{argument}, \pm\text{predicate}]$

- a. $N \Rightarrow [+arg, -pred]$: (e.g. Chinese/Japanese)
 Nouns can be of type e , cannot be of type $\langle e, t \rangle$.
 b. $N \Rightarrow [+arg, +pred]$: (e.g. English)
 Nouns can be of type e , can be type $\langle e, t \rangle$.
 c. $N \Rightarrow [-arg, +pred]$: (e.g. French)
 Nouns cannot be of type e , can be of $\langle e, t \rangle$.

A syntactic category N is mapped onto either semantic type e or type $\langle e, t \rangle$, and the mapping relation between syntactic categories and semantic types are represented as the features $[\pm\text{argument}, \pm\text{predicate}]$. According to the Nominal Mapping Parameter, in languages like Chinese and Japanese, every common noun has $[+arg, -pred]$ and is mapped onto type e , while in languages like French, every common noun has $[-arg, +pred]$ and is interpreted as predicate. In English, the mapping is determined item by

¹ In this paper, I shall not discuss floating numerals in Japanese. For relevant issues, see Nakanishi (2002) and the references therein.

item. For instance, *desk* is of type $\langle e, t \rangle$ whereas *furniture* is of type e .

It has been often pointed out, however, that Chinese and Japanese do have plural markers although they are not productive. In both languages, plural markers are used with [+human] nouns and some plural markers are also used with pronouns and demonstratives. Chinese has a plural morpheme *-men* and Japanese has two plural markers *-tachi* and *-ra*, and they can be used with [+human] nouns and *-men* and *-ra* can also be used with pronouns/demonstratives. As we shall later see, the antecedents of these pronouns/demonstratives with *-men* or *-ra* can be either [+human] or [-human] nouns.²

(4) Chinese

xuesheng- men	ta- men
student-Pl	he-Pl (= they)

Japanese

gakusee- tachi	gakusee- ra	
student-Pl	student-Pl	
sore- ra	kore- ra	are- ra
it-Pl (= they/them)	this-Pl (= these)	that-Pl (= those)

The existence of these plural markers immediately gives rise to the following questions: (i) Are the plural markers in Chinese/Japanese the same as the English plural morpheme *-s*? And (ii) Is Chierchia's Nominal Mapping Parameter correct? This paper will argue that the Chinese/Japanese plural markers are the same as the English *-s* with respect to the semantics of plurality, but they also have the definite interpretation. Concerning the second question, it will be argued that Chierchia's parameter is basically correct and Chinese and Japanese have the stratum in the lexicon.

2. Definiteness of the plural markers in Chinese/Japanese

2.1 Common nouns with plural markers

A crucial difference between the Chinese/Japanese plural markers and English *-s* is that the former tend to be interpreted as definites. The definiteness of Chinese *-men* is well documented (cf. Iljic 1994, Yang 1998, Li 1999, among many others). As shown in

² These plural morphemes are also used with names such as *John-men* and *John-tachi*, which mean "John and others, a group represented by John." I do not discuss this use of the plural markers, assuming that the semantics of this type of use is different from the one discussed in the text. See Nakanishi and Tomioka (2002) for an approach trying to unify the two uses.

(5), common nouns followed by *-men* are interpreted as definite.

- (5) a. Wo qu zhao haizi-**men**.
 I go find child-Pl
 ‘I will go find the child.’
 b. Wo qu zhao haizi.
 ‘I will go find the/some child/children.’ Li (1999:78)

The definiteness of *-men* is supported by the fact in (6), where the NP followed by *-men* cannot be used as a predicate.

- (6) Tamen shi xuesheng (*-**men**).
 they be student -Pl
 ‘They are students/*the students.’ Yang (1998:280)

An NP with *-men* also cannot be used in the existential construction, as in (7).

- (7) a. You ren lai-le.
 have man come-asp
 ‘There is somebody coming.’
 b. *You ren-men lai-le.
 have man-Pl come-asp
 ‘There are people coming.’ Yang (1998:281)

On the other hand, less attention has been paid to the definiteness of Japanese plural morphemes, and in fact, there are some cases where their expected definiteness is not observed, which will be discussed in section 3.6. The relation between plurality and definiteness in Japanese has been pointed out by Kawasaki (1989) through the study of reflexive pronouns with *-tachi*. She describes the contribution of *-tachi* as follows:

When *-tachi* is attached to a common noun, the resulting expression makes a definite description for a non-atomic entity. For example, *gakuse[e]-tachi* (student-Plural) means ‘the students.’ It denotes an individual sum all of whose atomic individual parts are students, and it presupposes that the speaker and the hearer know which group of students is being referred to.

(Kawasaki 1989, section 1.1)

In a sentence like (8), a noun with a plural marker is interpreted as denoting the individuals whom the speaker and listener both know.

- (8) a. John-wa gakusee-**tachi**/-**ra**-ni at-ta.
 -Top student-Pl/-Pl-Dat meet-Past
 ‘John met the students.’
 b. John-ga doroboo-**tachi**/-**ra**-o tsukamae-ru daroo.
 -Nom thief-Pl/-Pl-Acc catch-Pre maybe
 ‘Maybe John will catch the thieves.’

The definiteness of a common noun followed by a plural marker becomes clearer when used in question or negative sentences as given in the b-examples of (9) and (10).

- (9) a. Kono ie-ni kodomo-wa i-masu ka?
 this house-in child-Top exist-Pres Q
 ‘Is there a child in this house?’
 b. Kono ie-ni kodomo-**tachi**-wa i-masu ka?
 this house-in child-Pl-Top exist-Pres Q
 ‘Are the children in this house?’
 (10) a. Kono ie-ni kodomo-wa i-mase-n.
 this house-in child-Top exist-Pres-Neg
 ‘There is no child in this house.’
 b. Kono ie-ni kodomo-**tachi**-wa i-mase-n.
 this house-in child-Pl-Top exist-Pres-Neg
 ‘The children are not in this house.’

Like Chinese *-men*, the Japanese plural markers cannot be used with a predicative NP as shown in (11), which also shows the definiteness of them.

- (11) Kare-ra-wa gakusee(*-**tachi**/*-**ra**) desu.
 he-Pl-Top student -Pl/-Pl Cop.Pres
 ‘They are (*the) students.’

Another piece of evidence is, as Nakanishi and Tomioka (2002) point out, that a common noun with a plural marker takes wide scope over an intensional predicate, as shown in (12b).

- (12) a. Sono byooin-wa kangofu-o sagashi-tei-ru.
 that hospital-Top nurse-Acc seek-Prog-Pres
 ‘That hospital is looking for a nurse.’
 ?? ‘There is a nurse that hospital is looking for.’
 b. Sono byooin-wa kangofu-**tachi**/**-ra**-o sagashi-tei-ru.
 that hospital-Top nurse-Pl/-Pl-Acc seek-Prog-Pres
 ‘That hospital is looking for the nurses.’

If the object of the intensional verb is bare as in (12a), its most natural interpretation is a non-specific reading, and it is very difficult to interpret it as having wide scope over the verb. On the other hand, if the object NP is followed by a plural marker, it gets wide scope over the verb as given in (12b). Nakanishi and Tomioka give the NP a specific interpretation such that there are a group of nurses that the hospital is looking for. Although I agree that there is the possibility of analyzing such NPs as specific, I would like to interpret it as definite; otherwise we would have to assume an indefinite expression which always takes wide scope over another operator.

