The Mass-Count Distinction and the Syntax of Classifiers in Japanese

by

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Abstract

In this thesis, I investigate the properties of classifiers and the grammaticized mass-count distinction in Japanese from a generative perspective (Chomsky 1981, 1995 and subsequent works), adopting the analyses of Distributed Morphology (Halle and Marantz 1993 and subsequent works) and the Exo-Skeletal model (Borer 2005a).

I propose that, in addition to the mass-count distinction being manifested at the conceptual level, the mass-count distinction is grammaticized in Japanese. I do this by examining the individuation and number properties in various constructions with and without classifiers in the language (bare nouns, plurals, and numeral classifier constructions). The idea is that, in addition to classifiers, several residual ways to encode a grammaticized mass-count distinction are present in Japanese. Bare nouns and plurals also involve Ind(ividuation) Phrases, headed by a null Ind head or plural markers. Additionally, I show that these constructions are polysemous in nature, and encompass individuating and non-individuating varieties. I introduce a list of criteria that helps sort out which elements in the grammar manifest the grammaticized mass-count distinction from those that do not.

First, I propose that, in Japanese, there are two types of number neutral bare nouns. I show that bare nouns in Japanese are not restricted to narrow scope (in contrast to those in other languages: e.g., Rullmann and You 2006 for Mandarin). Based on observations from relative scope, but also from kind reference and telicity (Carlson 1977, Borer 2005b), I argue that Japanese bare nouns that take wide scope (which I call DP bare nouns) involve individuation, whereas Japanese bare nouns that take narrow scope (which I call nP bare nouns) lack IndPs. (See, e.g., Dayal 2011, Espinal and McNally 2011 for a similar heterogeneous view in other languages).

Second, I show that plural making in Japanese exhibits diverse properties, and can be mapped across nominal functional heads (cf. Mathieu 2014; also see Wiltschko 2008). Individuating plurals, including *-tati* (when used with proper names) and reduplication (Sudo 2017), are inclusive plurals, and pattern with bare plurals in English. Non-individuating plurals, on the other hand, including *-tati* (when used with common nouns) are exclusive plurals. This contributes to the recent literature on the inclusive-exclusive contrast seen in plural interpretation (e.g., Mathieu 2012). I point out that the observations in plurals in Japanese are not fully explained by an analysis of the head-modifier distinction of plurals proposed by Wiltschko (2008).

Third, I show that there are structurally two types of numeral classifier constructions in Japanese, each with different properties of individuation (see Cheng and Sybesma 1999 and Li 2013 for similar claims in Mandarin). Classifiers have been commonly classified in terms of what type of nouns they are used with: sortal classifiers are mainly used with count-y objects, while mensural classifiers are used with either count-y or mass-y nouns. Therefore, it is the type of classifiers that is often assumed to manifest or reflect the grammaticalized mass-count distinction in Japanese and other languages (e.g., Cheng and Sybesma 1999). I instead propose that each of these two types in Japanese allows either a count or mass reading. In other words, the grammaticalized mass-count distinction in Japanese is not distinguished by types of nouns or classifiers, but by the structural positions of classifiers. Regardless of the types of classifiers, classifiers become individuators when they are at IndPs.

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List of Abbreviations

ABS	Absolutive
ACC	Accusative
COMP	Complementizer
ADJ	Adjective
ASP	Aspect
CL	Classifier
COLL	Collective
COMP	Complementizer
COND	Conditional
CONT	Contrastive focus marker
COP	Copular
CP	Complementizer Phrase
D	Determiner head
DAT	Dative case
DEF	Definite article
DEM	Demonstrative
DET	Determiner
DP	Determiner Phrase
EMPH	Emphasizer
ERG	Ergative case
EV	Evidentiality
FEM	Feminine
FNQ	Floating Numeral Quantifier
FQ	Floating Quantifier
GEN	Genitive case
HON	Honorification
INDIC	Indicative
IndP	Individuation Phrase
IP	Inflection Phrase
IV	Intransitive
LIN	Linker
LOC	Locative
MASC	Masculine
N	Noun head
NEG	Negation
NMLZ	Nominalizer
NOM	Nominative case
NUM	Numeral
NP	Noun Phrase
nP	(little) n Phrase
PASS	Passive
PAST	Past tense
PFV	Perfective
PL	Plural
PP	Pre-/Postpositional Phrase
PTCPL	Participle
PRED	Predication
PRES	Present
PROG	Progressive
Q	Quantifier head
QP	Quantifier Phrase
QUES	Question Particle
REDUP	Reduplication
S	Sentence
SG	Singular
TOP	Topic
v	(little) v head
V	Verb head
VP	Verb Phrase
#P	#(Number) Phrase

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1 Introduction

1.1 Puzzles and Proposals

1.1.1 Problems and main proposals

This thesis investigates grammatical number and the mass-count distinction in relation to nominal functional constructions in Japanese, focusing on bare nouns, plurals, and classifiers.

With respect to number realization, languages are commonly categorized into two distinct groups: number languages and classifier languages (e.g., Corbett 2000). English belongs to the number languages, characterized by number morphology (e.g., *-s*) that denotes number properties (singular, plural), as in (1a). Also, plural marking in English serves to denote the grammaticized mass-count distinction, as in (1b).

(1) Plural marking in English (a number language)

a. John read {three books/*three book} this week.

b. *John bought {waters, meats} at the supermarket.

In English, as in (1a), plural marking is necessary when the referent is a plural entity (as indicated by the numeral *three*). Uncountable nouns (e.g., *water, meat*) are not pluralized,

as in (1b), thereby indicating that plural marking manifests the grammaticized mass-count distinction (e.g., Borer 2005a).[1] Theoretically, as elaborated later in this chapter, the plural marker heads an Individuation Phrase (IndP), creating a syntactically count nominal from an unindividuated mass term (i.e., "individuating a noun") (e.g., Borer 2005a, Mathieu 2012).

On the other hand, Japanese is a typical classifier language (e.g., Downing 1996). In Japanese, classifiers are normally required when nouns (to be precise, entities denoted by the nouns) are counted (or measured). Classifiers are used even when nouns are count-y (i.e., appear to be countable; e.g., human nouns, animal nouns, *book*, *house*, etc.), as in (2).[2,3]

(2) Haruko-wa Sato kyoozyu-ni san-**nin**-no gakusei-o syookaisita.
Haruko-TOP Sato professor-DAT 3-**CL**-LIN student-ACC introduced
'Haruko introduced three students to Professor Sato.'

In (2), a classifier *-nin* is used to count (the number of) students, which appear to be countable in contrast to typical mass entities (e.g., water).

Moreover, Japanese features General Number, i.e., number neutral bare nouns, which can function as arguments. General Number or bare arguments are widely observed in classifier languages, whereas Japanese lacks obligatory number marking, as in (3)[4] and (4), as well as obligatory number agreement, as in (5).

(3) Haruko-wa Sato kyoozyu-ni **gakusei**-o syookaisita.
Haruko-TOP Sato professor-DAT student-ACC introduced
'Haruko introduced **one or more** students to Professor Sato.'

[1] I abstract away from mass-to-count coercion effects (e.g., *Two beers, please!* at a bar) in this chapter. See Chapter 4 for more cases of coercion and discussions on the phenomenon.

[2] A grammaticality/acceptability judgement of the examples (without citation) in this thesis was verified by at least one native speaker alongside the author (unless the judgement is totally uncontroversial). However, the demographic backgrounds (including region, age, and occupation) of the informants for the Japanese examples were not strictly controlled. The informants are from various regions in Japan (e.g., Nagoya (including the author), Osaka, Chiba, Fukuoka, Niigata), yet unfortunately do not include speakers of the Tokyo/standard dialect. The ages of the Japanese informants range from their 20s to their 70s.

[3] Transcriptions of Japanese examples largely follow the conventions of the Kunreisiki Romanization system. However, a long vowel is described by doubling a vowel, as in *pooku* 'pork' (whereas the Kunreisiki employs a circumflex accent mark). /hw/ (used only in loanwords) is described with *f*, as in *ofisu* 'office' or *fensu* 'fence'.

When cited, romanized transcriptions and glosses are modified following the conventions employed in this thesis. Also, tones in Mandarin are removed when they are included in source documents.

[4] *Gakusei* 'student' in (3) is not totally bare, though marked with a grammatical case marker. In past literature, no consensus has been reached regarding the syntactic status of case markers in Japanese (e.g., Hasegawa 1999, Watanabe 2006; Miyagawa 1989 and subsequent works). As discussed in Chapter 3, I assume that case markers do not project or head phrases, and hence, they do not affect the bareness of bare nouns.

(4) Haruko-wa {gakusei/gakusei-**tati**}-ni kono hon-o syookaisita. Demo,
Haruko-TOP {student/student-**PL**}-DAT this book-ACC introduced but
kare-ra-wa yoma-nakat-ta.
he-PL-TOP read-NEG-PAST
'Haruko introduced this book to **students**, but **they** did not read (it).'

(5) Haruko-wa **kore-ra**-no {gakusei/gakusei-tati}-ni kono hon-o syookaisita.
Haruko-TOP this-**PL**-LIN {student/student-PL}-DAT this book-ACC introduced
'Haruko introduced this book to **these students**.'

In (3), the bare noun *gakusei* 'student' refers to either an individual student (singular) or a group of students (plural). As such, bare nouns are recognized as number neutral or general number. Plural marking is not obligatory even in contexts suggesting that the referent is a group of students, such as when it is referred back to by a plural pronoun, as in (4), or when it is modified by a plural demonstrative, as in (5). Thus, Japanese exhibits properties commonly observed in classifier languages, including generalized classifier systems, general number/bare arguments, and the lack of (obligatory) plural marking.[5]

As such, it is predicted that Japanese (or classifier languages in general) lacks grammatical number or the grammaticized mass-count distinction (e.g., Chierchia 1998a, 1998b, Gil 1987, Inagaki and Barner 2009, Lin and Schaeffer 2018, Sharvy 1978, among many others). From this perspective, bare nouns are used as arguments since they are mass and refer to kinds (e.g., Chierchia 1998a, Rullmann and You 2006).

Alternatively, classifiers are claimed to manifest the mass-count distinction in classifier languages (e.g., Cheng and Sybesma 1999). Functions and distributions of classifiers in classifier languages are often compared with number morphology in non-classifier languages. Classifiers and plurals are assumed to play a similar role in terms of number, mass-count distinction, and counting (e.g., Borer 2005a; also see Greenberg 1972, Sanches and Slobin 1973, among many others, for co-occurrence generalization of classifiers and plural marking). Under this view, classifiers head IndPs, and facilitate individuation (thus, classifiers manifest the grammaticized mass-count distinction). This claim further leads to two predictions. First, classifier languages do not have individuating plurals, i.e., plurals

[5]I acknowledge that the dichotomy of number languages and classifier languages is overly simplistic. There are languages that exhibit both classifiers and plural markers to varying extents. Armenian and Persian, for instance, possess both classifiers and plural markers, although neither is universally applied in these languages (e.g., Bale and Khanjian 2009 and Borer 2005a for Armenian; Hamedani 2011 for Persian). Despite the highly generalized classifier system in Japanese, the language still has a plural marker. Nevertheless, the plural marker in Japanese is optional and carries a non-plural interpretation (to be discussed in Chapter 4; Kurafuji 1999, 2004, Nakanishi and Tomioka 2004, Nomoto 2013). Additionally, in some classifier languages, classifiers may be optional, regardless of whether the languages include a plural marker or not (e.g., Ghomeshi 2003 for Persian; Nomoto 2013 for Malay); for a comprehensive overview and typology of classifier systems among the world's languages, refer to Aikhenvald 2000).

that work for individuation or the grammaticized mass-count distinction. Second, nouns are mass in the absence of classifiers, whether nouns are count-y or mass-y.

The predictions identified above regarding individuation and number in Japanese are listed in (6) (all of which I argue against through this thesis).

(6) Predictions tested in this thesis
   a. Prediction 1: Bare nouns in Japanese refer to kinds and are mass.
   b. Prediction 2: Japanese lacks individuating plurals.
   c. Prediction 3: Classifiers in Japanese individuate nouns, and the lack thereof yields mass syntax.

In this thesis, in order to examine these predictions, I investigate the individuation and number of bare nouns, plural expressions, and classifier constructions. Close scrutiny casts doubt on the predictions in (6), and presents several puzzles to us. By offering analyses for such puzzling observations, I put forth proposals as in (7).

(7) Proposals in this thesis
   a. Proposal 1: Certain types of bare nouns in Japanese can involve individuation.
   b. Proposal 2: Japanese has individuating plurals
   c. Proposal 3: Classifiers in Japanese individuate nouns, but not always.
   d. Proposal 4: Bare nouns, plurals, and classifier constructions in Japanese all have individuating and non-individuating varieties.

Proposals 1 and 2 relate to Predictions 1 (bare nouns) and 2 (plurals), respectively, and contend that Japanese involves individuation, i.e., shows the grammaticized mass-count distinction, even in the absence of classifiers. Proposal 3 initially (partially) confirms Prediction 3 concerning classifiers, yet it also reveals instances when Prediction 3 falls short. For all three constructions examined, I argue for a heterogeneous view of the syntax of these constructions (e.g., Espinal and McNally 2011, Mathieu 2014, Li 2013), and explain when they are individuating and when they are non-individuating.

1.1.2 Puzzles and analyses

1.1.2.1 Two levels of the mass-count distinction (Chapter 2)

In order to clarify what *mass-count distinction* I primarily address in this thesis, I begin with the non-grammaticized level. The first puzzle, as a point of departure for further discussions, is one that I think most English learners have thought of at least once: why

is *furniture* a "mass" noun yet we can easily count pieces of furniture (e.g., desks, chairs, beds, tables, etc.)? Indeed, *furniture* is mass since it cannot be directly modified by numerals (**two furniture(s)*) or morphologically marked for plural (**furnitures*) (e.g., Chierchia 1998a, Gillon 2015; see below for further elaboration on the criteria for countability).

To capture this discrepancy, two levels of the mass-count distinction are assumed: i.e., one is a conceptual mass-count distinction (countable vs. uncountable), and the other is a grammaticized mass-count distinction (count vs. mass) (Borer 2005a, Bale and Barner 2009, Chierchia 1998a, Inagaki and Barner 2009, Li 2013).[6] *Furniture* clearly demonstrates the discrepancy between these two levels: it is conceptually countable, yet grammatically mass (see below for some revisions on this judgement). For this reason, I first review a conceptual mass-count distinction in Chapter 2. I then investigate various constructions with or without classifiers (including General Number, modified nouns, plurals, and numeral classifier constructions) from Chapters 3 to 5, where I propose the existence of grammaticized mass-count distinction in Japanese.

The presence of a conceptual mass-count distinction in classifier languages is evident and straightforward, since it appears to be universal, stemming from human cognition rather than properties specific to language abilities (Chierchia 2010). In the past literature, it is further assumed that nouns are classified into countable (e.g., *person, book, furniture*), uncountable (e.g., *water, mud*), or flexible nouns (e.g., *chicken, string*), depending on the conceptual properties of the entities denoted by the nouns (Bale and Barner 2009).

However, upon close scrutiny, it becomes evident that the distinction is not as clear-cut as it first looks. Consider (8) and (9), where *furniture* and *hito* 'person' in Japanese (which are expected to be countable) allow an uncountable reading (Grimm and Levin 2012, Rothstein 2016).

(8) John has more furniture than Bill, so he will need the larger moving truck.

(Rothstein 2016:4)

(9) Kono nagaisu-ni ano nagaisu yori hito-ga iru. Dakara, ano
this long.chair-on that long.chair than person-NOM there.be so that
nagaisu-ni suwar-oo.
long.chair-on sit-let's
'There is/are more PERSON on this bench than on that bench. So, let's sit down on that bench.'

[6] As discussed in Chapter 2, the distinction grounded upon conceptual properties is frequently not called the mass-count distinction, reserving the term for the grammaticized one (e.g., Li 2013, de Vries and Tsoulas 2021; also see Joosten 2003 for a critical review of studies of the mass-count distinction). However, I opt for the term *conceptual mass-count distinction* to prevent any unintended implications.

> Context: The speaker and her/his colleagues are at an outdoor concert, where a number of long benches are installed for spectators. They are looking for a bench, where there still is space left enough for all of them to sit.

Since furniture and persons appear to be countable, they are expected to be compared by cardinality. In (8) and (9), nevertheless, the contexts prompt comparison by volume (or the total amount of space/area occupied by the pieces of furniture or people), irrespective of the quantity of individual pieces of furniture present, or regardless of the discreteness of the entities. Comparison by volume indicates that the noun is used as an uncountable noun.

I propose that nouns in the Japanese language are classified into three types: conceptually uncountable (e.g., *water, mustard*), ambiguous (e.g., *book, person*) where those can be countable or uncountable contextually (as in (8b)), or flexible (e.g., *fish, rope*), where those can be uncountable or ambiguous depending on different states (e.g., *meat* or living animals). The presence of ambiguous nouns implies the existence of a conceptual mass-count distinction, since they distinguish countable nouns from uncountable ones.

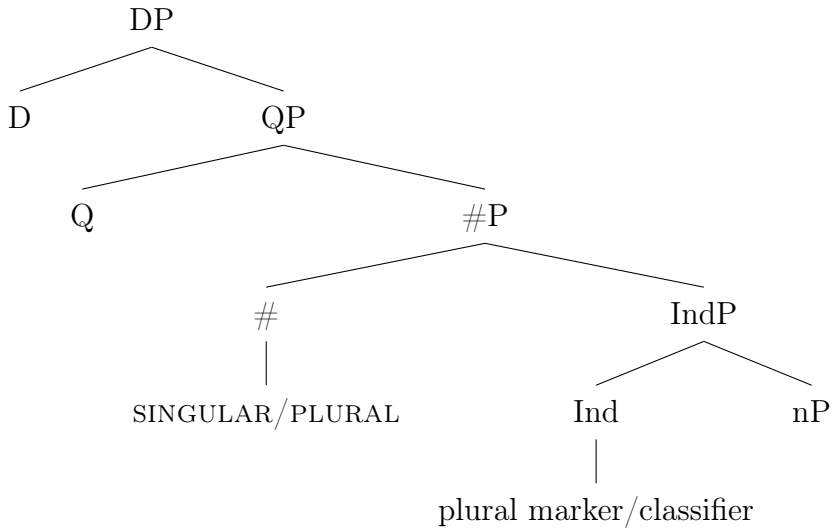
While the claim that count-y nouns can be either countable or uncountable conceptually, holds true in Japanese, it encounters challenges in English since uncountable interpretations, as in (8), are limited to a specific category of nouns (e.g., *furniture*)(Grimm and Levin 2012). However, conceptual countability is not expected to vary among languages since this type of distinction is universal to a large extent (Chierchia 2010). I discuss how overt count syntax (that English employs but Japanese does not employ) makes it hard to examine conceptual countability.

1.1.2.2 The grammaticized mass-count distinction

Descriptively, a grammaticized mass-count distinction is observed (or tested) in plural marking, direct numeral modification (e.g., *three cats* vs. **three mud(s)*), and countability sensitive modifiers (e.g., *many cats* vs. **many mud(s)*). According to Chierchia (2010), the inability to be directly modified by numerals is a fundamental property of mass nouns and is universal in languages that appear to lack the grammaticized mass-count distinction.

Theoretically, the grammaticized mass-count distinction is manifested by classifiers in classifier languages. Namely, classifiers individuate nouns in these languages. This function of classifiers is analogous to number morphology (e.g., plural markers) in number languages (languages where number features are morphologically marked; Borer 2005a, Chierchia 1998a, Watanabe 2006), as in (10).

(10) Number and Individuation (adopted from Borer and Ouwayda 2010)



Borer (2005a) and Mathieu (2012) also introduce more elements as individuators: e.g., *a, the, each* in English, numerals in Turkish, the singulative in Arabic. This indicates that the elements serving as individuators in grammar vary depending on each language. Therefore, I investigate the grammaticized mass-count distinction in Japanese across various constructions, including bare nouns in Chapter 3, modified nouns and plural expressions in Chapter 4, and numeral classifier constructions in Chapter 5.

1.1.2.3 Bare nouns (Chapter 3)

The second puzzle refers to bare nouns in Japanese, which show different properties from number neutral expressions in other languages. Bare nouns are neutral for number (General Number; Corbett 2000) in numerous classifier languages, including Mandarin and Japanese, allowing either a singular or plural interpretation, as in (3), repeated here.

(11) Haruko-wa Sato kyoozyu-ni **gakusei**-o syookaisita.
Haruko-TOP Sato professor-DAT student-ACC introduced
'Haruko introduced **one or more** students to Professor Sato.'

In addition, bare nouns can function as arguments as in (11), akin to bare plurals in English, as in *Haruko bought books* (e.g., Chierchia 1998a). Number neutral bare nouns (e.g., Mandarin) and bare plurals (e.g., English) share common properties, including obligatory narrow scope, reference to kinds, inability to function as nominal predicates, and atelic interpretations (e.g., Rullmann and You 2006 for Mandarin, Carlson 1977 for English). With these, it is claimed that bare nouns in classifier languages (including Japanese) are mass syntactically (e.g., Chierchia 1998a). Besides the syntactic countability, number

neutral bare nominals in many languages are analysed as incorporated nominals (e.g., Dayal 2011 for Hindi, Zareikar 2018 for Azeri). In particular, number neutrality and narrow scope are regarded as key properties of semantic incorporation (e.g., van Geenhoven 1998, Paul 2012).

However, bare nouns in Japanese exhibit a peculiarity in that they can take wide scope in relation to a number of operators, as in (12) (Nakanishi and Tomioka 2004), unlike the expressions in many other languages that lead to a number neutral interpretation (see Rullmann and You 2006 for Mandarin, and Chierchia 1998a for English).

(12) Sono byooin-wa kangosi-o sagasi-teiru. (narrow or wide scope)
that hospital-TOP nurse-ACC look.for-PROG

a. Narrow: 'That hospital is looking for a nurse/nurses (to hire).'

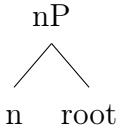
b. Wide: 'There is a nurse/are nurses that hospital is looking for.'

(Adopted from Nakanishi and Tomioka 2004:115)

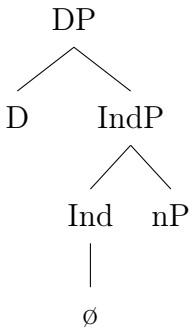
In (12), the bare noun allows a wide scope interpretation, suggesting that there is/are (a) nurse(s) that the hospital is looking for, alongside a narrow scope interpretation similar to bare plurals in English. Thus, while bare nouns in Japanese are number neutral and can be arguments (as bare nominals in other languages), they show different properties than bare nominals in other languages.

To untangle this puzzle, I propose two distinct structures for bare nouns in Japanese, i.e., *nP bare nouns* and *DP bare nouns*, which surface in the same form. I demonstrate (i) that nP bare nouns are similar to bare plurals in English (narrow scope, reference to kinds, ability to be a nominal predicate, compatibility with atelic expressions; Borer 2005a, Carlson 1977, Chierchia 1998a, Rullmann and You 2006), and (ii) that DP bare nouns pattern with indefinite nouns, with respect to various scope taking, subkind reference, inability to be a nominal predicate and telic interpretations. I argue that nP bare nouns project only up to nPs, as in (13a) (Bliss 2004, Rullmann and You 2006), whereas DP bare nouns project full DPs, including IndPs (headed by a null head), as in (13b), where underspecification of number induces number neutrality (Kramer 2015, 2017, Zareikar 2018).

(13) a. nP bare nouns



b. DP bare nouns



I also examine whether incorporation analyses are applicable for bare nouns in Japanese (for the incorporation analyses of the number neutral bare nominals (bare nouns, bare singulars, bare purals), see, e.g., Dayal 2011 for Hindi; Espinal 2010 for Catalan). I show that (i) neither nP nor DP bare nouns are derived through noun (or head) incorporation (e.g., Baker 1988), and (ii) nP bare nouns display properties of semantic incorporation (obligatory narrow scope, number neutrality, non-specificity, and telicity), but do not show the syntactic properties of pseudo incorporation (e.g., Dayal 2011, Farkas and de Swart 2003, van Geenhoven 1998, Massam 2001). On the other hand, DP bare nouns do not show properties of pseudo- or semantic incorporation.

1.1.2.4 Plurals (Chapter 4)

The third puzzle involves the individuation of plural expressions, including plural markers (*-tati*, reduplication) and null plurals with plural quantifiers/demonstratives. If classifiers were obligatorily required to individuate nouns, individuation could not be implemented in the absence of classifiers. This prediction is not tenable with the examples in (14), which show that there are count-sensitive quantifiers in Japanese (in a similar way to English).

(14) a. tasuu-no gakusei/*mizu
many.number-LIN student/water
'many students/water'

b. nan-zen-toiu gakusei/*mizu
what-1000-say student/water
'thousands of students/water'

I propose that the expressions in (14) are examples of the grammaticized mass-count distinction in Japanese, manifested by count-sensitive modifiers (e.g., *tasuu*, *nan-zen-toiu*). I demonstrate that the Japanese language possesses just as many ways to instantiate grammaticized countability as English.

Moreover, I further propose that Japanese has individuating plurals, which show similar properties to bare plurals in English, as well as non-individuating plurals, as in (15).[7]

(15) a. *-tati* plurals with common nouns: **Non-individuating**

gakusei-tati
student-PL

'students, (a) student(s) and his/her/their associates'

b. *-tati* plurals with proper names: **Individuating**

Haruko-tati
Haruko-PL

'people all named Haruko, Haruko and her associates'

c. Plurals via reduplication: **Individuating**
yama-yama 'mountains' / mura-mura 'villages' / hito-bito 'persons'

d. Null plurals with plural quantifiers/demonstratives: **Individuating**

{korera/tasuu} no gakusei-$\emptyset_{\text{Ind/PL}}$
these/many of student

'these/many students'

First, to reveal individuation in plural expressions, I sort out plurals, as in (16), before focusing on their roles in countability.

(16) Various types of plurals

a. Individuating plurals (Borer 2005a for number languages)

b. Counting plurals (Mathieu 2012, 2014 for Arabic, Ojibwe; Borer and Ouwayda 2010 for Arabic; Krifka 2008 for English)

c. Lexical plurals (Acquaviva 2008 for English, Italian, Greek)

d. DP plurals (Butler 2011 for Yucatec Maya; Kim and Meng 2021 for Mandarin)

Plurals are classified into the first two types with respect to whether inclusive plural interpretation is available, as in (17) and (18).

[7]Note that the claim that a plural in certain contexts does not individuate a noun, does not necessarily imply that the *nominal* containing the non-individuating plural is mass. As long as the nominal demonstrates the grammaticized mass-count distinction, individuation should be involved and done by other elements (e.g., a null Ind head).

(17) Inclusive plurals (= individuating) in English
A: Do you have children?
B: Yes, I have one child. / *No, I have (only) one child.

(18) Exclusive plurals (= non-individuating) in Arabic

hal ʕindik burtogaala-at?
QUES have-you oranges.FEM-PL (FEM = singulativizer in this case)

(Intended): 'Do you have oranges (= more than one orange)?'

(Mathieu 2014:170, annotations added)

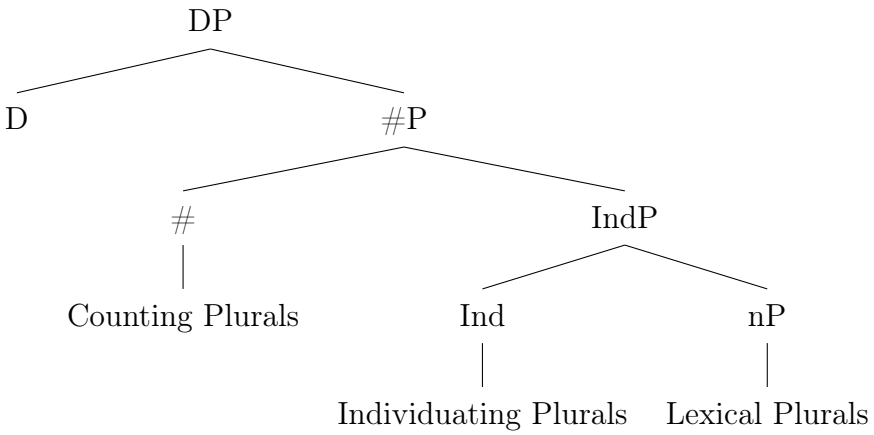
Lexical plurals are often attached to mass nouns to convey particular meanings (e.g., abundance), as seen in (19).