2.2 Pronouns with plural markers

The claim that Japanese plural morphemes are not just plural markers is also supported by facts concerning pronouns. Japanese has the null/overt contrast of pronouns, and their distributions are different. Overt pronouns cannot be used in so-called paycheck sentences and bathroom sentences, as given in (13a) and (13b), respectively.

- (13) a. John igai-no dare-mo-ga jibun-no kurejittokaado-o tsuma-ni
 except-Gen who-∀-Nom self-Gen credit.card-Acc wife-to
 watashi-ta. John-wa **ø**/??**sore**-o aijin-ni watashi-ta.
 give-Past -Top it-Acc mistress give-Past
 ‘Everyone but John gave a credit card of his to his wife.’
 John gave one of his to his mistress.’
 b. Kono tatemono-ni toire-ga na-i ka, **ø**/??**sore**-ga
 this building-in bathroom-Nom Neg-Pres or it-Nom
 henna tokoro-ni a-ru ka-no dochira-ka-dea-ru.
 funny place-in exist-Pres or-Cop which-Q-Cop-Pres
 ‘It is the case either that this building does not have a bathroom or that it
 is in a funny place.’

As is argued by Chierchia (1995), pronouns in these contexts are interpreted as E-type pronouns. Thus, the fact in (13) demonstrates that the null pronoun can be interpreted as E-type, while the overt pronoun cannot in Japanese.

The anti-E-type character of the overt pronoun suggests that they translate into variables. In fact, the bound variable reading is available when they are c-commanded by their antecedents, as shown in (14).

- (14) a. *Dono ronbun-mo sore-ga keesais-are-ru zasshi-no*
 which paper- \forall that-Nom publish-Pass-Pres journal-Gen
shoshiki-ni shitagaw-anakerebanarana-i.
 format-Dat follow-must-Pres
 ‘Every paper must follow the format of the journal in which it appears.’
 b. *Dono doroboo-mo soitsu-ga nusun-da shina-o jimanshi-ta.*
 which thief- \forall that.guy-Nom steal-Past thing-Acc boast.of-Past
 ‘Every thief boasted of what he stole.’

Sore in (14a) and *soitsu* in (14b) are c-commanded by their universally quantified antecedents and they are interpreted as bound variables. When they are not c-commanded by their antecedents, they cannot be interpreted as bound variables, as in (15).

- (15) a. *John-wa sono chuukoshaya-no dono kuruma-ni-mo*
 -Top that used.car.shop-Gen which car-Dat- \forall
*notte-mi-ta. Yosoo-ijooni *sore-wa yoku hashit-ta.*
 drive-try-Past expectation-more.than it-Top well run-Past
 ‘John tried driving every car in the used car shop. It ran better than expected.’
 b. *Dono doroboo-mo kono machi-no doko-ka-ni kakure-tei-ru.*
 which thief- \forall this town-Gen where- \exists -in hide-Prog-Pre
*Keesatsu-wa *soitsu-o sagashi-tei-ru.*
 police-Top that.guy-Acc search.for-Prog-Pres
 ‘Every thief is hiding somewhere in this town. The police are searching for him.’

If the overt pronoun is followed by the plural marker *-ra*, however, the anaphoric link between the pronoun and the universally quantified antecedent can be established.

- (16) a. John-wa sono chuukoshaya-no dono kuruma-ni-mo
 -Top that used.car.shop-Gen which car-Dat-∀
 notte-mi-ta. Yosoo-ijooni sore-**ra**-wa yoku hashit-ta.
 drive-try-Past expectation-more.than it-Pl-Top well run-Past
 ‘John tried driving every car in the used car shop. They ran better than
 expected.’
 b. Dono doroboo-mo kono machi-no doko-ka-ni kakure-tei-ru.
 which thief-∀ this town-Gen where-∃-in hide-Prog-Pre
 Keesatsu-wa soitsu-**ra**-o sagashi-tei-ru.
 police-Top that.guy-Pl-Acc search.for-Prog-Pres
 ‘Every thief is hiding somewhere in this town. The police are searching
 for them.’

This parallels with the singular/plural contrast in English as observed in (17).

- (17) Every boy walked in. *He/They sat down.

The singular pronoun cannot be linked to the non-c-commanding, universally quantified antecedent while the plural pronoun can. As claimed in Chierchia (1995) et al., the plural pronoun in contexts like (17) is interpreted as E-type, and if the E-type analysis of plural pronouns is correct, then the overt pronoun with the plural marker in Japanese like (16) also should be interpreted as E-type. Here is an interesting situation. We observed that overt pronouns without a plural marker are not interpreted as E-type, but those with a plural marker are interpreted as E-type. This fact suggests that the E-type interpretation comes from the semantics of the plural marker. I would like to propose that the plural marker has the Cooperian definite description meaning, which gives the definite interpretation, as illustrated in (18). (The formal definition will be given in section 3.4.)

- (18) Cooperian definite description
 ↓
 sore -ra
 ↑
 variable

If the pronoun with *-ra* is interpreted as definite, it should obey the uniqueness/ maximality requirement. And it does in fact, as in (19).

- (19) Oozee no gyangu-ga futa kumi-ni wakare-ta.
 many-Gen gangster-Nom two group-into separate-Past
 #Soshite **soitu-ra-wa** **soitsu-ra-o** naguri-hajime-ta.
 and that.guy-Pl-Top that.guy-Pl-Acc hit-begin-Past
 ‘Many gangsters separated into two groups. #And they started hitting them.’

The intended reading of (19) is that the first *soitsu-ra* refers to a group of gangsters and the second to the other group of gangsters. But the context does not supply enough information to tell one from the other. As a result, these overt pronouns refer to parts of the gangsters, which violates the uniqueness/maximality requirement.

The account proposed here predicts that the plural morpheme makes overt pronouns available in paycheck sentences, and in fact this prediction is borne out as in (20).³

- (20) John igai-no dare-mo-ga jibun-no untenmenkyosho to
 except-Gen who- \forall -Nom self-Gen driver’s license and
 kurejittokaado-o tsuma-ni azuke-ta.
 credit.card-Acc wife-to give-Past
 John-wa **o/(?)sore-ra-o** aijin-ni azuke-ta.
 -Top it-Pl-Acc mistress give-Past
 ‘Everyone but John gave his driver’s license and credit card to his wife.
 John gave them to his mistress.’

The judgment varies from speaker to speaker. Some found that the overt pronoun with the plural marker in (20) is clearly better than (13a); some said that the difference between (13a) and (20) is very subtle, but the latter is slightly better than the former. There are also native speakers who found no difference between the two. But importantly, there is no native speaker who regarded (13a) as better than (20). This fact suggests that the plural morpheme functions as Cooperian definite description.

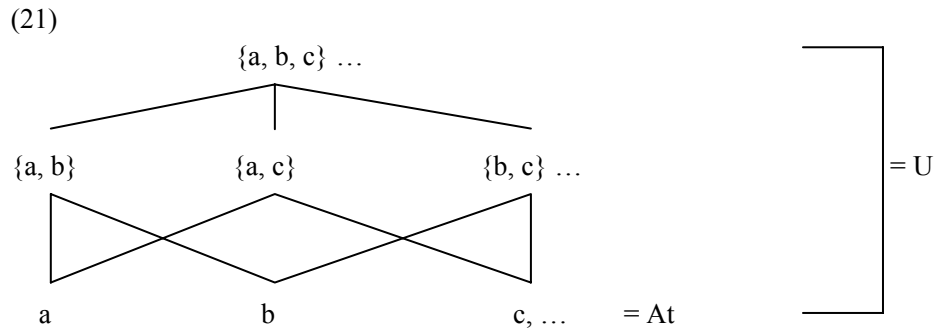
3. The semantics of plural markers in Chinese/Japanese

In the previous section, we have seen that the plural morphemes in Chinese and Japanese function as definite markers. In this section, we shall give the formal definition of the plural markers.