(19) The river discharges its waters into the lake. (= lots of water) (Acquaviva 2008:1)

DP plurals show properties of D (e.g., specificity/definiteness) and interactions with demonstratives.

I propose that plurals are derived through various structures, as in (20) (Mathieu 2014, Wiltschko 2021).

(20) Various types of plurals



I apply the analyses thus far to plural expressions in Japanese. As is well-known, whereas bare nouns and classifiers are extensively utilized in many classifier languages, those languages also have a plural marker (e.g., *-tati* in Japanese, *-men* in Mandarin, *-tul* in Korean). Since these plural markers exhibit distinct properties from those in number languages, plural markers in classifier languages are often purported to not contribute to the mass-count distinction (e.g., Nakanishi and Tomioka 2004 for Japanese, Li 2013 for Mandarin, Kim

and Melchin 2018 for Korean). Also, the claim that classifier languages do not have individuating plurals is supported by the observation that plural marking and classifiers are in complementary distribution (Borer 2005a, Greenberg 1972, Sanches and Slobin 1973, T'sou 1976).

The examples in (21) and (22) raise doubts about the prediction that plurals in Japanese (a typical classifier language) do not individuate nouns.

(21) *Kyoo oni-wa Sato-tati-o tukamae-nakat-ta. Hitori-dake da.
today demon-TOP Sato-PL-ACC catch-NEG-PAST 1.CL-only be
'Today, demons did not catch Satos. (It caught) only one (Sato).'

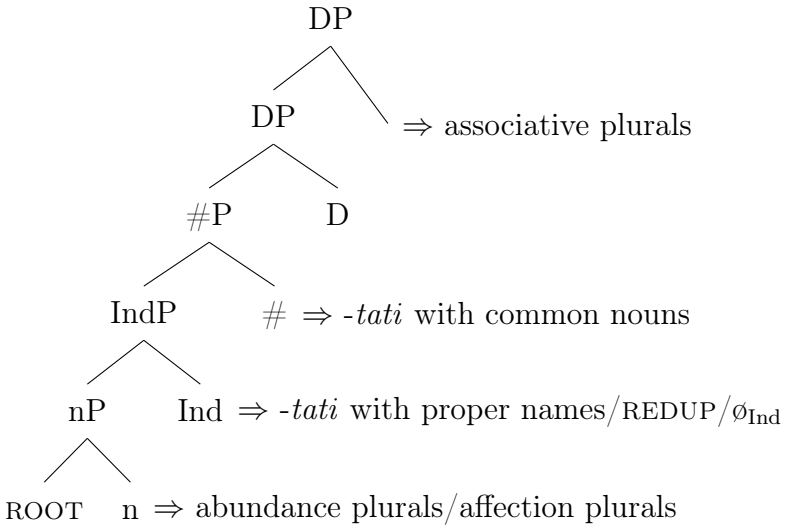
(22) *Taro-wa kisetu-no hana-bana-o motteko-nakat-ta. Iti-rin-dake
Taro-TOP season-GEN flower-REDUP-ACC bring-NEG-PAST 1-CL-only
mottekita.
brought
'Taro didn't bring seasonal flowers. (He) brought only one.'

(Sudo 2017:27, the second phrase was added based on the discussion therein.)

The *-tati* plurals with proper names and plurals via reduplication allow inclusive plural interpretations, as in (21) and (22), respectively. With the inclusive plural interpretations, I argue for the individuation of these plurals in Japanese. I also show that these plurals pattern with bare plurals in English (which involve individuation).

By comparing these with *-tati* in other environments, I introduce various structures for plurals in Japanese, including individuating plurals (i.e., plurals on Ind) and non-individuating plurals (i.e., plurals on n, #, or in DPs), as in (23).

(23) Plurals in Japanese



Thus, by analyzing bare nouns (Chapter 3) and plural expressions (Chapter 4), in particular, by comparing them with bare nominals and bare plurals in other languages, I show that the grammaticized mass-count distinction is manifested in Japanese even in the absence of classifiers. While it is undeniable that bare nouns and classifiers play a dominant role in number and individuation in Japanese, residual ways of conveying the grammaticized mass-count distinction are also present in the absence of classifiers in the language.

I also claim that bare nouns and plurals are both polysemous in nature. Namely, these constructions have both individuating and non-individuating varieties. This claim is in line with a heterogeneous view on these constructions (e.g., Deprez 2005, Espinal and McNally 2011 for bare nominals; Mathieu 2014, Wiltschko 2021 for plurals).

1.1.2.5 Classifiers (Chapter 5)

The final puzzle I address in this thesis is related to the individuation of classifiers. It is not a new idea that classifiers individuate nouns (e.g., Allan 1977, Borer 2005a, Cheng and Sybesma 1999, Chierchia 1998a, Greenberg 1972, Watanabe 2006), or that classifiers manifest the grammaticized mass-count distinction (e.g., Cheng and Sybesma 1999, Li 2013). However, it has yet to be figured out how or when classifiers individuate nouns. For instance, Cheng and Sybesma (1999) claim that the distinction between sortal classifiers and mensural classifiers in Mandarin and Cantonese indicates the grammaticized mass-count distinction. The distinction proposed in Cheng and Sybesma (1999) appears to be applicable to Japanese, as in (24).

(24) a. Sortal classifier

San-**nin** no gakusei-ga kinoo kono hon-o katta.
3-CL LIN student-NOM yesterday this book-ACC bought

'Three students bought this book yesterday.'

b. Mensural classifier

Haruko-wa go-**hai** no wain-o nonda.
Haruko-TOP 5-CL LIN wine-ACC drank

'Haruko drank five glasses of wine.'

Sortal classifiers are primarily used with nouns whose English counterparts are typically countable. Mensural classifiers include those denoting containers (cups, bottles, etc.) and standard measures (kg, km). As such, the type of classifiers (sortal or mensural) is often assumed to manifest or reflect the grammaticized mass-count distinction (Cheng and Sybesma 1999).

Nonetheless, the examples in (25b) cast doubt on this.

(25) a. Haruko-wa san-bon no tabako-o sutta.
Haruko-TOP 3-CL LIN cigarette-ACC smoked
'Haruko smoked three cigarettes.'

b. Haruko-wa san-bon **han** no tabako-o sutta.
Haruko-TOP 3-CL half LIN cigarette-ACC smoked
'Haruko smoked three and a half cigarettes.'

In (25a), Haruko may or may not smoke each cigarette fully. Meanwhile, in (25b), Haruko is expected to smoke three whole cigarettes and half of another. In the latter case, one cigarette is used as a sort of measure to measure the amount of cigarettes consumed. Thus, sortal classifiers do not always individuate.

Mensural classifiers do not always instantiate mass syntax, either. As in (26), mensural classifiers also permit both count and mass interpretations.

(26) a. Container reading (count)

Haruko-wa go-hon no wain-o **hakonda**.
Haruko-TOP 5-CL LIN wine-ACC carried

'Haruko carried five bottles of wine.'

b. Measure reading (mass)

Haruko-wa go-hon no wain-o **nom-eru**.
Haruko-TOP 5-CL LIN wine-ACC drink-can

'Haruko can drink five bottlefuls of wine.'

Mensural classifiers commonly allow for two interpretations: a container interpretation and a measure interpretation (e.g., Li 2013, Watanabe 2006, Zhang 2020). In the container interpretation, as in (26a), there should be five bottles that Haruko carried. In this interpretation, the wine is quantified by counting the number of bottles, each of which contains wine.

On the other hand, in the measure reading as in (26b), the numeral quantifier *go-hon* '5-CL' does not refer to the number of bottles of wine, but merely describes the amount of wine that Haruko can drink (e.g., five bottlefuls of wine). Hence, the distinction between the container and measure interpretations manifests the grammaticized mass-count distinction (also see Li 2013, Zhang 2018, 2020, and Mathieu and Zareikar 2015 for a similar claim in other languages). Consequently, both sortal and mensural classifiers allow both a count interpretation (involving individuation) and a mass interpretation (not involving individuation).

I map the count and mass interpretations of classifiers of each type (sortal, mensural) to two distinct structures. Classifiers, irrespective of the type, manifest the grammaticized mass-count distinction in the count interpretation, but in the mass interpretation, they act as modifiers. I refine the classification of classifiers, using nominal ellipsis (Ochi 2012, Saito et al. 2008, Watanabe 2010), Floating Numeral Quantifiers (Kitaoka 2014, Miyagawa 1989 and subsequent works, Nakanishi 2007, 2008), and incompletive interpretations (Zhang 2018, 2020).

I propose distinct structures for pre-nominal classifiers, post-nominal numeral classifiers, and non-individuation classifiers. When classifiers head IndPs, or when numeral quantifiers (sequences of a numeral and a classifier) serve for individuation (in a similar way to count-sensitive quantifiers/demonstratives), the nominal phrase involves individuation, thereby leading to a count reading.

1.2 Salience of this thesis

Count syntax and individuation/number in the absence of classifiers are commonly perceived as irrelevant to Japanese, a typical classifier language. However, while this assumption may seem to be valid to a large extent on the surface, covert properties or underlying structures reveal the opposite. This thesis, therefore, aims to shed light on aspects of Japanese morphosyntax related to these issues that have hitherto escaped attention in the theoretical literature. To achieve this, I apply observations and analyses developed for languages that overtly exhibit such properties (e.g., the plural marker *-s* in English) to Japanese. In particular, while each phenomenon addressed in this thesis (e.g., General Number, plural marking in classifier languages, non-individuating classifiers) has been subject to heated debate in previous literature, it is uncommon to analyze them through the lens of one key feature, i.e., mass-count distinction. I believe that throughout this thesis, it will become clear that Japanese exhibits (mostly covertly, though) the grammaticized mass-count distinction in diverse constructions, in a similar way to English or other number languages. At the same time, I illustrate that the analyses of General Number and classifiers are in line with those of plurals (e.g., Borer and Ouwayda 2021, Mathieu 2014, Park 2022, Wiltschko 2021) in that a grammatical feature is mapped across nominal functional structures.

1.3 Theoretical background

1.3.1 Generative Grammar

I explore the aforementioned predictions and proposals from the perspective of Generative Grammar, which is "the study of linguistic capacity as a component of human cognition" (Chomsky et al. 2019: 1). Specifically, I base representations of syntactic structures in this thesis on the Principles and Parameters approach (Chomsky 1981, Chomsky 1986b, Chomsky 1993b, and subsequent works), and occasionally refer specifically to a framework of the Minimalist Program (Chomsky 1993a, Chomsky 1995, and subsequent works) for the computation of phrases/sentences. Assumptions on the structures, in particular, nominal functional structures, are supplemented by the analyses of Distributed Morphology (DM) (Halle and Marantz 1993, Halle and Hale 1994, Marantz 1997, and subsequent works), and by Exo-skeletal structures developed by Borer (2005a).

In the Principles and Parameters approach and in the Minimalist Program, lexical items selected from the lexicon are merged together through a compositional operation known as *Merge* to form phrases and sentences. Another fundamental operation in syntax is *Agree*. The Agree operation relates two syntactic objects: a probe, which has unvalued features, and the goal, which has valuable features. (See below for a structure and derivation I assume in this thesis based on Borer 2005a.)

In the Minimalist Program, the derivation of phrases through the Merge and Agree operations is followed by an operation *Transfer* (Chomsky 2000, 2004). At this point, combined phrases are *transferred* to two types of interfaces (see also Chomsky 2001b, 2008 for a *phase*, a unit with which combined elements are transferred). The Conceptual-Intentional interface, also known as the Syntax-Semantics interface, which concerns how meanings are derived from the structures generated, is proposed to compute Logical Form (LF). The Sensory-Motor Interface (Articulatory-Perceptual interface), also known as the Syntax-Phonology Interface, which deals with how structures are realized (as sounds, gestures, etc.), is proposed to compute Phonetic Form (PF).

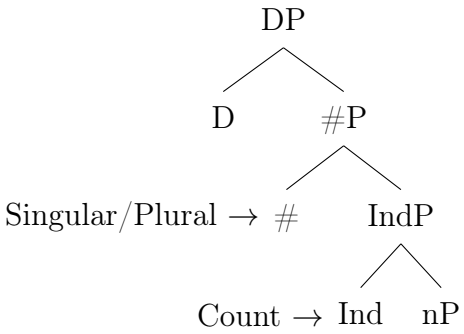
1.3.2 Distributed Morphology, Exo-skeletal Model

By adopting the Distributed Morphology approach (Halle and Marantz 1993, 1994, Marantz 1997), I posit that lexical items consist of an acategorial root and functional heads that specify a categorial feature. Words are also structured syntactically through Merge and Agree, leading Morphology and Syntax to be a single array of grammar. For instance, nouns enter into syntax as roots (or *listeme* in Borer 2005a, citing Di Sciullo and Williams

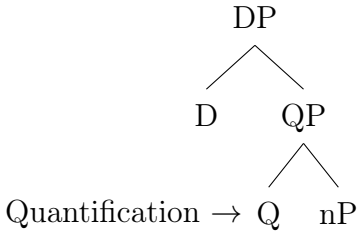
1987), which are sound-meaning pairs devoid of any categorial feature. At this point, no categorial feature or any other grammatical features (e.g., individuation, number) are assigned. Roots are categorized as *nouns* by merging with a category-defining functional element n, giving rise to a little n phrase (nP).

I further follow Borer (2005a) in asserting that the syntactic countability (the grammaticized mass-count distinction) and number features (singular, plural) are specified during the syntactic derivation by functional heads. As shown in (27), Ind (or the lack thereof) determines the grammaticized countability of a noun , while # specifies number properties.

(27) a. Count nouns



b. Mass nouns



While this thesis predominantly employs simplified structures as in (27), I offer more detailed assumptions on structures and derivation, drawing from Borer (2005a). I use the term *assign range* and *range assignment* in addition to *specify a feature/property* and *specification*. According to the assumption in Borer (2005a), functional heads are considered open values, and their range is assigned by various range assigners. Three ways are proposed to assign range as in (28): head features (that may or may not involve movement), f-morphs, and indirect range assignment. The descriptions in (28) take quantification for instances, which takes place at the level of #Ps.