³ I would like to thank a reviewer of this journal for drawing my attention to this case. In fact, her/his comment was that Japanese paycheck pronouns do not improve with the help of the plural morpheme. As reported here, however, the resulting sentence is better than its singular pronoun counterpart.

3.1 The semantics of plurality

Let us first consider the semantics of bare nouns in Chinese/Japanese. Following Krifka (1995) and Chierchia (1998a, b), I shall assume that Chinese/Japanese bare nouns are mass/kind-denoting expressions of type e .⁴ I shall also follow Chierchia's (1998a) theory of plurality, which inherits the basic insights from Links (1983), according to which the domain of individuals has an internal structure. It forms a complete join semilattice, as illustrated in (21).



The domain of individuals consists of singular individuals and plural ones. In (21) At is a set of singular individuals. $\{a, b\}$ is, for example, a plural individual formed by a and b . The relations between individuals in the domain are expressed by means of a “component-of” relation, represented as \leq . In $A \leq B$, A can be a member of or a subset of B .

- (22) a. $a \leq \{a, b, c\}$
 b. $\{a, b\} \leq \{a, b, c\}$.

The sum operation **U** is defined with \leq .

- (23) For any elements A, B in U , $A \mathbf{U} B$ is the smallest element in which A and B are both components.

Examples:

$$a \mathbf{U} b = \{a, b\}$$

⁴ The idea that bare NPs in determiner-less languages are kind denoting expressions was first proposed by Porterfield and Srivastav (1988). According to them, Hindi bare NPs are interpreted either as definite or as kind-denoting, but not as indefinite.

$$\begin{aligned} \{a, b\} \mathbf{U} \{c, d\} &= \{a, b, c, d\} \\ a \mathbf{U} \{b, c\} &= \{a, b, c\} \end{aligned}$$

In terms of \mathbf{U} , we can define the supremum operator, which gives us the sum of all the elements of X , as in (24).

$$(24) \text{ For any } X \subseteq U, \mathbf{U}X = \{u \in At: \text{For some } u' \in X, u=u' \text{ or } u \in u'\}$$

Examples:

$$\begin{aligned} \mathbf{U}\{a, \{a, b\}\} &= \{a, b\} \\ \mathbf{U}\{\{a, b\}, c\} &= \{a, b, c\} \\ \mathbf{U}\{a, b\} &= \{a, b\} \end{aligned}$$

An operator that selects the greatest element of a set is defined as in (25).

$$(25) \text{ For any } X \subseteq U, \text{Max}(X) = \mathbf{U}X, \text{ if } \mathbf{U}X \in X; \text{ otherwise undefined.}$$

Example:

$$\begin{aligned} \text{Max}(\{a, \{a, b\}\}) &= \{a, b\} \\ \text{Max}(\{a, b\}) &= \text{undefined} \end{aligned}$$

And also in terms of \mathbf{U} , the closure is defined as in (26).

$$(26) \text{ For any } X \subseteq U, *X \text{ is the closure of } X \text{ under } U, \text{ i.e. the set of all sums of elements of } X: *X = \{\mathbf{U}Y: Y \subseteq X\}.$$

Example:

$$*\{a, b, c\} = \{\{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\}\}$$

Given a domain of individuals like (26), pluralization can be expressed as mapping a set of atoms into the set of pluralities constituted by those atoms. This can be formalized as in (27).

$$(27) \text{ For any set of atoms } A \subseteq U, \text{PL}(A) = *A - A$$

If we have $A = \{a, b, c\}$ as a set of atoms, the pluralization function PL , which corresponds to Link's asterisk (*), takes it as its domain, and gives us the set of pluralities $\text{PL}(A) = \{\{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\}\}$. Note that here we are assuming that $\{a\} = a$, which Schwarzschild (1996) calls Quine's innovation.

So far we have seen the semantics of plurality. The semantics of mass terms is also

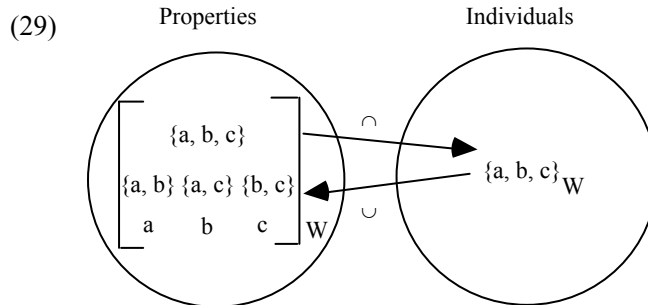
explained by means of lattice theory. In Link 1983, in addition to the domain of (singular and plural) individuals, there is a set whose internal structure is a complete, but not necessarily atomic, join-semilattice, which serves as a domain of the denotation of mass nouns. In Chierchia 1998a, on the other hand, the domain of mass nouns has the same internal structure as that of count nouns. And he claims that mass nouns are lexically pluralized. This is called the Inherent Plurality Hypothesis. Denotation of mass nouns can be expressed by means of the **U**-closure. Suppose we have chair *a* and table *b* in world *w*. Then ‘*a* is a piece of furniture’, ‘*b* is a piece of furniture’, ‘*a* and *b* are pieces of furniture’ are all true in *w*. This shows that the denotation of ‘furniture’ contains both atoms and pluralities, which is pictured as in (28).

$$(28) \quad \llbracket \text{furniture}_w \rrbracket = \left[\begin{array}{c} \{a, b\} \\ \swarrow \quad \searrow \\ a \quad \quad b \end{array} \right] \quad \begin{array}{l} \boxed{} = \llbracket \text{pieces of furniture}_w \rrbracket \\ \boxed{} = \llbracket \text{piece of furniture}_w \rrbracket \end{array}$$

Formally, the domain of mass nouns corresponds to the **U**-closed atomic subsets of *U*. And this means that mass nouns are plurals in that they denote pluralities. The difference between mass nouns and plural count nouns is therefore that the latter exclude atoms while the former contains atoms but they are sometimes vague (e.g., ‘water’).

3.2 The semantics of kind-denoting terms

Let us see the semantics of kind denoting expressions. As is extensively discussed in Chierchia (1984), kinds are “nominalized” counterparts of predicates. Extensionally, the furniture-kind in *w* in (28) denotes the greatest element in *w*, namely, $\{a, b\}$. The relation between properties and kinds is illustrated in (29), where the \cap -operator changes properties into individuals, and the \cup -operator “predicativizes” individuals. So, for any properties *P*, $\cap P$ is a kind, and for any kinds *k*, $\cup k$ is a property.



More formally, kinds and properties are defined based on the domain designed for pluralities above, as in (30).

- (30) a. U is a join atomic semilattice
 b. AT is the atoms of U
 c. S is the set of worlds/situations
 d. $K \subseteq U^S$ is the set of kinds
 e. $K \subseteq AT$
- (31) Let k be a kind. Then for any world/situation s ,
 $\cup k = \lambda x[x \leq k_s]$, if k_s is defined,
 where k_s is the plural individual that comprises all of the atomic members of the kind in s ;
 otherwise undefined.
- (32) For any property P , and world/situation s
 $\cap P = \lambda s \text{MAX}(P_s)$, if $\lambda s \text{MAX}(P_s)$ is in K ,
 where P_s is the extension of P in s ;
 otherwise undefined.