(28) Range assignment (adopted from Borer 2005a:36)

a. Head feature $[_{\#P}$ <q>.<e>$_{\#}$.N $[_{nP}$ ~~N~~]]

b. f-morph $[_{\#P}$ f-morph.<e>$_{\#}$ $[_{nP}$ N]]

c. Indirect adverb $[_{\#P}$ <e>$_{\#}$ $[_{nP}$ N]]

As schematized in (45a), when a head feature <q> assigns range to the functional head #, the noun head undergoes head movement to phonologically realize the head feature. Borer (2005a) argues that this type of quantification in the #P domain is unavailable in English, though is attested in singulars in Hebrew (which I discuss in Chapter 4). As in (45b), the range of quantification can also be assigned by "independent grammatical functional formatives" (p.31), i.e., *f-morphs*, such as quantifiers (e.g., *many*, *much*, *three*, etc.) and, according to Borer, articles (*a*, *the*). Since f-morphs are free morphemes, the lexical head does not move up to the #P level (unless there are other motivations for movement). Conversely, functional heads may be left unspecified within the phrase. In such cases, the functional head should be indirectly assigned range from outside. For instance, as in (45c), adverbs of quantification (e.g., *mostly*) assign a range to the # head. Since there is no head feature in (45c) causing movement of the noun, it does not move. In this thesis, I primarily exclude the third type of range assignment system, although it is widely attested for nominal functional heads in English and Japanese (e.g., adverbs of quantification, existential closure, generic operator).

1.4 Organization of this thesis

I investigate the syntax of the mass-count distinction in Japanese from four different perspectives: conception, bare nouns, modified nouns and plurals, and nouns with classifiers. In Chapter 2, I discuss the conceptual side of the mass-count distinction, and present classifications of entities denoted by nouns. Chapters 3 to 5 explore the grammaticized side of the mass-count distinction. In Chapter 3, I demonstrate that the number neutrality of bare nouns in Japanese is semantic, yet it still involves individuation. The aim of Chapter 4 is two-fold. First, I introduce count-sensitive modifiers in Japanese, which show grammaticized countability (similar to *many, a few* in English). Second, I investigate the syntactic and semantic properties of plurals in Japanese (the *-tati* plurals, reduplication, bare-formed plurals). I also distinguish between individuating plurals and non-individuating plurals. Chapter 5 discusses numeral classifiers in Japanese. In that chapter, I distinguish individuating classifiers from non-individuating classifiers, and present diagnostics for the classification. Chapter 6 summarizes the thesis.

2

Conceptual Countability and Refining Classification of Nouns

2.1 Puzzles and Proposals

As we shall see throughout this thesis, the countability of nouns (or entities denoted by nouns) in Japanese has attracted much attention in the literature. Since it is not hard to imagine that Japanese speakers count some objects (e.g., *student*, *elephant*, *cookie*), but not others (e.g., *water*), it might be expected that the Japanese language shows the mass-count distinction.[1] However, it was once argued that classifier languages (languages with generalized classifier systems like Japanese or Mandarin Chinese) lack the mass-count distinction altogether (e.g., Allan 1977, Gil 1987, Greenberg 1972, Sharvy 1978). Under such a view, nouns are all uncountable/mass in Japanese, a typical classifier language, regardless of whether the nouns are count-y (nouns likely to be countable, e.g., *student*,

[1] In this chapter, I abstract away from cases of mass-to-count or count-to-mass coercion (Bunt 1985, Pelletier 1975). Since I follow Borer's theory on derivation (theoretically any nouns can be either count or mass), I use the term *coercion* fairly descriptively: an operation/phenomenon where a conceptually uncountable noun is used in count syntax (e.g., *Give me two beer**s**!!* at a bar), or a conceptually countable noun is used in mass syntax (e.g., *There is **dog** all over the wall*). See Chapters 4 and 5 for more discussion on coercion.

cat, *chair*) or mass-y (nouns likely to be uncountable, e.g., *water*).

This claim appears to be derived from observations as in (1) and (2), which indicate that nouns in Japanese are bare on the surface whether they yield a singular or plural reading (1), and that classifiers are commonly used when a noun is modified by a numeral (2).[2]

(1) Haruko-ga kesigomu-o katta.
Haruko-NOM eraser-ACC bought
'Haruko bought {an eraser/erasers}.'

(2) a. Haruko-ga ni-ko no kesigomu-o katta.
Haruko-NOM 2-CL LIN kesigomu-ACC bought
'Haruko bought two erasers.'

b. *Haruko-ga ni no kesigomu-o katta.
Haruko-NOM 2 LIN kesigomu-ACC bought
(Intended) 'Haruko bought two erasers.'

The claim that classifier languages such as Japanese lack the mass-count distinction seems to be discussed with limited data such as those in (1) and (2). More empirical work needs to be done in order to justify the claim being made.

It must be noted, at the outset, that the term *mass-count distinction* is used in various ways in the past literature. In particular, the presence or absence of the mass-count distinction in a language in one sense does not necessarily lead to the same claim in other senses. For instance, Chierchia (1998a, 1998b) reviews the grammatical properties of nouns in a variety of languages and proposes the Mass Noun Hypothesis, according to which denotations of nouns in classifier languages are all mass. Namely, in this sense, classifier languages *lack* the mass-count distinction.

I believe, however, that Chierchia (1998a, 1998b) does also assume that *countability* exists even in classifier languages, presumably in a similar way or even in an identical way to number languages. Borer's (2005a:99) comments on Chierchia (1998a) clearly describe this assumption:

"And we note here in defence of Chierchia (1998a, 1998b) that he does not claim that the mass-count distinction does not exist in Chinese. He only claims that to the extent that it exists, it is not represented on noun extensions."

[2]Classifiers *can* be dropped in certain exceptional cases. See Chapter 3 for details.

In this thesis, I distinguish these two levels of the mass-count distinction, which I identify as a *conceptual* mass-count distinction and a *grammaticized* mass-count distinction, respectively.[3] Following Chierchia (1998a) and Borer (2005a), the conceptual mass-count distinction (i.e., conceptually countable or uncountable) is outside the number system, which is not represented in the extension. The conceptual distinction appears to be somewhat or largely universal, and does not show wide variations among languages, since it stems from human cognition or perception (e.g., Chierchia 2010). The grammaticized mass-count distinction (i.e., grammatically mass or count) can be defined by count syntax (e.g., plural markers, count-sensitive modifiers, numerals) or classifiers (see the next section and ensuing chapters for details).

The view according to which there are two levels of the mass-count distinction explains the mismatch between the conceptual and syntactic properties of what I call *furniture*-type nouns in English (e.g., *furniture*, *cutlery*, *mail*), nouns that are countable conceptually but mass grammatically.[4]

The view with two levels of the mass-count distinction further leads us to (i) predict that Japanese exhibits a conceptual mass-count distinction, where count-y nouns in Japanese pattern with the *furniture*-type nouns in English (i.e., both of them can be countable conceptually, but mass grammatically), and (ii) predict, based on (1) and (2), that Japanese does not show a grammaticized mass-count distinction (at least, not in the same way as English, a number language).[5]

In this chapter, therefore, I delve into the first prediction and review the conceptual mass-count distinction in English and Japanese. Inagaki and Barner (2009) and Sudo (2016) demonstrate that in Japanese (as well as in English), mass-y nouns are conceptually

[3] In the relevant literature, the non-grammaticized mass-count distinction is also called lexical distinction (e.g., Rothstein 2010 and subsequent works), cognitive distinction (e.g., Chierchia 2010 and subsequent works, Kuo and Yu 2012, Wisniewski 2010), semantic distinction (e.g., Sudo 2014), ontological distinction (e.g., Borer 2005a, Chierchia 2021, Li 2013, Sudo 2016), or conceptual distinction (e.g., Chierchia 2021), etc. To avoid confusion, I will use the term *conceptual mass-count distinction* for the non-grammaticized distinction in this thesis.

The term *mass-count distinction* is often not used for the non-grammaticized mass-count distinction (e.g., Borer 2005a, Chierchia 1998b, de Vries and Tsoulas 2021, Li 2013, Zhang 2018), where the term is saved only for the grammatical/grammaticized/syntactic one. In this thesis, I use the term *mass-count distinction* for both the grammaticized level and the non-grammaticized level (following Bosveld de Smet 1997, Deprez 2005, Paul et al. 2021). See Joosten (2003) for an extensive, critical review of the terminology and studies on mass-count distinction.

[4] *Furniture*-type nouns are also called object mass nouns (e.g., Chierchia 1998b), count mass nouns (e.g., Doetjes 1997), fake mass nouns (e.g., Chierchia 2021), atomic mass nouns (e.g., de Oliveira and Rothstein 2011), naturally atomic mass nouns (e.g., Rothstein 2010), or individuated mass nouns (e.g., Landman 2011), etc. For the sake of simplicity and clarity, I call them *furniture*-type nouns in this thesis.

[5] Needless to say, throughout this thesis, I challenge the prediction in (ii), and instead argue that the grammaticized mass-count distinction is observed in various phenomena and constructions in Japanese (although those are not dominant number systems in the Japanese grammar).

uncountable, and count-y nouns are conceptually countable. Grimm and Levin (2012) and Rothstein (2016) argue that *furniture*-type nouns in English are ambiguous in that they can be countable or uncountable contextually. Building upon these past studies, I propose the classification of nouns in Japanese with respect to conceptual countability. Specifically, I claim that in Japanese, mass-y nouns are conceptually uncountable, while count-y nouns, including human nouns, are ambiguous in a similar way to *furniture*-type nouns in English. The existence of ambiguous nouns, as well as flexible nouns (e.g., *fish*), however, should suffice to argue for the mass-count distinction at the conceptual level in Japanese.

First, I set a number of criteria to test the countability of nouns. Following a series of works by Barner and his colleagues (e.g., Barner and McKeown 2005, Barner and Snedeker 2005, Bale and Barner 2009, Cheung et al. 2012), I use comparatives to test the conceptual countability. If a noun is compared by cardinality, it is considered to be countable. If a noun is compared by volume, it is considered to be uncountable. For instance, in (3a), the truth condition of the sentence depends on the cardinality of the cups, therefore *cup* is countable. In (3b), on the other hand, *toothpaste* is uncountable since the truth condition of the sentence depends on the volume of the toothpaste.

(3) a. Esme has more cups than Seymour.
b. Esme has more toothpaste than Seymour. (Bale and Barner 2009:226)

Beside countable and uncountable nouns, two more classifications should be introduced: **flexible** and **ambiguous** nouns. Flexible nouns (e.g., *chicken*, *rock*, *fence*) can be either uncountable or countable, depending on the state. For instance, *chicken* is uncountable when it refers to a lump of chicken meat. It is countable when it refers to individual birds (alive or dead) or individualized processed meat (e.g., slices of chicken meat).

Ambiguous nouns include so-called *furniture*-type nouns (e.g., *furniture*, *cutlery*, *mail*, etc.). Barner and Snedeker (2005) show that *furniture*-type nouns pattern with count-y nouns (compared by cardinality), hence these nouns are countable. However, Grimm and Levin (2012) and Rothstein (2016) point out that *furniture*-type nouns can be counted by volume in certain contexts, as in (4):

(4) John has more furniture than Bill, so he will need the larger moving truck.

(Rothstein 2016:4)

The sentence in (4) is judged to be true when Bill has one big piano and one couch while John has six small chairs. In such a context, the comparison is made by volume rather than cardinality of the furniture. Thus, *furniture*-type nouns are **ambiguous** in terms of whether they are countable (counted by cardinality) or uncountable (counted by volume).

Next, I apply these observations to Japanese and show that, as predicted, count-y nouns in Japanese pattern with *furniture*-type nouns in English: (i) Japanese count-y nouns (as well as English *furniture*-type nouns) show a conceptual mass-count distinction (Inagaki and Barner 2009, Sudo 2014); (ii) both of them are ambiguous in that those words can be counted by cardinality while those can also be counted by volume in some contexts, as in (4). Based on these test results, I propose that nouns in Japanese are classified into three groups at the conceptual level, including uncountable (e.g., *water*), ambiguous (most count-y nouns), and flexible (e.g., *fish*).

Although this classification does not include "countable nouns," whose existence may be expected to argue for the conceptual mass-count distinction in a language, the crucial point here is that ambiguous and flexible nouns are regarded as involving counting by cardinality. That is to say, ambiguous and flexible nouns allow access to their atoms in certain contexts, and, thereby, I claim that these nouns exhibit the conceptual mass-count distinction in Japanese.

Provided that the conceptual mass-count distinction is, at least to a large extent, universal (Chierchia 2010), the property of count-y nouns should not show wide variations among languages. The test results show the contrary, however. That is, they show a striking contrast between the classification of count-y nouns in Japanese and that in English. I assume that this gap stems from differences in the use of count syntax in these languages. Typical count nouns in English do not naturally show such ambiguity, since in English, the ambiguous nature of count-y nouns is blurred and hard to be observed because of count syntax (e.g., *more rope* vs. *more rope**s***). In Japanese (as well as with the *furniture*-type nouns in English), the lack of syntactic elements that indicate countability or a number feature (e.g., a plural marker) makes the ambiguity detectable.

This chapter is organized as follows. I first briefly recapitulate the two levels of countability, including the countability at the conceptual level and the one at the grammatical level (Section 2.2). Then, I clarify how to determine and classify the conceptual countability of a noun (Section 2.3). In Section 2.4, I apply the criteria introduced in Sections 2.2 and 2.3 to Japanese, based on the works of Inagaki and Barner (2009) and Sudo (2016) as well as Grimm and Levin (2012) and Rothstein (2016). There, I classify nouns in Japanese into three groups: uncountable, flexible, and ambiguous. I close the chapter by discussing the test results that show striking differences between Japanese and English in terms of the classifications on nouns, in particular, count-y nouns.

2.2 Two levels of mass-count distinction

First, I clarify what conceptual countability is in this thesis, and why it is needed in addition to the grammaticized mass-count distinction (individuation), which is the main topic of this thesis. Countability, in one way, can be defined by the conceptual or cognitive image of a noun (to be precise, an entity denoted by a noun examined; henceforth, simply a *noun*) (Allan 1977). If a noun contains conceivable minimal parts, it is countable (e.g., *woman, dwarf, sheep, elephant, willow, sun*, etc.). If not, it is uncountable (e.g., *water, blood, mud, meat*, etc.). The countable-uncountable distinction made by this criterion is thus on a conceptual basis.