With these notions, mass and kind denoting nouns in English are treated as follows.

- (33) a. Gold is rare. \rightarrow rare'(GOLD)
 b. Dogs are widespread. \rightarrow widespread'(\cap dogs)

Both *rare* and *widespread* are kind-selecting predicates. Mass nouns like *gold* is a kind-denoting expression, so that it translates into GOLD. Plural count nouns like *dogs* are “nominalized” by the \cap -operator. Plural count nouns are also interpreted as existential if used with object-level predicates, as in (32). Following Carlson’s (1977) idea that the lexical semantics of predicates forces the operation from kind to instances of the kind. Chierchia (1998b) proposes a rule, called Derived Kind Predicate (DKP), formulated in (35).

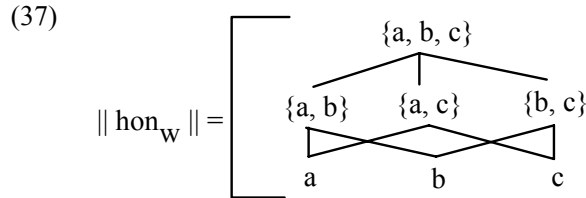
- (34) Lions are ruining my garden.
- (35) Derived Kind Predication
 If P applies to objects and k denotes a kind, then
 $P(\dots, k, \dots) = \exists x[\cup k(x) \wedge P(\dots, x, \dots)]$

Given DKP, the existential reading in (34) is derived as shown in (36).

- (36) ruining-my-garden'(\cap lions)
 via DKP
 $\exists x[\cup \cap \text{lions}(x) \wedge \text{ruining-my-garden}'(x)]$

3.3 The semantics of common nouns in Chinese/Japanese

Now let us go to Chinese/Japanese bare common nouns. Take a world w in which there are three books, say a, b, c , in as shown in (37). The elements of the **U**-closed set are $a, b, c, \{a, b\}, \{a, c\}, \{b, c\}$, and $\{a, b, c\}$, and they all can be interpreted as extensions of a bare noun *hon* 'book' in w . This means that Japanese bare nouns should be treated as mass.



So just like *furniture* in English, *hon* is kind-denoting and translates into BOOK, and (38) is represented as (39).

- (38) John-ga hon-o yon-da.
 -Nom book-Acc read-Past
 (39) read'(BOOK)(j)

Here read' applies to objects while BOOK denotes the book-kind, so via the DKP (40) is derived.

- (40) $\exists x[\cup \text{BOOK}(x) \wedge \text{read}'(x)(j)]$

Our intuition that Japanese bare nouns are kind-denoting and they are interpreted as existential can be now captured by DKP.

Now let us look at the semantics of classifiers. The theory of classifiers I follow here is basically Krifka (1995). The logical representation of a sentence with a classifier like (41), for example, is represented as in (42).

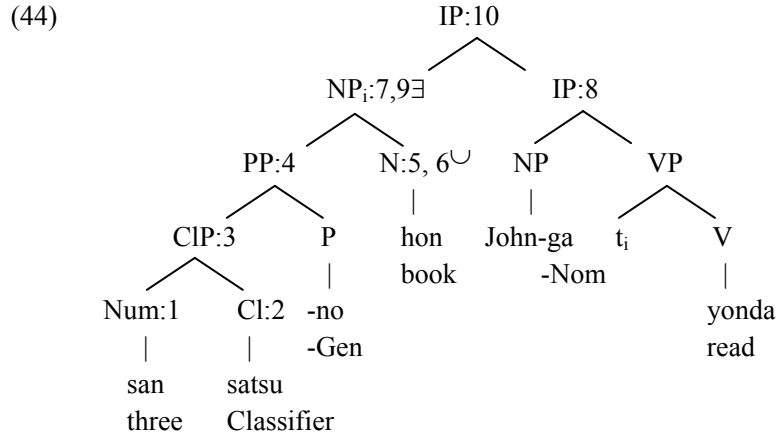
- (41) John-wa san satsu-no hon-o yon-da.
 -Top three Cl-Gen book-Acc read-Past
 'John read three books.'

$$(42) \exists x[\cup \text{BOOK}(x) \wedge \text{CL}'(x) = 3 \wedge \text{read}'(x)(j)]$$

The translation of the classifier itself is given (43).⁵

$$(43) \text{ classifier: } \lambda n \lambda P \lambda x [P(x) \wedge \text{CL}'(x) = n], \text{ where } n \text{ is number.}$$

Number (43) requires a predicate, so that the host noun BOOK of type e must be lifted into $\langle e, t \rangle$. In other words, the classifier triggers the type lifting. This is the job of the \cup -operator. The computation of the whole object of the example in (41) is illustrated in (44), where I assume that the genitive case marker *-no* is semantically vacuous.



- | | | |
|------|--|---|
| 1. | 3 | e (number) |
| 2. | $\lambda n \lambda P \lambda x [P(x) \wedge \text{CL}'(x) = n]$ | $\langle e, \langle \langle e, t \rangle, \langle e, t \rangle \rangle \rangle$ |
| 3-4. | $\lambda P \lambda x [P(x) \wedge \text{CL}'(x) = 3]$ | $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ |
| 5. | BOOK | e |
| 6. | $\cup \text{BOOK} (= \lambda x [x \leq \text{BOOK}_s])$ | $\langle e, t \rangle$ |
| 7. | $\lambda P \lambda x [P(x) \wedge \text{CL}'(x) = 3](\cup \text{BOOK})$ | |
| | $= \lambda x [\cup \text{BOOK}(x) \wedge \text{CL}'(x) = 3]$ | $\langle e, t \rangle$ |
| 8. | $\lambda y [\text{read}'(y)(j)]$ | $\langle e, t \rangle$ |
| 9. | $\exists: \lambda x [\cup \text{BOOK}(x) \wedge \text{CL}'(x) = 3]$ | |
| | $= \lambda Q [\exists x [\cup \text{BOOK}(x) \wedge \text{CL}'(x) = 3 \wedge Q(x)]]$ | $\langle \langle e, t \rangle, t \rangle$ |
| 10. | $\exists x [\cup \text{BOOK}(x) \wedge \text{CL}'(x) = 3 \wedge \text{read}'(x)(j)]$ | t |

⁵ CL' in (42) corresponds to Krifka's (1995) OU(k), where OU 'object unit' applies to kinds k and OU(k) applies to individuals.

A few comments should be given at this point. First the object NP with the classifier is of type $\langle e, t \rangle$ because of the translation of classifiers given in (44). The type of the transitive verb *yonda* ‘read’ is $\langle e, \langle e, t \rangle \rangle$. So function application does not apply. Following Bittner (1994) among others, I assume that type mismatch triggers LF movement. In (44) the object NP moves and adjoins to IP. The lower IP translates into $\lambda x[\text{read}'(x)(j)]$ of type $\langle e, t \rangle$, which again cannot combine with the moved NP. To salvage this type mismatch, a type-lifting operation dubbed \exists , which makes $\langle e, t \rangle$ into $\langle \langle e, t \rangle, t \rangle$, applies as shown in 9. (Cf. Partee (1987) and Bittner (1994) for further discussion on type shifting operations.) Via this type lifting operation, the existential quantifier is introduced.

3.4 The definition of Chinese/Japanese plural markers

In section 2, we observed that the plural morphemes in Chinese and Japanese function as definite markers. This fact can be captured by the definition in (45) and (46).

- | | | | |
|------|--------------------------|-------------------------------|------|
| (45) | Lexical Item | Translation | Type |
| | <i>-men, -tachi, -ra</i> | $\sigma x[\text{PL}(P_i)(x)]$ | e |
- (46) $\|\sigma_u \phi\|^g$ denotes the greatest element v which satisfies $\|\phi\|^g[u/v]$;
Otherwise undefined.

As given in (45), besides the pluralization function PL, the translation of the plural morphemes has two more components. “ P_i ” is the Cooperian property variable, which denotes the most salient property in the context. The other is the σ -operator, from which the definiteness of the plural morphemes comes.

Given these assumptions and definitions, let us see, for example, how the overt pronoun in (15a), repeated as (47), is interpreted.

- (47) John-wa sono chuukoshaya-no dono kuruma-ni-mo
 -Top that used.car.shop-Gen which car-Dat- \forall
 notte-mi-ta. Yosoo-ijooni **sore-ra-wa** yoku hashit-ta.
 drive-try-Past expectation-more.than it-Pl-Top well run-Past
 ‘John tried driving every car in the used car shop. They ran better than
 expected.’

The computation of the overt pronoun followed by the plural morpheme is shown in (48).

(48)

$$\begin{array}{c}
 \text{DP:4} \\
 \swarrow \quad \searrow \\
 \text{NP:2,3} \quad \text{D:1} \\
 | \quad \quad | \\
 \text{sore} \quad \text{-ra} \\
 \text{it} \quad \quad \text{-Pl}
 \end{array}$$

$$\begin{array}{ll}
 1. & \sigma x[\text{PL}(P_i)(x)] \quad e \\
 2. & x \quad e \\
 3. & \lambda_{xx} \quad \langle e, e \rangle \\
 4. & \lambda_{xx}(\sigma x[\text{PL}(P_i)(x)]) \\
 = & \sigma x[\text{PL}(P_i)(x)] \quad e
 \end{array}$$

The important point in the derivation of (48) is that *sore* translates into a variable just like the cases where no plural marker is used. If it is followed by a plural marker, on the other hand, it has to be bound by the λ -operator to complete function application, as in 3. Giving the denotation of the contextually specified property variable P_i , the whole DP refers to the maximal sum x such that x were cars in the used-car shop and driven by John, namely ‘the cars in the used car shop that John tried driving’.

How about the computation of a common noun followed by *-ra*? The fact that the plural morphemes can be used with *gakusee* ‘student’ seems to be a serious problem for our approach, for we assume that Chinese/Japanese common nouns such as *hon* ‘book’ are mass terms/kind denoting expressions like English *furniture*, and they cannot be pluralized by a plural marker for the same reason as *furniture* cannot be pluralized. More precisely, they cannot be pluralized because they are inherently pluralized (the Inherent Plurality Hypothesis). However, it is also a fact that common nouns with the [+human] feature like *gakusee* ‘student’ can be pluralized with *-ra* or *-tachi*, as we have seen above. The generalization in (49) thus obtains.

- (49) In Chinese and Japanese, all bare/common nouns are mass/kind-denoting expressions of type e . But the common nouns having the [+human] feature are ambiguous between count nouns and mass/kind nouns, and when followed by a plural marker, they are count nouns of type $\langle e, t \rangle$.

As we shall discuss in section 4, this generalization will shed new light on the notion of “semantic parameter” of Chierchia (1998a).

With the assumption that *gakusee* ‘student’ is an atom denoting property, translating into student’ of type $\langle e, t \rangle$, like English *student*, the common noun followed by *-tachi* is computed as in (50).

- (50)
- | | | |
|---------|--------|--|
| DP:4 | | |
| NP:3 | D:1,2 | |
| | | |
| gakusee | -tachi | |
| student | -Pl | |
-
- | | | |
|----|--|---|
| 1. | $\sigma x[PL(P_i)(x)]$ | e |
| 2. | $\lambda P_i [\sigma x[PL(P_i)(x)]]$ | $\langle \langle e, t \rangle, e \rangle$ |
| 3. | student' | $\langle e, t \rangle$ |
| 4. | $\lambda P_i [\sigma x[PL(P_i)(x)]](student')$ | |
| = | $\sigma x[PL(student')(x)]$ | e |

The point of this derivation is that the Cooperian property variable P_i is λ -bound, and the resulting representation combines with student'.

For the sake of exposition, I shall show why treating *gakusee* as mass term doesn't work.

- (51)
- | | | |
|----------------------|--------|--|
| DP:5 | | |
| NP:3, 4 [∪] | D:1,2 | |
| | | |
| gakusee | -tachi | |
| student | -Pl | |
-
- | | | |
|----|--|---|
| 1. | $\sigma x[PL(P_i)(x)]$ | e |
| 2. | $\lambda P_i [\sigma x[PL(P_i)(x)]]$ | $\langle \langle e, t \rangle, e \rangle$ |
| 3. | STUDENT | e |
| 4. | [∪] STUDENT | $\langle e, t \rangle$ |
| 5. | $\lambda P_i [\sigma x[PL(P_i)(x)]](^{\cup}STUDENT)$ | |
| = | $\sigma x[PL(^{\cup}STUDENT)(x)]$ | e |
| | (uninterpretable) | |

In (51), type-theoretically, function application is completed. Semantically, however, $PL(^{\cup}STUDENT)$ makes the whole DP uninterpretable, since mass terms cannot be pluralized. As we saw in 3.1, for any set of atoms A , $PL(A) = *A - A$. The extension of $^{\cup}STUDENT (= \lambda x[x \leq STUDENT_s])$ is the **U**-closed set of atoms of being a student in s , namely $*^{\cup}STUDENT$. So $PL(^{\cup}STUDENT) = *^{\cup}STUDENT - *^{\cup}STUDENT = \emptyset$.

This is the Inherent Plurality Hypothesis's account of why mass terms/kind denoting expressions cannot be pluralized.

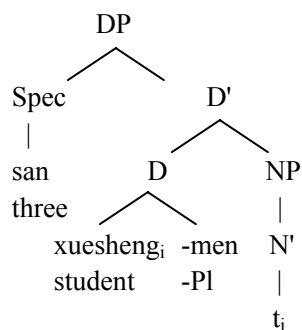
One might argue against the claim that [+human] nouns in Chinese and Japanese are count nouns when followed by a plural marker, pointing out that they cannot be used with numerals, as shown in (52) and (53).