No matter what a precise definition of conceptual countability is, the problem that arises from this view is that, at least in English, there are plenty of mismatches, where some grammatically mass nouns are likely to have conceivable minimal parts conceptually. This kind of noun, which I call *furniture*-type nouns, include *furniture*, *cutlery*, *mail*, etc. The minimal part of a piece of furniture is easily identifiable; one individual chair, one individual desk, one individual sofa, and so on.[6] Also, words corresponding to *furniture*-type nouns in English are often grammatically count in other languages (e.g., *un meuble*/*deux meubles* '(lit.) one furniture/two furnitures' in French). Nevertheless, *furniture* is commonly mass grammatically in English. See (5) and (6) to observe similarities between *furniture* and a typical mass (substance) noun *water*.

(5) a. *furniture
b. *many furniture(s)/*few furniture(s)
c. *three furniture(s)
d. much furniture/little furniture

(6) a. *water
b. *many water(s)/*few water(s)
c. *three water(s)
d. much water/little water

Furniture shows the typical massness in syntax that patterns with a typical mass noun like *water*. Both *furniture* and *water* are not used in count syntax. They cannot be pluralized, as in (5a) and (6a), used with count-sensitive quantifiers (*many*, *few*), as in (5b) and (6b), or modified by a numeral directly, as in (5c) and (6c), whereas they are used in mass syntax, i.e., compatible with mass-sensitive quantifiers (*much*, *little*), as in (5d) and (6d).

[6] However, see below the cases where *furniture*-type nouns can be considered uncountable conceptually.

To capture the mismatch on the countability of *furniture*-type nouns, I argue for two distinct levels of countability. One is at the grammatical level, and the other is at the conceptual level (see, e.g., Doetjes 1997, Pelletier 2012, Wiltschko 2012 for a similar view, but also see Krifka 2008). In the next section, I introduce counting/measuring-related criteria to determine the conceptual countability (applying, e.g., a series of works by Barner and his colleagues). Countability at the grammatical level is defined by its compatibility with count syntax, including the possibility of morphological plural marking, as in (7a), count sensitive quantifiers, as in (7b), and numerals, as in (7c).

(7) a. students
b. many students/ a few students
c. three students
d. *much student(s)/*a little student(s)

Importantly, these two levels of countability are essentially different in syntactic analysis. The countability at the conceptual level, I assume, is inherently encoded in the lexicon (or the *root, listeme* in a theoretical term in this thesis) to form a part of lexical information. On the other hand, I claim, following views of Distributed Morphology (e.g., Halle and Marantz 1993, Marantz 1997 and subsequent works) or Neo-Constructionist approaches (e.g., Borer 2005a, among many others), that the grammaticized mass-count distinction is specified by a functional head, Ind(ividuation).[7]

In this thesis, I will not discuss the true nature of the ontological or conceptual distinction: e.g., what ontological properties countable/uncountable nouns show. I leave for future research the relations between formal linguistic systems and concepts or conceptualizations.[8]

2.3 Criteria on the conceptual mass-count distinction

2.3.1 Non-linguistic criteria

In this section, I introduce the criteria for determining the conceptual mass-count distinction. Aside from the tests based on conceivable minimal parts and homogeneity, I employ

[7]Notably, the distinction between the conceptual and grammaticized mass-count distinctions does not necessarily imply that these two levels are totally independent of each other. As discussed in Chapter 5, in Japanese, an appropriate classifier, which creates a count nominal from an unindividuated mass term, is selected by the conceptual or cognitive properties of a noun and/or by contextually salient features of a noun (Downing 1996). Conceptual countability of a noun seems to play a role in this selection of classifiers.

[8]For such issues, see Gil 1987, plenty of works on the Sapir and Wharf Hypothesis, works by cognitive linguists (e.g., Langacker 2008), and also see Chierchia 2010 for a brief summary of this sort.

criteria based on empirical facts that involve counting and measuring. To do so, I review past studies on this issue to clarify how conceptual countability is determined (e.g., Barner and Snedeker 2005, Bale and Barner 2009, Grimm and Levin 2012, Inagaki and Barner 2009, Rothstein 2016, Sudo 2016).

As mentioned above, conceptual countability may be defined by virtue of identifiability of conceivable minimal parts (Allan 1977). A noun is considered countable if it has conceivable minimal parts. For instance, human nouns (e.g., *man, woman, girl, aunt, dwarf*, etc.) are mostly countable (but presumably not all human nouns are, since minimal parts are not clear in *crowds* or *audience*). Animals are also countable (e.g., *elephant, cat, sheep, monster*, etc.). *Book, laptop, car, tree, rice*, and *planet* are all likely to be countable as well by this criterion, since minimal parts of these entities can be identified. For the same reason, *rice* (which is mass grammatically as can be seen in an ungrammatical example **rices*) is conceptually countable according to this criterion. On the other hand, the minimal part of *water* is not identifiable unless one refers to atoms (the microscopic ones discussed in such a field as chemistry or biology; but also see Chierchia 2010), and hence, *water* is uncountable. Similarly, the minimal part of other liquids including *wine, mud*, or *blood*, etc., is not identifiable, and hence, these nouns are uncountable. *Meat, paper*, and *branch* are also uncountable by this criterion. The countability according to this criterion is shown in (8).

(8) Countability based on the identifiability of conceivable minimal parts
   a. Countable – human nouns, animal nouns, inanimate nouns (e.g., *tree*, *book*, *rice*, etc.)
   b. Uncountable – *water*, *wine*, *blood* (and other liquids), *meat*, *paper*, *branch*, etc.

Another similar criterion based on conceptual images is homogeneity. An example from Greenberg (1972:13) demonstrates the property clearly: "If I cut a piece of meat in two, I have two pieces of meat, but if I cut a dog in two, I still have only one dog, a dead one." As shown in (9), if a noun is not homogeneous, it is countable, whereas if it is homogeneous, it is uncountable.

(9) Countability based on homogeneity
   a. Countable – human nouns, animal nouns, inanimate nouns (e.g., *tree*, *book*, *rice*, etc.)
   b. Uncountable – *water*, *wine*, *blood* (and other liquids), *meat*, *paper*, *branch*, etc.

These criteria are mostly straightforward, and the classification does not vary much among speakers in a language or even among languages (Chierchia 2010). These types of crite-

ria strongly suggest the existence of the *conceptual* mass-count distinction, since such distinctions can be judged without language. Nevertheless, in addition to the tests with conceivable minimal parts and homogeneity, I also employ criteria based on more grammatically empirical facts (e.g., using comparatives) in order to show more obscure behaviour of *furniture*-type nouns in English and count-y nouns in Japanese.

2.3.2 Syntactic tests for conceptual countability

In order to test the conceptual countability using methods that involve counting and/or measuring, and to set a testing ground for conceptual countability in Japanese, I introduce tests with comparative and quantifiers (following a series of works by Barner (e.g., Bale and Barner 2009) and Rothstein 2016), and present the classification of English nouns as in (10).

(10) Countability of English nouns based on Bale and Barner (2009), Rothstein (2010)

a. Countable – human nouns, animal nouns, inanimate nouns (e.g., *book*, *house*, *car*, etc.).

b. Uncountable – *water*, *wine*, *blood* (and other liquids), *mud*, *meat* etc.

c. Flexible – *rock*, *rope*, etc.

d. Ambiguous – *furniture*, *mail*, etc.

Bale and Barner (2009) conducted a series of experiments to investigate cthe ountability of nouns using comparatives, and identified three types of nouns in English in terms of countability: countable, uncountable, and flexible nouns. Bale and Barner examined how nouns are quantified in comparatives, and took comparison by cardinality of objects as an indicator of countability, whereas they took comparison by volume of objects as an indicator of uncountability. See the sentence in (11) in a context where Esme has three small cups, while Seymour has one giant cup.

(11) Esme has more cups than Seymour. (Bale and Barner 2009:226)

In the above context, the sentence was judged to be true. Namely, the participant with a larger *number* of cups was judged to have *more cups*, even though the total *size* of the objects owned by the participant was smaller than that of the other. This indicates that cups are counted by cardinality, and thus, *cup* is countable.

In contrast, a mass object like toothpaste is quantified by volume. See the sentence in (12) with a context where Esme has one big portion of toothpaste while Seymour has three small portions of toothpaste.

(12) Esme has more toothpaste than Seymour. (Bale and Barner 2009:226)

In the above context, the sentence was judged to be true. Namely, the participant with the larger amount of toothpaste was judged to have "more toothpast," no matter how many portions of toothpaste each of them has. Thus, *toothpaste* is uncountable, assuming that comparing by volume is an indicator of uncountability.

Crucially, *furniture*-type nouns patterned with *cup* in their study in that both of them were counted by cardinality in the comparative construction. The sentence in (13) was judged to be true if the *number* of pieces of furniture that Esme had was larger than that of Seymour, no matter how much space the furniture occupied (see below for cases that are inconsistent with this result; Grimm and Levin 2012, Rothstein 2016).

(13) Esme has more furniture than Seymour. (Bale and Barner 2009:228)

The example in (13) also shows that the judgement of countability according to this test is not the same as the grammaticized mass-count distinction. That is, *furniture* is quantified or counted in the same way as *cup* is, and hence, it is countable conceptually, although it usually is used as a mass noun grammatically because (i) it cannot be pluralized (**furnitures*), (ii) it is incompatible with count-sensitive quantifiers (**many furniture*(*s*), **a few furniture*(*s*)), (iii) it cannot be modified by a numeral directly (**three furniture*(*s*)), and (iv) it is compatible with mass-sensitive quantifiers (*much furniture*, *a little furniture*).

In the observations of Bale and Barner (2009), there is another type of noun, flexible nouns, which are naturally used either in a count context, as in (14a), or in a mass context, as in (14b). Such nouns include *rock*, *string*, *spinach*, etc.

(14) a. too many rocks
b. too much rock

The experimental results on this type of nouns conducted by Bale and Barner (2009) indicate that the interpretation of *more* for these nouns depends on whether countability or a number feature is marked (e.g., by a plural marker). The truth condition of sentences depends on whether the noun is used in a count context (marked for plural), as in (15a), or the noun is used in a mass context (unmarked for plural), as in (15b).

(15) a. Seymour has more rocks than Esme does.
b. Seymour has more rock than Esme does.

When *rock* is pluralized (15a), it is counted by cardinality, with which it is considered to be countable. When *rock* is bare (15b), it is compared by volume, with which it is considered

to be uncountable. This means that *rock* is flexible in terms of its countability at the conceptual level. That is, when it is in a count context (15a; with a plural marker), it becomes countable. When it is in a mass context (15b; the lack of a number morphology), it becomes uncountable. Thus, based on Bale and Barner (2009) and subsequent works, three types of nouns can be identified, as in (16)[9]:

(16) Countability based on Bale and Barner (2009) and subsequent works

a. Countable – *book*, *furniture*, *branch*, etc.

b. Uncountable – *water*, *toothpaste*, *rice*, etc.

c. Flexible – *rock*, *rope*, *spinach*, *chicken*, etc.

The flexibility of the countability of *rock* can become clear in certain (syntactic) contexts. Note that the flexibility here does not mean that the countability of flexible nouns is underspecified. The flexible nouns are polysemous in the sense that two concepts, i.e., a count-y one (e.g., an individual leaf) and a mass-y one (e.g., a mass of leafy food) have the same surface form.

I also classify *chicken* into this group. *Chicken* is also flexible, which can be countable or uncountable conceptually. It is, however, different from *spinach* and *string* in that the concepts of *chicken* differ among usages, in contrast to *spinach*. When *chicken* is used as a mass noun, it denotes meat (in particular, a processed one), as in *I had 500g of chicken for lunch*. When it is used as a count noun, it denotes a living animal or a whole body, as in *I keep 100 chickens on my farm*. What is important here is that a flexible noun should be countable when it is used in count syntax (e.g., with *-s* and a numeral), and uncountable when it is used in mass syntax.

2.3.3 Ambiguity of *furniture*-type nouns

In the preceding section, I showed that *furniture*-type nouns are countable. However, *furniture* deviates from the classification in (16) in certain contexts. Examine (17):

(17) a. John has more pieces of furniture than Bill, so he will need the larger moving truck.

b. John has more furniture than Bill, so he will need the larger moving truck.

(Rothstein 2016:4)

Grimm and Levin (2012) and Rothstein (2016) demonstrate that the construal of objects affects the judgement as to how to make comparisons, i.e., by cardinality or by volume (see

[9]The classification in (16) is revised in Section 2.3.3.

also Landman 2011 for a similar claim). In (17a), the context forces the speaker to focus on each individual piece of furniture. Therefore, the *number* of individuals is at issue. In (17b), on the other hand, pieces of furniture as a whole are compared by *volume*. The comparison here focuses more on how much space/area the pieces of furniture occupy in each case, rather than how many pieces of furniture there are in the context.

Note that such flexibility is not observed in count-y nouns, as in (18). In English, count-y nouns are normally used in count syntax, which leads to a count context (wherein a comparison is made by cardinality), and disallows a comparison by volume.

(18) # Bill has more **cup** than John, so he had better take the bigger cupboard.

As such, the ambiguity in countable-uncountable properties in (17) should stem from the lack of syntactic elements that indicate countability or a number feature. The lack thereof enables an uncountable reading of count-y objects (i.e., pieces of furniture) (cf. 15).[10] Thus, *furniture*-type nouns are not straightforwardly countable, and they can be uncountable in certain cases.

Taking into account these ambiguous nouns (e.g., *furniture*), which can be either countable or uncountable contextually without altering their states, I propose the classification in English as in (19) for the discussion in this chapter.

(19) Countability at a conceptual level of English nouns

a. Countable (countable) – human nouns, animal nouns, inanimate nouns (e.g., *book*, *house*, *chair*, *paper*, *branch*), etc.

b. Uncountable (uncountable) – *water*, *mud*, *rice*, etc.

c. Flexible (countable, uncountable) – *rock*, *rope*, *spinach*, *fish*, etc.

d. Ambiguous (countable, uncountable) – *furniture*, *mail*, etc.

[10] *Fish* (and also *deer*, *carp*, etc.) shows a similar ambiguity in (17b), as in (i):

(i) a. John has more fish than Kate. (countable context)
Context: John and Kate went fishing together.

b. John has more fish than Kate. (uncountable context)
Context: At a sushi restaurant, John and Kate both ordered a rice bowl with minced raw fish on it.