- (52) Chinese
- | | | |
|----|-------|----------------------|
| a. | *san | xuesheng- men |
| | three | student-Pl |
| b. | *san | xuesheng |
| | three | student |
- (53) Japanese
- | | | |
|----|-------|---------------------------|
| a. | *san | gakusee- tachi/-ra |
| | three | student-Pl/-Pl |
| b. | *san | gakusee |
| | three | student |

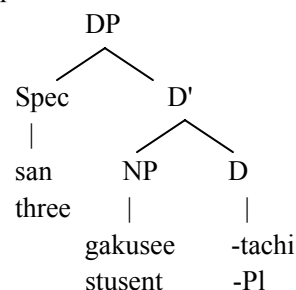
The ungrammaticality of the b-examples is easy to account for. If these [+human] nouns are kind-denoting expressions, they cannot be used with numerals, just like the ungrammaticality of **three furniture*. On the other hand, if they are countable nouns, the extension of which is a set of atoms, then they have to be pluralized by a plural marker when used with numerals. So, the account is straightforward. The apparent problem is the ungrammaticality of the a-examples, since it seems possible to interpret them as 'the three students'. But the ungrammaticality of these also follows from our approach. For the Chinese example (52a), I assume the structure (54a), where the N-head moves to *-men*. This is basically the same analysis proposed by Li (1999) except that she assumes *-men* projects NumP, rather than DP. For the Japanese example (53a), I assume the structure (54b). In either case, a common noun and a plural marker make a small constituent and the numeral attaches the complex.⁶

⁶ See also Cheng and Sybesma (1999) for a different approach.

(54) a. Chinese



b. Japanese



In order for these to be interpretable, they should be translated into $\sigma x[\text{PL}(\text{student}')(\mathbf{x}) \wedge |\mathbf{x}| = 3]$. However, it is clear that such a logical representation is not obtainable. For the common nouns and the plural markers give us $\sigma x[\text{PL}(\text{student}')(\mathbf{x})]$ of type e , which cannot be combined with numerals of type e . Simply put, the ungrammaticality of (52a) and (53a) is the same as that of **three the students* in English.

A potential problem concerning our claim that Chinese/Japanese [+human] nouns are ambiguous between countable and mass is that it predicts that [+human] nouns can be used with the numeral 'one' without classifier, just like English *one student*. This prediction is not borne out, however. As shown in (55), neither Chinese nor Japanese allows such a sequence in argument position.⁷

(55) Chinese: **yi xuesheng*
 one student

Japanese: **ichi gakusee*
 one student

I assume that numerals in Chinese/Japanese are not generalized quantifiers, and hence they cannot combine with countable nouns of type $\langle e, t \rangle$.

3.5 Plural markers and classifiers

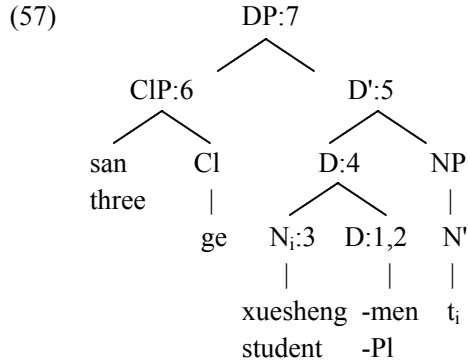
What happens then if expressions like (52a) and (53a) are used with classifiers? There is an interesting contrast between Chinese *-men* and Japanese *-tachi/-ra* concerning the cooccurrence with classifiers. As shown in (56b), in Chinese the use of classifier with the plural marker makes the expression ungrammatical.

⁷ In Japanese an expression like (55) is okay if used as a predicative, as given in (i).

(i) John-wa ichi gakusee toshite hantaishi-ta.
 -Top one student as make.objection-Past
 'John made an objection as a student.'

- (56) a. san-ge xuesheng
 three-Cl student
 ‘three students’
 b. *san-ge xuesheng-**men**
 three-Cl student-Pl

The ungrammaticality of (56b) follows from our semantics of *-men* and classifiers. See the following semantic computation.



- | | | |
|------|--|---|
| 1. | $\sigma x[PL(P_i)(x)]$ | e |
| 2. | $\lambda P_i [\sigma x[PL(P_i)(x)]]$ | $\langle\langle e, t \rangle, e \rangle$ |
| 3. | student' | $\langle e, t \rangle$ |
| 4-5. | $\sigma x[PL(student')(x)]$ | e |
| 6. | $\lambda P \lambda x [P(x) \wedge CL'(x) = 3]$ | $\langle\langle e, t \rangle, \langle e, t \rangle \rangle$ |
| 7. | function application does not apply | |

Unlike Cheng and Sybesma (1999) or Li (1999), where a classifier is assumed to be a head of the whole nominal expression, in (57), a numeral and a classifier make a constituent, CIP (see also Krifka 1995). This assumption only needs because of the semantic type of classifiers. If we modify it as $\langle\langle e, t \rangle, \langle e, \langle e, t \rangle \rangle\rangle$ from $\langle e, \langle\langle e, t \rangle, \langle e, t \rangle \rangle\rangle$, it fits into Cheng and Sybesma's and Li's structure, and still it accounts for the ungrammaticality of (56b). The point is that type-theoretically *xuesheng-men* 'the students' of type e does not combine with classifiers.

In Japanese, on the other hand, an NP with a plural marker can be used with a classifier as given in (58b).⁸

⁸ For some speakers, (58b) sounds less natural than (58a). In the previous study (Kurafuji 1999), I assumed that the difference between these two examples is significant and concluded that

- (58) a. [San-nin-no gakusee]-ga tsukamat-ta.
 three-Cl-Gen student-Nom be.caught-Past
 ‘Three students were arrested.’
 b. (??) [San-nin-no gakusee-**tachi**/**-ra**]-ga tsukamat-ta.
 three-Cl-Gen student-Pl/-Pl-Nom be.caught-Past
 ‘The three students were arrested.’

This fact cannot be accounted for by our semantic approach, since we are assuming that Chinese *-men* and Japanese *-tachi* and *-ra* are the same. In order to account for the grammaticality of (58b), I would like to propose that Japanese plural morphemes have an additional, higher-order translation, as given in (59).

- | | | |
|------|---|---|
| (59) | Translation | Type |
| | $\lambda P \lambda \Pi \Pi \sigma x [PL(P)(x) \wedge \Pi(\neg P)(x)]$ | $\langle \langle e, t \rangle, \langle \langle \langle e, t \rangle, \langle e, t \rangle \rangle, e \rangle \rangle$ |

Unlike the definition in (48) ($\sigma x [PL(P_i)(x)]$), (59) does not contain the Cooperian property variable ‘ P_i ’. The reason is that a pronoun with *-ra* cannot be used with a classifier, as shown in (60).

- | | | |
|------|---|--|
| (60) | *san-ko-no sore- ra
there-Cl-Gen it-Pl
“three them” | *san-nin-no soitsu- ra
three-Cl-Gen that-guy-Pl
“three those guys” |
|------|---|--|

The other and more prominent difference between (48) and (59) is that the latter has two variables ‘ Π ’ and ‘ $\neg P$ ’. Number (61) shows how these variables work.

- (61)
-
- ```

graph TD
 DP6[DP:6] --- PP5[PP:5]
 DP6 --- D3[D':3]
 PP5 --- CIP4[CIP:4]
 PP5 --- P[P]
 CIP4 --- san[san]
 CIP4 --- Cl[Cl]
 Cl --- nin[nin]
 P --- no[-no]
 no --- Gen[-Gen]
 D3 --- NP2[NP:2]
 D3 --- D1[D:1]
 NP2 --- gakusee[gakusee]
 gakusee --- student[student]
 D1 --- tachi[-tachi]
 tachi --- Pl[-Pl]

```

---

Japanese is not different from Chinese when classifiers are used with NPs followed by a plural marker. In the present paper, however, I regard (58b) as grammatical, following the native speakers' judgment which I obtained.

1.  $\lambda P \lambda \Pi \sigma x [PL(P)(x) \wedge \Pi(\neg P)(x)]$   $\langle\langle e, t \rangle, \langle\langle\langle e, t \rangle, \langle e, t \rangle \rangle, e \rangle\rangle$
2.  $student' \langle e, t \rangle$
3.  $\lambda \Pi \sigma x [PL(student')(x) \wedge \Pi(\neg student')(x)]$   $\langle\langle\langle e, t \rangle, \langle e, t \rangle \rangle, e \rangle$
- 4-5.  $\lambda P \lambda x [P(x) \wedge CL'(x) = 3]$   $\langle\langle e, t \rangle, \langle e, t \rangle \rangle$
6.  $\lambda \Pi \sigma x [PL(student')(x) \wedge \Pi(\neg student')(x)] (\lambda P \lambda x [P(x) \wedge CL'(x) = 3])$   
 $= \sigma x [PL(student')(x) \wedge \lambda P \lambda x [P(x) \wedge CL'(x) = 3] (\neg student')(x)]$   
 $= \sigma x [PL(student')(x) \wedge \neg student'(x) \wedge CL'(x) = 3]$   $e$

The technical reason for assuming ‘ $\Pi$ ’ is function application for the classifier of type  $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ . The job of ‘ $\neg P$ ’ in (59) is to fill the property variable  $P$  in the translation of the classifier. The ‘ $P$ ’ of ‘ $\neg P$ ’ is replaced with the atom-denoting common noun  $student'$ , yielding ‘ $\neg student'$ ’ in 3, and after reduction of  $\lambda \Pi$ , it comes in the property variable  $P$  of the classifier. The logical representation of  $\neg student'(x)$  in 6 means that  $x$  is not a member of a set of singularity of being a student. Notice that  $PL(student') = *student' - student'$ , where  $student'$  is a set of atoms, so that  $\neg student'(x)$  is in fact redundant and the final logical form in 6 is equal to  $\sigma x [PL(student')(x) \wedge CL'(x) = 3]$ .

To sum up, the difference between Chinese (56b) and Japanese (58b) is that Japanese plural morphemes have an additional, higher-type translation, which combines with classifiers. It might be speculated that as mentioned in footnote 6, some Japanese speakers feel expressions like (58b) to be less natural, and for those speakers, the translation in (59) is not available.

### 3.6 Remaining problems: Indefinite interpretations of Japanese plural markers

As pointed out by Nakanishi and Tomioka (2002), there are cases where noun phrases with *-tachi* are not interpreted as definites. Typical cases are given in (62).

- (62) a. Kodomo-**tachi**-wa itsumo otona-**tachi**-no mane-o su-ru.  
 child-Pl-Top always adult-Pl-Gen imitating-Acc do-Pres  
 ‘Children always imitate adults.’
- b. Kongo nanmin-**tachi**-ga fue-tsuzukeru daroo.<sup>9</sup>  
 from.now.on refugee-Pl-Nom increase-continue will  
 ‘(The number of) refugees will continue to increase from now on.’

<sup>9</sup> Number (62b) is attributed to Yoshihisa Kitagawa (personal communication). His original example is actually the relative clause construction, but the point remains the same.

- c. Kooen-de kodomo-**tachi**/-**ra**-ga ason-dei-ru.  
 park-in child-Pl/-Pl-Nom play-Prog-Pre  
 ‘Children are playing in the park.’

In what follows, I would like to suggest possible approaches to each example in turn, although they are tentative, open-ended, and far from formal.

Number (62a) is a generic sentence, and the common nouns with *-tachi* in this sentence are interpreted generically. In English, definite plurals such as *the children* do not have generic interpretation. So, (62a) seems to be a counter-example against my claim. Cross-linguistically, however, definite plurals are used in generic sentences. For instance, in French, every noun requires an article, and definite plurals, as well as definite singulars, can be interpreted as kind-denoting, as shown in (63).

- (63) Les pandas sont éteint.  
 the(pl) pandas are extinct  
 ‘The panda is extinct.’

Thus, I would like to analyze the NPs with *-tachi* in (62a) as kind-denoting expressions.

The noun followed by the plural marker in (62b) is analyzed in the same way as (62a); that is, it is a kind-denoting term. To support this analysis, I would like to point out an English example like (64), where the definite plural is used as subject.

- (64) The wolves are getting bigger as we travel north. (Krifka et al. 1995:78)

Clearly the predicate *be getting bigger* do not apply to each member of the set denoted by the plural subject NP. Rather the plural subject is interpreted as denoting the wolf-kind. Number (62b) is not exactly the same as (64), but the semantics of *be getting bigger* and that of *continue to increase* can be treated in the same manner. Number (62b) does not mean that each refugee will continue to increase, which does not make sense. Rather it means that the sum of refugees at *w'* will be greater than the sum of refugees at *w* prior to *w'*.

Finally let us discuss (62c), which is the most serious problem to our approach, for the NP with *-tachi* is not interpreted as kind-denoting but clearly as indefinite plural. In order to understand how to get indefinite interpretation, let me mention an important fact concerning the relation between noun phrases with *-tachi* and quantifiers. As shown in (65), Chinese *-men* cannot coöccur with expressions like *many*, while Japanese plural markers can, and they denote indefinite pluralities.



- (65) Chinese  
 a. \*henduo xuesheng-**men**  
     many student-Pl
- Japanese  
 b. ooku-no gakusee-**tachi**  
     many-Gen student-Pl  
     ‘many students’

The ungrammaticality of the Chinese example (65a) follows from the account given in (52a). Simply put, it is the same as the ungrammaticality of *\*many the students*. On the other hand, the grammaticality of (65b) does not follow from our semantics, since no matter how *ooku* ‘many’ is combined with *gakusee-tachi*, the fact that the NP is interpreted as indefinite cannot be accounted for. Interestingly, the indefinite interpretation of an NP with a plural marker also arises when classifiers with approximative numerals such as *more than 3* or *2 or 3* are used with it.

- (66) san-nin ijoo-no gakusee(-**tachi**)    ni, san-nin-no gakusee(-**tachi**)  
       three-Cl more.than student-Pl        two three-Cl-Gen student-Pl  
       ‘more than three students’            ‘two or three students’

These contrast with the definite interpretation of (61). At this moment, I have no idea how to derive the readings in (66) compositionally, and I would like to stipulate the following: The definiteness of Japanese plural markers is nullified when NPs are used with quantifiers or non-specific numerals. This amounts to saying that under such circumstances, Japanese plural markers translate into PL, defined in (27), just like English -s.

Given this observation, let us go back to (62c). My suggestion is that the NP with *-tachi* in (62c) has an implicit quantifier corresponding to *a few/some/several* depending on context, and it gives indefinite interpretations to the NP. It is very easy to imagine the situation where appropriate numbers of children, like at most 20 children, are playing in a typical size of park in Japan. Thus, out of the blue, it is very natural to interpret (62c) as meaning that some children, say about 10 children, are playing in the park, and the implicit approximative numeral makes the NP indefinite.

Alternatively, I would like to suggest that the definite plural marker has the indexical use like the English definite article. Number (62c) is felicitous in the situation where some children are playing in the park, but there is also a child who is in the park but not playing. That is, (62c) does not seem to satisfy the maximality requirement on the definite marker. The English definite article *the* also has a similar use, as in (67).

(67) Look. The desk is dirty.

This can be felicitously uttered when there is more than one desk. Chierchia (1995) accounts for such cases, which he calls the indexical use of definites, by domain selection. He argues that (67) has an implicit restriction as shown in (68).