However, these nouns are flexible nouns. The ambiguity stems from the irregularity of the plural forms (i.e., null-formed plural) of these nouns. In contrast to *furniture*-type nouns, these nouns are commonly used in count syntax when they are used in a count reading: *a fish, two fish, many fish*. Therefore, the states of the entities are different depending on the reading. When they are in a mass context, they refer to meat. When they are in a count context, they refer to an individual fish (dead or alive) or slices of meat. This difference is comparable with *furniture*, which can be used either in a countable or uncountable context without altering its state, as in (17b). Therefore, I consider *fish*, *deer*, etc. as flexible nouns, rather than ambiguous nouns.

Flexible nouns are polysemous in nature. They may denote either a mass-y object or a count-y object, depending on the ontological properties of the entity. For instance, *rock* can be used for an individual rock (countable) or a substance of rock (uncountable). These two concepts are distinguished if the sentence contains syntactic elements that specify the countability or a number feature of the objects (e.g., *more rocks* for a countable use vs. *more rock* for an uncountable use). When a noun is marked with a plural marker, it should be compared by cardinality, i.e., it is countable.

Inventories of flexible nouns are language specific, and the classification is lexically determined. *Chicken* in English is flexible since it allows either a count reading (e.g., hen) or a mass reading (e.g., chicken meat). So is *fish*. *Beef* is not flexible, since it has an independent word for a living counterpart (*cow*).

Unlike flexible nouns, the ambiguity of *furniture*-type nouns does not stem from involving two distinct concepts. The objects (furniture) conceptualized in (17b) are ontologically identical. These examples simply pick up different aspects of furniture: one as individual furnishing items, and the other as space holders. *Piano* shows a similar ambiguity. In the sentence *I like playing the piano*, the function of a piano is the key point. In the sentence *I can lift a piano alone*, it is considered to be a heavy object. In either case, one individual piano is identified.[11]

With this classification, I consider the existence of countable, flexible, or ambiguous nouns as an indicator of the conceptual mass-count distinction. In what follows, I apply the tests and the classification to Japanese to confirm the prediction that Japanese exhibits a conceptual mass-count distinction.

2.4 Conceptual countability in Japanese

2.4.1 Proposals: classification of nouns

In this section, I apply to nouns in Japanese the definition and criteria of the conceptual mass-count distinction introduced in the previous section, as in (19). Following Inagaki and Barner (2009) and Sudo (2016), and applying the analysis of Rothstein (2016) to nouns

[11] In the classification for English in (19), count-y nouns are not ambiguous, but countable. However, the example in (i) suggests count-y nouns might be ambiguous. I get back to this issue in Section 2.4. (I am indebted to Elizabeth Ritter for the relevant example and discussion.)

(i) John is responsible for 10 adults, and Bill is responsible for 12 kids. I think John needs the bigger van.
Context: John, Bill, their colleagues, and their family members, including kids, are going to a ballpark. There are only two cars (bans) and only two drivers (John, Bill).

in Japanese, I propose that as in (20), nouns in Japanese are classified into three types: uncountable nouns, flexible nouns, or ambiguous nouns.[12]

(20) Conceptual countability of nouns in Japanese (the items are provided in English)
   a. Uncountable – *water*, *mud*, *mustard*, etc.
   b. Flexible (ambiguous, uncountable) – *fish*, *string*, *rock*, etc.
   c. Ambiguous (countable, uncountable) – human nouns, animal nouns, inanimate nouns (e.g., *book*, *shoe*, etc.)

Mass-y nouns are uncountable conceptually both in English and Japanese. Count-y nouns in Japanese are either ambiguous or flexible, but not straightforwardly countable. In Japanese, nouns can be unmarked for countability or a number feature, in contrast to English (in which a plural marker indicates these properties). The lack of such markers leads to the ambiguity, where nouns can be either countable or uncountable (in a similar way to *furniture*-type nouns in English) without involving two distinct concepts. Flexible nouns are in some sense polysemous, having two distinct (closely related, though) concepts (e.g., hen (countable) and chicken meat (uncountable)). With the presence of ambiguous nouns and flexible nouns in Japanese, I propose that the language exhibits the conceptual mass-count distinction.

2.4.2 Conceptual countability in Japanese at first glance

First, I show that count-y nouns can be countable in Japanese. Inagaki and Barner (2009) conducted a series of experiments to see if the findings in English observed in Bale and Barner (2009) are replicated in Japanese as well. Imagine that Person A has one pair of giant shoes, while Person B has three pairs of small shoes, and consider the sentence in (21).[13] (Note that the quantifier *ooku* 'lots of' is compatible with either count-y or mass-y objects.)

(21) Dotira no hito-ga yori ooku-no kutu-o motte-iru desyoo?
   which of person-NOM more lots-LIN shoe-ACC have-PROG EV
   'Who has more shoes?' (Inagaki and Barner 2009:23)

The speakers in the experiments answered Person B in Inagaki and Barner (2009). Namely, (pairs of) shoes were compared by cardinality, i.e., a person with a larger number of (pairs

[12] According to (19) and (20), English and Japanese show a surprising contrast in terms of the classification of count-y nouns. At the end of Section 2.4, I briefly discuss this issue.

[13] In (21), (22), and (28), the Japanese sentences and the English translations are provided by Inagaki and Barner (2009). The glosses are added by the author.

of) shoes was judged to have "more shoes". These results suggest that Japanese shows countability in count-y nouns, which is similar or even identical to English.

Karasi 'mustard' is, on the other hand, one of the typical substance mass nouns, which was used in the experiments in Inagaki and Barner (2009). Person A had two large portions of mustard, while Person B had five small portions of mustard. With this context, consider the example in (22).

(22) Dotira no hito-ga yori ooku-no karasi-o motte-iru desyoo?
which of person-NOM more lots-LIN mustard-ACC have-PROG EV
'Who has more mustard?' (Inagaki and Barner 2009:23)

The speakers in the experiments almost all answered Person A. Namely, mustard was compared by volume, i.e., a person who had a larger sum of mustard was judged to have "more mustard". This is to say, typical mass-y objects are compared by volume in Japanese, and therefore, those are uncountable.

Sudo's (2016) explanation based on the interpretation of *most* also demonstrates that nouns in Japanese show conceptual countability, as demonstrated in Inagaki and Barner (2009). Imagine that there are six books: BOOK L is 500 page long, while BOOKs M to Q are all 20 page long. In total, there are six books, whose total number of pages is 600. With this context, consider the sentence in (23):

(23) Taro-wa hotondo-no hon-o yonda.
Taro-TOP most-LIN book-ACC read
'Taro read most of the books.' (Sudo 2016:4)

The sentence in (23) is true if Taro read all the books except Book L (five out of six books), no matter how many pages he has read, or he has not read. The sentence in (23) is false if Taro read only Book L (500 pages out of 600 pages), even though he read most *pages* of the books. This test also shows (in the same way as Inagaki and Barner 2009) that books are compared by cardinality rather than by volume. In a similar way to the experiments in Inagaki and Barner (2009), this explanation suggests that *hon* 'book' is countable, and that Japanese shows the conceptual countability in count-y nouns (e.g., *shoe*, *book*).

Next, imagine that there are six bottles of water. Bottle L contains 500ml of water, while Bottles M to Q each contain 20ml of water. That is, there is a total of 600ml of water divided into six bottles. Consider the sentence in (24):

(24) Taro-wa hotondo-no mizu-o nonda.
Taro-TOP most-LIN water-ACC drank
'Taro drank most of the water.' (Sudo 2016:4)

The sentence in (24) is true if Taro drank only Bottle L (500ml out of 600ml). Namely, *water* is compared by volume, thus indicating that a typical mass-y noun *water* is, as expected, uncountable.[14]

2.4.3 Flexible and ambiguous nouns in Japanese

Next, I illustrate that the conceptual countability of count-y nouns in Japanese is not as straightforward as it looks. After showing (as in the previous section) that count-y nouns are countable, Inagaki and Barner (2009) further demonstrate that the flexibility is also observed in Japanese nouns, as observed in English. Moreover, I show that the distinction between a countable reading and an uncountable reading is not as clear-cut as that in English. In addition, I claim that count-y nouns are in fact not countable, but ambiguous (in a similar way to *furniture*-type nouns in English).

As discussed in the previous section, and as in (25), although a flexible noun *fish* allows either a countable or uncountable (mass) reading, it depends on the context which reading is salient and what state (individuals or meat) the fish is/are in.

(25) a. John has more fish than Kate. (countable context)
Context: John and Kate went fishing together.

b. John has more fish than Kate. (uncountable context)
Context: At a sushi restaurant, John and Kate both ordered a rice bowl with minced raw fish on it.

In (25a), *fish* is compared by cardinality since the context leads us to focus on the number of individuals (*fish* in a count reading). In (25b), on the other hand, the context leads us to highlight the total sum of the mass term (fish meat or flake; *fish* in a mass reading). If no context is provided to disambiguate its reading, the chances are half and half.

Inagaki and Barner (2009) show that the same as (25) is true of Japanese. *Himo* 'string' has two interpretations (i.e., flexible): one as a count-y object, as in (26), and the other as a mass-y object, as in (27).

(26) Tenzyoo-kara tasuu no himo-ga oti-tekita.
ceiling-from many.number of string-NOM fall-came
'A number of strings fell off from the ceiling.'

[14] In fact, if Taro drank all the bottles except Bottle L (five out of six bottles), the sentence in (24) is also true, though to a lesser extent than in the first case. Such various judgements stem from a (portion) coercion effect, which I leave out from the discussion in this chapter. In the coercion reading, *mizu* 'water' is metonymically interpreted as *bottles of water*, and the number of bottles is counted instead of the volume of water being measured. See Chapter 5 for more discussion on coercion effects.

(27) Basuketto-wa himo-de ippai-da.
basket-TOP string-by full-COP
'The basket is full of string.'

The fact that *himo* 'string' in (26) is modified by *tasuu*, which only occurs with count-y objects, clearly shows that it is countable conceptually and count grammatically. On the other hand, each individual of the strings is not considered in (27). There might be hundreds of them, or just one very long string. With this flexibility of *himo* in mind, imagine that Person A has two very long strings, while Person B has six tiny pieces of strings, and consider the sentence in (28).

(28) Dotira no hito-ga yori ooku no himo-o motte-iru desyoo?
which of person-NOM more lots of spring-ACC have-PROG EV
'Who has more string(s)?' (Inagaki and Barner 2009:24)

In the experiments of Inagaki and Barner (2009), the speakers' answers were divided. Roughly half of the participants answered Person A (comparing by volume), while the other half answered Person B (comparing by cardinality).

These results show that *himo* 'string' is flexible in the same way as its English counterpart. Both can be either countable or uncountable contextually, but in different states.

Moreover, Japanese also has ambiguous nouns, but in fact, count-y nouns, even human nouns, are ambiguous. Recall that *furniture*-type nouns in English are ambiguous, allowing either a countable or uncountable reading without involving two distinct concepts, as in (29):

(29) John has more furniture than Bill, so he will need the larger moving truck.

(Rothstein 2016:4)

When, as in (29), the total sum of the space/area that the furniture occupies is salient rather than individual pieces of furniture (or the number of pieces of it), *furniture* is compared by volume, and therefore uncountable. Interestingly, the similar reading is possible with *hon* 'book' in Japanese. Examine (30) to see what can be compared. (In the translations in (30), (31), and (32), the ambiguity of the noun is indicated with the capitalized words.)

(30) Kono hondana-ni ano hondana yori hon-ga aru.
this bookshelf-on that bookshelf than book-NOM there.be
'There is/are more BOOK on this bookshelf than on that bookshelf.'

The sentence in (30) is true, as expected, when there are 100 books on this bookshelf while 50 books on that shelf (i.e., compared by cardinality of the books on each shelf). In this reading, *hon* is countable. Crucially, this sentence is also true when there are 20 thick books on this shelf while 25 very thin books on that shelf (i.e., compared by volume or total pages of the books). Differing from Sudo's (2016) observations, *hon* 'book' can be compared by volume, by creating a context where the volume (thickness, the number of pages) is focused on more than the number of the copies is. These ambiguous interpretations are possible since the nouns in Japanese are bare in devoid of syntactic markers to indicate whether a noun is meant to be countable or uncountable.

Surprisingly, a similar reading is possible, if not totally natural, even in human nouns. Examine the examples in (31) and (32) to see whether persons can be compared by volume.

(31) Kono nagaisu-ni ano nagaisu yori hito-ga iru. Dakara, ano nagaisu-ni suwar-oo.
this long.chair-on that long.chair than person-NOM there.be so that long.chair-on sit-let's
'There is/are more PERSON on this bench than on that bench. So, let's sit down on that bench.'
Context: The speaker and her/his colleagues are at an outdoor concert, where a number of long benches are installed for spectators. They are looking for a bench, where there still is space left enough for all of them to sit.

(32) Kono beddo-ni ano beddo yori kodomo-ga iru. Dakara, ano beddo-ni nek-ase-yoo.
this bed-on that bed than child-NOM there.be so that bed-on sleep-CAUS-let's
'There is/are more KID on this bed than on that bed. So, let's lay (the kid) on that bed.'
Context: In a nursery, there are several big beds, so kids take a nap. Several kids can share one bed. The caretakers are looking for a space to let a kid take a nap.

The sentence in (31) is true when there are 20 people on this chair, while 15 on that chair (compared by cardinality of people on each chair). Interestingly, it is also true when there are 10 sumo wrestlers on this chair, while 15 small children on that chair (compared by the total amount of space (perhaps even including spaces in-between) that each of the bodies occupies). Similarly, the sentence in (32) is true when there are 5 kids on this bed, while 3 kids on that bed (compared by cardinality of kids on each bed). It is also true when there are 5 low-teens on this bed, while 7 toddlers on that bed (compared by the total amount of space that bodies occupy on each bed).

With the observations in (30), (31), and (32), I argue that count-y nouns in Japanese are ambiguous between countable and uncountable. This classification is fairly straightforward when we recall that count-y nouns in Japanese in general are considered comparable with *furniture*-type nouns in English.

Thus, nouns in Japanese are classified into three groups, including uncountable (e.g., *water*), flexible (e.g., *fish*), and ambiguous (e.g., human nouns, most animal nouns, most inanimate nouns).

These classifications need some more refinement. The test results in (30), (31), and (32) show that the flexibility in English and in Japanese are not the same. Flexible nouns in English (e.g., *chicken*, *rope*, *spinach*, etc.) are flexible in terms of whether those are countable or uncountable. When *chicken* is used in count syntax (e.g., *chickens*, *many chickens*), it is counted by cardinality and thus countable. When it is used in mass syntax (e.g., *much chicken*), it is compared by volume and thus uncountable.

Flexible nouns in Japanese are flexible in terms of whether those are ambiguous or uncountable. When a flexible noun refers to mass-y objects (e.g., meat), it is uncountable (unless it is individualized as, e.g., slices of meat). When a flexible noun refers to a count-y object (e.g., individual fish), it is ambiguous, i.e., it can be either countable or uncountable, as in (30), (31), and (32).

As predicted, a flexible noun *sake* 'salmon' and *sakana* 'fish' (in a lesser degree than *sake*) allow three-way interpretations.[15] Consider the next examples, noting that *aru* is used for inanimate things while *iru* is for living things:

(33) a. Uncountable (meat), compared by volume

Kono onigiri-ni ano onigiri yori {sake/?sakana}-ga aru.
this rice.ball-in that rice.ball than salmon/fish-NOM there.be

'There is more {salmon/fish} in this rice ball than in that rice ball.'

b. Countable (living), compared by cardinality

Kono oke-ni ano oke yori {sake/sakana}-ga iru. Kono oke-ni
This pail-in that basket than salmon/fish-NOM there.be This pail-in
go-hiki, ano oke-ni 2-hiki iru.
5-CL that pail-in 2-CL there.be

'There are more {salmons/fish} in this pail than in that pail. There are five in this pail, and two in that pail.'

[15] *Sakana* 'fish' is less acceptable than *sake* 'salmon' presumably because it is conventionally more common in Japan to specify what ingredient is put in rice balls (e.g., salmon, tuna, seaweed, etc.).

c. Countable (living), compared by volume

Kono oke-ni ano oke yori {sake/sakana}-ga iru. Kono oke-wa
this pail-in that basket than salmon/fish-NOM there.be this pail-TOP
ni-hiki-de ippai-da.
2-CL-with full-be

'There are more {SALMON/FISH} in this pail than in that pail. This pail is already full with only two {salmons/fish}.'

As shown in the contrast between (33a) and (33b) as well as (33c), the flexibility of Japanese lies between uncountable and ambiguous.[16]

The classifications of nouns in Japanese and in English in terms of their conceptual countability (based on the series of experiments outlined thus far), are summarized in (34) (The words are provided in English for ease of exposition).

(34) Conceptual countability in Japanese and in English

	Class	Japanese	English
a.	Uncountable	*water*, *mud*	*water*, *mud*
b.	Countable	N/A?	human, animals, *book*
c.	Flexible (Uncount./ Ambi.)	*fish*, *rope/string*, *rock*	*fish*, *rope/string*, *rock*
d.	Ambiguous (Uncount./ Count.)	humans, animals, *book*, *shoe*	*furniture*, *mail*

Flexible nouns and ambiguous nouns can be conceptually countable in certain contexts. The existence of these nouns is enough to argue for the existence of the conceptual mass-count distinction in Japanese.

It is noteworthy that the classifications on conceptual countability in (34) could not have been proposed without linguistic tests (e.g., comparative; mainly from the works by Barner and his colleagues). In particular, ambiguous nouns can be argued for by applying linguistic tests. Grimm and Levin (2012) and Rothstein (2016) use comparatives to observe the ambiguity of *furniture*-type nouns in English. Moreover, the ambiguity of count-y nouns, including human nouns, in Japanese has not been discussed in the relevant literature, or could not have been observed without the linguistic tests.

While the main proposal in this chapter that Japanese shows the conceptual mass-count distinction appears tenable, the discrepancy in the test results between Japanese

[16]Besides the readings in (33), *salmon* and *fish* can be countable when they refer to slices. It appears to depend on people or regions whether slices of fish can be countable. For instance, in contrast to salmon slices, slices of blowfish, which are somewhat popular in Japan, are commonly served in a large portion, and hence they sound uncountable.

and English (in particular, in terms of the classifications of count-y nouns) is a puzzle that needs some more discussions, since, as noted above, the conceptual mass-count distinction is to much extent universal (Chierchia 2010).

In an attempt to solve this puzzle, I tentatively further assume, expanding from the classification in (34), that in English, not only are *furniture*-type nouns ambiguous, but other count-y nouns are also ambiguous. The example in (35) shows that an uncountable reading of a count-y noun could be achievable in English.

(35) John is responsible for 10 adults, and Bill is responsible for 12 kids. I think John needs the bigger van.
Context: John, Bill, their colleagues, and their family members, including kids, are going to a ballpark. There are only two cars (bans) and only two drivers (John, Bill).

Crucially, however, the sentence in (35) does not contain the noun in question (e.g., *person*), although the uncountable reading of persons/people is examined. In English, once count-y nouns are overtly used, syntax requires number specification, with which the uncountable interpretation is blocked.[17] If the assumption that English count-y nouns are ambiguous, but the ambiguity is not easily detectable because of syntax, is on the right track, it explains the striking contrast between English and Japanese in terms of the conceptual countability of count-y nouns.

The fact that *furniture*-type nouns in English and count-y nouns in Japanese allow an uncountable reading, suggests that the presence or absence of the overt number morphology in comparative sentences is a key factor as to whether an uncountable interpretation is achievable.

It is true that the assumption that the syntactic tests (comparatives) obscure the ambiguity of nouns in English, might lead us to doubt the validity of tests with comparatives or any other linguistic/syntactic tests for conceptual countability. I leave it for future research on how to identify the uncountable reading of count-y nouns in English. However, it is worth re-stating, as mentioned above, that these linguistic tests are crucial for observing and identifying ambiguous nouns and for proposing more comprehensive classifications than the classifications that can be made by conceivable minimal parts and homogeneity.

[17] Needless to say, there are a number of cases in English that do not fit in this regular number marking system. These include *furniture*-type nouns (count-y nouns, but only used in mass syntax), bare marked plurals (e.g., *fish, deer*), pluralia tantum (*glasses, pants*), and inherently plural nouns (e.g., *people, cattle*, among which there are even more variations in terms of countability, as shown in the contrast between *ten people* and **ten cattle*). Also see Pelletier 1975 for cases of so-called Universal Grinder, where count-y nouns are used in mass syntax.

2.5 Summary of Chapter 2

In this chapter, I argued for the presence of a conceptual mass-count distinction in Japanese, based on the observations derived from the studies by Barner and his colleagues (e.g., Bale and Barner 2009, Inagaki and Barner 2009, and Sudo 2014, 2016), as well as Grimm and Levin (2012) and Rothstein (2016). Japanese nouns can be classified into three groups in terms of their conceptual countability: (i) uncountable (e.g., *mizu* 'water'), (ii) flexible (e.g., *sakana* 'living fish, fish meat'), which are polysemous in nature, allowing both count and mass interpretations naturally, and (iii) ambiguous, to which most count-y nouns belong, and with which in some context, the uncountable interpretation is preferred (e.g., when the space/area that it occupies is at issue).

In Chapter 5, I argue that, in order to achieve diverse fine-grained interpretations, nouns in numeral classifier constructions select for appropriate classifiers based on ontological properties of the nouns, including conceptual countability and the classifications of nouns. I also show that sortal classifiers, which are often linked to count syntax, in fact allow a mass reading, analogous to the uncountable reading of count-y nouns in Japanese in the conceptual domain.

3

General Number

After investigating the conceptual countability of nouns (i.e., entities denoted by the nouns) in Japanese in the previous chapter, the next question that arises naturally at this point is whether or not Japanese exhibits the grammaticized mass-count distinction (i.e., whether or not nominals project Individuation Phrases (IndPs), where count nominals are made from mass terms) in the same or similar sense than in English, where individuation and number features are morphosyntactically marked by a plural marker, *-s*, which sits on the Ind head.

In the past literature on the topic, it is widely claimed that classifiers (or types of classifiers) manifest the (grammaticized) mass-count distinction in classifier languages (e.g., Borer 2005a; Cheng and Sybesma 1999, 2012 for Mandarin), and that classifiers are indispensable to individuating and/or counting nouns in these languages (e.g., Borer 2005a, Chierchia 1998a). These claims predict that Japanese, a typical classifier language, does not show the grammaticized mass-count distinction in the absence of classifiers.

In Chapters 3 through 5, in order to examine this prediction, I examine individuation and counting of nominal phrases in three stages: (i) bare nouns (General Number), (ii) modified nouns (nouns with count-sensitive quantifiers and demonstratives; e.g., *many, these*) and plurals (a putative plural marker *-tati*, plurals via reduplication, null-marked plurals) and (iii) nouns with (numeral) classifiers.

I propose that in Japanese, the grammaticized mass-count distinction is observed in various phenomena and constructions in the absence of classifiers. To be more specific, there are two types of number neutral bare nouns: one type involves individuation and the other does not (Chapter 3). Japanese has count-sensitive modifiers that also manifest the mass-count distinction (Chapter 4). Although number neutral bare nouns are prevalent, bare plural nouns also manifest the grammaticized mass-count distinction (Chapter 4).

As we shall see in Chapter 5, it is evident that classifiers play a dominant and crucial role in individuation and counting in Japanese. However, the absence of classifiers does not mean that nouns are not individuated. Rather, all of the constructions examined in Chapters 3 and 4 that do not contain classifiers (i.e., bare nouns, modified nouns, plural nouns), show residual ways of the grammaticized mass-count distinction in the absence of classifiers. On the other hand, I show in Chapter 5 that classifiers in Japanese individuate nouns, but not always.

The proposals and analyses in Chapter 3 to 5 support for heterogeneous views of syntactic constructions. For instance, bare nouns in different languages show different properties, for which various analyses on underlying structures and derivations are presented (e.g., Paul 2012). Plurals are mapped to various functional heads (or as adjuncts onto various positions) across nominal structures (e.g., Mathieu 2012, 2014, Wiltschko 2008, 2021). Li (2013) argues that classifier constructions in Mandarin that involve individuation and the ones that do not involve individuation, are structurally distinct.

In particular, I show that these constructions (bare nouns, modified nouns, plural nouns, numeral classifier constructions) in Japanese include individuating varieties and non-individuating varieties, and that the distinctions between individuating and non-individuating varieties, are reflected on nominal functional structures. Constructions that involve individuation project Ind(ividuation) Phrases, where various individuators sit: a null Ind head for bare nouns or for nouns with count-sensitive quantifiers and demonstratives, individuating plurals, and individuating classifiers.

In the past literature that investigates the nominal domain in Japanese, each of bare nouns, plurals, and classifier constructions provokes rigorous debate, has its own popular topics, and enjoys syntactic and/or semantic analyses. It appears, however, not common to look at these constructions from a certain point of view (e.g., mass-count distinction) and/or to provide a unified structure to capture all of these constructions. Chapters 3 to 5 attempt to fill these gaps.

3.1 Puzzles and Proposals

As seen in (1), bare nouns in Japanese can be used either in a singular reading or in a plural reading.

(1) Haruko-ga kesigomu-o katta.
Haruko-NOM eraser-ACC bought
'Haruko bought an eraser/erasers.'

In (1), Haruko might buy just one eraser, three erasers, or hundreds of erasers. Thus, the bare noun *kesigomu* is number neutral. Number neutrality is a key property of what Corbett (2000) calls *General Number*. While Corbett (2000) provides a thorough descriptive overview of General Number in the world languages, the nature of the number neutrality and the structures of General Number are yet to be figured out.

The past literature on General Number or number neutral bare nominals can be divided in terms of the nature of the number neutrality: semantic and morphological. Different analyses of the number neutrality lead to different predictions on functional structures (#Ps, IndPs). Semantically, number neutrality can be achieved when number features (e.g., singular and plural) are not specified (e.g., Kramer 2015, 2017). Under the assumption in this thesis (i.e., number features are specified at the #P level), if the neutrality is semantic, it predicts that number features are not specified on #, or number neutral bare nouns do not project #Ps. With this prediction, it should be further explored whether or not bare nouns with semantically neutral interpretation involve individuation.

On the other hand, Watanabe (2006) claims that the number neutrality of bare nouns is morphological; two interpretations (singular and plural) employ the same surface form. This implies that number neutral bare nouns project #Ps, where number features are specified (but not phonologically distinct). Under the assumption made in this thesis, the presence of #Ps presupposes the existence of IndPs. Therefore, if the number neutrality is morphological, it implies that number neutral bare nouns involve #Ps as well as IndPs. This means that number neutral bare nouns, if the number neutrality is morphological, should show properties of individuation.

In this chapter (Sections 3.3 and 3.4), I employ ambiguity tests (e.g., Zwicky and Sadock 1975) to examine the nature of the number neutrality of bare nouns in Japanese. I propose that bare nouns in Japanese are semantically number neutral, where number features are not specified. This proposal leaves open whether or not number neutral bare nouns involve individuation, which is to be discussed in Sections 3.5.

Crosslinguistically, number neutral bare nouns, in particular, those in classifier languages, show common properties, with which the structures of bare nouns are discussed:

obligatory narrow scope, kind reference, and discourse anaphora (Mandarin (Rullmann and You 2006), Turkish (Bliss 2004), etc. among classifier languages; Amharic (Kramer 2015, 2017), Brazilian Portuguese (Cyrino and Espinal 2015), Catalan (Espinal and McNally 2011), etc. among other languages). Also, number neutral bare nouns are often analyzed as incorporated nominals (although it varies among languages and among past studies which types of incorporation are claimed to involve)(e.g., Azeri (Zareikar 2018), Brazilian Portuguese (Cyrino and Espinal 2015), Hindi (Dayal 2015)). Moreover, the properties commonly observed in number neutral bare nouns in languages with General Number, overlap with properties commonly observed in bare plurals in number languages (e.g., English (Carlson 1977, Link 1983), French (Dobrovie-Sorin 2021), etc.).[1]

However, bare nouns in Japanese do not always show the properties commonly observed with number neutral bare nominals in other languages. For instance, in contrast to bare nominals in other languages (where obligatory narrow scope is one of the common properties), bare nouns in Japanese take variable scope, as shown in (2)[2].