- (68) a. The desk over there is dirty.  
 b.  $\text{dirty}'(\sigma x[R(o, x) \wedge \text{desk}'(x)])$   
 R = is occupied by, o = a location

Number (62c) can also be analyzed as having an implicit restriction, and the sentence means that all the children in the most salient domain are playing in the park. The truth conditions of (62c) are given in (69).

- (69)  $\text{be-playing}'(\sigma x[R(o, x) \wedge \text{PL}(\text{child}')(x)]) \wedge \text{part-of}(o, \text{the-park})$   
 R = is the most salient place occupied by, o = a location

Number (69) says that the maximal sum of x, x children, who are at a location o, are playing and o is a part of the park.

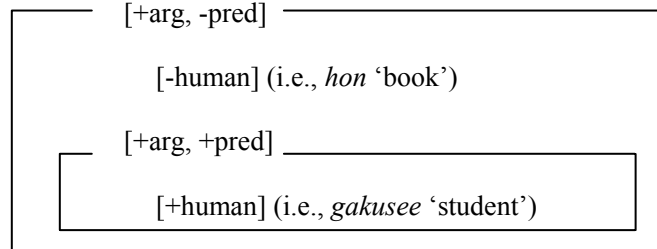
#### 4. A theoretical implication

The main claim of the present paper was given in (49), repeated as (70).

- (70) In Chinese and Japanese, all bare/common nouns are mass/kind-denoting expressions of type *e*. But the common nouns having the [+human] feature are ambiguous between count nouns and mass/kind nouns, and when followed by a plural marker, they are count nouns of type  $\langle e, t \rangle$ .

This result is very important with respect to the Nominal Mapping Parameter. Number (70) suggests that even in [+arg, -pred] languages there are common nouns of type  $\langle e, t \rangle$  in the lexicon. The immediate question is then: Are Chinese and Japanese [+arg, +pred] languages like English? And a more general question is: Is the Nominal Mapping Parameter correct? A possible answer might be that there is no such parameter, and the mass/count distinction should be specified lexical item by lexical item. However, this cannot capture the fact that in French, every common noun is used only as predicate, and likewise that in Chinese and Japanese, every common noun can be used in argument position and there is no common noun which can be used only as predicate. So, I would like to suggest that the Chinese/Japanese lexicon consists of two strata in the subset relation, as illustrated in (71).

(71) The strata of Chinese/Japanese nouns in the lexicon



All Chinese/Japanese nouns, both [+human] and [-human] nouns, have the parameter setting of [+arg, -pred], mapped onto type *e*, but [+human] nouns can have the value of [-arg, +pred], so their category-type mapping is determined item by item like English. They are mapped onto type  $\langle e, t \rangle$  when used with plural morphemes. This means that the [+arg, -pred] are default values in Chinese and Japanese, but the [-pred] value of the [+human] nouns can be changed to [+pred] when the semantics of *-men* or *-ra* is learned through positive evidence.

This situation is reminiscent of Itô, Mester, and Padgett's (1995) analysis of voicing of consonants after nasal in Japanese. In the framework of Optimality Theory, they claim that the constraint ranking for native Japanese vocabulary differs from the one for non-native Japanese vocabulary. This means that one language, say Japanese, can have two constraint rankings. What we are looking at is very similar to this case in that a language has two types of vocabulary and one has the opposite value of parameter setting against the other.

## 5. Conclusion

In this paper, I investigated the semantics of plural morphemes in Chinese and Japanese, and claimed that common nouns with a plural morpheme function as definite markers. In particular, this paper showed the definiteness of the Japanese plural markers based on the following facts: (i) They show the usual presupposition projection effect; (ii) they cannot be used as predicates; (iii) they take scope over intensional verbs; (iv) over pronouns show the anti-E-type property while those with *-ra* are interpreted as E-type, which suggests that the plural morpheme functions as Cooperian definite description; and (v) overt pronouns with *-ra* obey the uniqueness/ maximality requirement.

The Chinese/Japanese plural morphemes are used with [+human] nouns, which means that those nouns are of type  $\langle e, t \rangle$  in spite of the fact that Japanese bare nouns can be used in argument position, being of type *e*. This fact appears to be counter-evidence against the Nominal Mapping Parameter proposed by Chierchia 1998a, b,

which says that Chinese and Japanese are [+arg, -pred] languages in which every common noun is mapped onto type *e* and there is no plural marker. I argued that the Nominal Mapping Parameter is correct, and claim that the Japanese lexicon has two strata where one properly includes the other. The superset has the [+arg, -pred] value and the subset the [+arg, +pred] value. The [+human] nouns are members of the subset; that is, they have the [+arg, +pred], so their category-type mapping is determined item by item.

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## Appendix: An OT reformulation of the Nominal Mapping Parameter

The Nominal Mapping Parameter can be restated in OT as follows. Suppose any common noun can be either [arg] or [pred]. Relevant constraints are given in (A1).

- (A1) \*arg: argumental use is not allowed.  
 \*pred: predicative use is not allowed.  
 FAITHFULNESS: Don't change a feature of input.

In French, \*arg outranks FAITH and \*pred, so even if an input common noun has [arg], it cannot be used as argument, but had better be used as predicative, violating FAITH and \*pred, as shown in (A2).

- (A2) French

| input: [arg]  | *arg | FAITH | *pred |
|---------------|------|-------|-------|
| [arg]         | *!   |       | *     |
| ☞ [pred]      |      | *     |       |
| input: [pred] |      |       |       |
| [arg]         | *!   | *     |       |
| ☞ [pred]      |      |       | *     |

In Chinese and Japanese, the default ranking of constraints is \*pred >> {\*arg, FAITH}, so bare nouns in these languages can be used in argument position.

- (A3) Chinese/Japanese (default)

| input: [arg]  | *pred | FAITH | *arg |
|---------------|-------|-------|------|
| ☞ [arg]       |       |       | *    |
| [pred]        | *!    | *     |      |
| input: [pred] |       |       |      |
| ☞ [arg]       |       | *     | *    |
| [pred]        | *!    |       |      |

The English ranking is FAITH >> {\*arg, \*pred}, by which the feature specified in an input is respected. The [+human] nouns in Chinese/Japanese are also subject to this ranking. So, if the input is *gakusee* 'student' with the [arg] feature, the optimal output is its argumental use, and if the same lexical item happens to be assigned the [pred] feature, it is used as predicative.

(A4) English, Chinese/Japanese [+human] nouns

| input: [arg]  | FAITH | *arg | *pred |
|---------------|-------|------|-------|
| ☞ [arg]       |       | *    |       |
| [pred]        | *!    |      | *     |
| input: [pred] |       |      |       |
| [arg]         | *!    | *    |       |
| ☞ [pred]      |       |      | *     |

## 複數語素、有定性與語意參數

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根據 Chiercha (1998a, b) 的「名詞對應參數」，漢語與日語的一般名詞的類型是 *e*，屬性為 [+論元, -述語]，這表示這類語言有豐富的類別詞系統，沒有定詞、複數標記。但很多文獻指出，漢語與日語確實有複數標記，這對 Chiercha 的分析造成了問題。本文主張漢語、日語的名詞在辭彙庫裡是有層次的。那些與複數標記一起使用的一般名詞，其類型是  $\langle e, t \rangle$ ，帶有 [+論元, +述語] 屬性，而複數標記的功能是作為定指標記。

關鍵詞：漢語，日語，名詞對應參數，形式語意學