(2) Sono byooin-wa kangosi-o sagasi-teiru. (narrow or wide scope)
that hospital-TOP nurse-ACC look.for-PROG

a. Narrow: 'That hospital is looking for a nurse/nurses (to hire).'

b. Wide: 'There is a nurse/are nurses that hospital is looking for.'

(Nakanishi and Tomioka 2004:115)

In (2), that hospital might be currently recruiting any eligible candidate(s) (narrow scope reading), or looking for (a) certain nurse/nurses who, e.g., stole confidential information of the hospital (wide scope reading). Bare plurals in English, e.g., *nurses* in a sentence *That hospital is looking for nurses*, obligatorily take a narrow scope (e.g., Carlson 1977).

In English, indefinite DPs (e.g., *a nurse, some nurses*) are observed to take variable scope (e.g., Carlson 1977, Chierchia 1998a). With this, I predict that bare nouns in Japanese, when they take a wide scope, pattern with indefinite DPs in English, rather than bare plurals. However, this does not exclude the possibility that Japanese does not have bare nominals that pattern with bare nouns in other languages with General Number (e.g., Mandarin; Rullmann and You 2006). Considering the fact that Japanese does not overtly mark properties on D (definiteness, specificity), I claim that there are two types of number neutral bare nouns, including narrow scope bare nouns and wide scope bare nouns, and that these two types of bare nouns are identical on the surface, but different covertly.

[1]See Section 3.5 for a claim that bare plurals in English are also number neutral.

[2]The original example in Nakanishi and Tomioka (2004) uses *kangohu*, which literally means 'nursing lady'. I replace it with a gender neutral word, *kangosi* 'nursing expert'.

In Section 3.5, I examine the properties of bare nouns in Japanese when they take narrow scope and when they take wide scope, separately. I propose that (i) narrow scope bare nouns are structurally bare (i.e., nPs; hence, I call them 'nP bare nouns'), and pattern with number neutral bare nominals in other languages (both classifier languages and number languages; kind reference, discourse anaphora, properties of incorporated nominals), and (ii) wide scope bare nouns are DPs (hence, I call them "DP bare nouns"), project IndPs, and pattern with indefinite DPs in English (although individuation and definiteness/specificity of bare nouns in Japanese are not overtly marked).

This chapter is organized as follows. In Section 3.2, I clarify the working definitions of bare nouns and General Number in this thesis. In Section 3.3, I examine tests to define number neutrality. With ambiguity tests (e.g., Zwicky and Sadock 1975), I classify ambiguity into three types: polysemy (featural neutrality), underspecification, and homonyms (lexical/structural neutrality). In Section 3.4, I apply to Japanese the tests examined in the previous section. I claim that the neutrality of bare nouns in Japanese is semantic, where the number properties (singular, plural) are not specified. In Section 3.5, I turn to the structures of bare nouns in Japanese. After introducing two types of bare nouns (DP bare nouns and nP bare nouns), I investigate the structures and derivations of each type in order to figure out what nominal function projections are involved. Section 3.6 concludes the chapter.

3.2 General Number

First, I clarify a working definition of General Number before delving into the descriptions and analyses of General Number in the subsequent sections. General Number can be defined as the neutrality of number (singular, plural, and other number systems, such as dual, paucal, etc.), as Corbett (2000:9-10) states:

"[T]here are languages for which number is less dominant, languages in which the meaning of the noun can be expressed without reference to number. We shall call this 'general number', by which we mean that it is outside the number system."

As shown in (1) above, bare nouns in Japanese match this definition. The number system in Japanese is relatively simpler since the Japanese language does not have complex number systems (e.g., dual, paucal), but just General Number (neutral), singular, and plural. Discourse anaphora also illustrates that bare nouns in Japanese can be used either in a singular reading or in a plural reading. Number neutral bare nouns can be referred back

to by either a singular or plural pronoun:

(3) Tiisana kyoositu no mae de gakusei-ga tugi no zyugyoo-o matteiru.
small classroom of front at student-NOM next of class-ACC waiting
{Kare/Kanozyo/Karera/Kanozyotati}-wa sumaho-de konsyuu no
he/she/they/they.F-TOP smartphone-with this.week of
kadai-o kakuninsiteiru.
assignment-ACC checking
'A student/students is/are waiting for the next class in front of the small classroom.
The student(s) is/are checking the assignment(s) this week.'

It is also possible to consider mass interpretations into General Number, as presented by Gil (1996) with an example from Tagalog, as in (4). The example in (5) shows that such three-way neutrality is also observed in Japanese.

(4) Mansana ang kinain ni Boy. [Tagalog]
apple TOP PAST.PERF-eat PERS:DIR boy
'Boy ate apple/an apple/apples.' (Gil 1996:55)

(5) Haruko-wa ringo-o tabeta.
Haruko-TOP apple-ACC ate
'Haruko ate apple/an apple/apples.'

In (4) and (5), the subject of the sentence may eat one apple on the way back home from a supermarket where she/he got a bag of apples, or may eat two or three of them (count readings). She/He may eat a spoonful of mashed apple to put in curry, or minced apple to put in a salad (mass readings).

In this thesis, I adopt the view of Gil (1996) that General Number is neutral among singular, plural, and mass. The three-way ambiguity is adopted because, as discussed in Chapter 2, not only flexible nouns (e.g., *fish*, *apple*), but also count-y nouns allow uncountable interpretations in Japanese.[3]

[3]However, it is notable that bare nouns do not always allow a mass interpretation, even when the context forces such an interpretation. As in (i), bare nouns in Japanese resist the Universal Grinder (Pelletier 1975), with which typical count-y nouns can be turned into a mass term in English (but not in Japanese; see Cheng et al. 2008 for a similar observation in Mandarin Chinese). While English count-y nouns (except *furniture*-type nouns) allow a mass interpretation with the Universal Grinder (*Dog is all over the wall*), the Japanese literal translation to this sentence, as shown in (i), only allows a count interpretation, which needs a special context. I leave this important observation for future research.

(i) Inu-ga kabe-zyuu-ni hirogatteiru.
dog-NOM wall-all.over-on spread

a. Count: '{A dog is/dogs are} all over the wall.' (e.g., drawings or photos of a dog/dogs)
b. *Mass: 'Dog is all over the wall.'

As we see through this chapter, the three-way neutrality of General Number in Japanese is a mixture of multiple types of neutrality. First, as discussed in Section 3.4, singular-plural neutrality is achieved via the underspecification of number features. This neutrality in number features (i.e., count interpretations) in turn contrasts with a mass interpretation. The neutrality of mass-count features is achieved via structural ambiguity. namely, whereas a count nominal and a mass nominal are realized with distinct nominal functional structures, those two structures are identical on the surface. In this chapter, for ease of exposition, I use the term *General Number* only for the singular-plural distinction.

I propose in Section 3.4 that number neutral bare nouns in Japanese are realized with two distinct structures: DP bare nouns (that take wide scope) and nP bare nouns (that take narrow scope). I use the term General Number for both of these two types of bare nouns.

Beside the number neutrality, I only consider nouns that are bare morphologically, namely nouns without an overt number suffix (e.g., a putative plural marker *-tati*, plurals via reduplication) or the functional elements in the extended nominal projections (e.g., numeral classifiers, quantifiers, demonstratives). Since it is one of the main foci of this thesis to compare bare nouns with nouns that are modified by number-related elements (e.g., count-sensitive quantifiers or demonstratives, numeral classifiers), General Number (associated with bare nouns) should be separated from nouns that overtly involve extended nominal functional projections.[4]

Bare nouns may not be totally bare even on the surface (while I argue that DP bare nouns are covertly not bare, but complex structurally, involving IndPs, #Ps, and DPs). Normally, General Number can be case-marked: nominative case (i); accusative case (5); and dative case (6).

(6) Haruko-wa gakusei-ni hon-o syookaisita.
Haruko-NOM student-DAT hon-ACC introduced
'Haruko introduced a book/books to a student/students.'

The literature does not seem to have reached a consensus as to whether a functional projection hosts case markers in Japanese. It is widely assumed that case-markers do not project functional projections by themselves (e.g., Miyagawa 1989 and subsequent

[4]With this definition, bare plurals in English are not General Number since they are not morphologically overtly bare in the assumption here. However, bare plurals in English show striking similarities to bare nouns in classifier languages (e.g., Borer 2005a, Chierchia 1998a). It is well-known that bare plurals in English show (i) properties of kinds and (ii) sort of number neutrality (i.e., an inclusive plural reading), the properties that are often associated with bare nouns in classifier languages. We revisit this issue in Section 3.5 to show similarities between nP bare nouns in Japanese and bare plurals in English, and differences between DP bare nouns in Japanese and bare plurals in English.

works on floating numeral quantifiers). Various functional projections are also claimed to host case markers (e.g., Watanabe 2006, 2008, and Hasegawa 1999). In this thesis, I assume without further scrutiny that nominative, accusative, and dative markers are (phonologically) attached without a functional head specifically dedicated to grammatical cases.

Nouns modified by adjunct modifiers, as in (7), or relative clauses, as in (8), are considered to be bare and General Number if they are neutral in number.

(7) Haruko-wa akai kuruma-o aratta. {Ichi-dai-dake dat-ta./ zenbu-de san-dai atta.}
Haruko-TOP red car-ACC washed 1-CL-only COP-PAST/ all-with 3-CL there.were
'Haruko washed a red car/red cars. {There was only one (red car)./There were three (red cars) in total.}'

(8) Sono gakusei-wa [Haruko-ga syookaisita hon]-o yonda. {Is/Ni}-satu-dake dat-ta-ga nana-syuu-kan kakatta.
that student-TOP Haruko-NOM introduced book-ACC read 1/2-CL-only COP-PAST-but 7-week-for took.
'That student read a book/books that Haruko introduced (to her/him). Although (Haruko introduced) only 1 book/2 books, it took seven weeks (for her/him to read).'

Under the assumption in this thesis, adjunct modifiers (e.g., adjectives) and relative clauses do not project nominal functional projections (nP-IndP-#P-DP), but adjoin to those functional projections. Therefore, attaching adjectives or relative clauses to nouns does not alter the phrases, i.e., if a noun is structurally bare, it is still structurally bare even when it is modified by adjectives or relative clauses. I focus on unmodified bare nouns in this thesis, however, unless otherwise needed.

Bare nouns also allow a definite/specific reading in certain contexts, as in (9). The second instance of student(s) in (9), which is a definite expression, is presented with a bare noun *gakusei*. This is so, irrespective of the number property of the noun, as indicated by the English translation.

(9) Tiisana kyoositu no mae de gakusei-ga tugi no zyugyoo-o matteiru.
small classroom of front at student-NOM next of class-ACC waiting
Gakusei-wa sumaho-de konsyuu no kadai-o kakuninsiteiru.
student-TOP smartphone-with this.week of assignment-ACC checking
'A student/students is/are waiting for the next class in front of the small classroom. The student(s) is/are checking the assignment(s) this week.'

Although in this chapter, I discuss DP bare nouns, which project DPs as well as #Ps and IndPs, I focus on indefinite expressions (in particular, their narrow and wide scope readings), and abstract away from the details of definite expressions unless necessary.

3.3 Nature of Number Neutrality

First, I investigate the nature of the ambiguity (number neutrality) of bare nouns (General Number). After introducing three types of ambiguity and ambiguity tests in order to examine which type General Number in Japanese belongs to, I show that the ambiguity (number neutrality) of General Number in Japanese is semantic, where the number feature is underspecified.

3.3.1 Types of ambiguity

Neutrality can be achieved in three ways: homonyms, polysemy, and the lack of specification (Cruse 1986, Moldovan 2021, Rullmann and You 2006, Zwicky and Sadock 1975). First, in (10), the ambiguity[5] of *bank* is derived when two distinct lexical items employ the same form on the surface.

(10) John went to a bank.
   a. John went to a financial institution.
   b. John went to a riverbank.

This type of ambiguity is homonymic, where two different lexical items are involved. The homonymic ambiguity is observed in homonymic expressions: e.g., *pen* (a writing tool, animal enclosure), *palm* (hand, tree), *get* (ride, acquire), etc. Although homonyms are mainly used for certain words, homonymic ambiguity can also be found in sentences:

(11) She saw a man with binoculars.
   a. She used binoculars to see a man.
   b. She saw a man who held binoculars.

Note that this type of ambiguity refers to surface forms, but does not imply that those two interpretations have the same structure. Rather, sentences with this type of ambiguity

[5]I use the term ambiguity with no theoretical implications. If a form has multiple meanings, interpretations, readings, and/or senses, it is ambiguous. To classify the ambiguity, the literature cited in the text introduces more detailed and diverse classifications (homonymic, polysemous, vague, general, etc.). For clarity and simplicity, I use the terms in the discussion here, including *homonymic ambiguity*, *polysemous ambiguity* and *underspecification*, and *ambiguity* for the cover term for these three.

involve two distinct structures underlyingly. In (11), for instance, a PP *with binoculars* is either adjoined onto the VP (as in the case of (11a)) or contained in the DP (as in the case of (11b)). In homonyms, multiple senses are presented with the same surface form.[6] For a morphosyntactic analysis, the homonymic ambiguity is structural. Namely, multiple logical forms are presented with the same surface form. If we apply the homonymic (or structural) ambiguity to General Number, it implies that the singular and plural forms constitute different structures (e.g., one projects XPs, but the other does not), but happen to be phonologically identical on the surface.

The second type of ambiguity, polysemy, is observed when an expression has multiple, but related, meanings. As discussed by Falkum and Vincente (2015), *line* is used with multiple meanings. See (12) to see how various meanings of *line* are close or related to each other in some sense.

(12) a. draw a line
b. read a line
c. line around eyes
d. a wash on a line
e. wait in a line
f. a line of bad decisions

Moldovan (2021) claims that polysemy arises through the metonymical or metaphorical expansions of the same lexical item (which is contrary to the homonymic ambiguity where two distinct lexical items or syntactic constructions are involved). In (12), the prototype meaning seems to be the one in (12a), from which other usages are invented via similarities or proximity (e.g., in (12b), a string of words in a passage is considered to be similar to a *line* as in (12a)). For a morphosyntactic analysis, polysemous ambiguity is featural or arises from different flavours of a functional head or phrase. If we apply the polysemous (or featural) ambiguity to General Number, I assume, this would imply that structures of singular and plural forms are the same, but with different feature specifications (Watanabe 2006).

Ambiguity also emerges when certain semantic properties are underspecified, as in (13).

[6] I leave for future research whether or not such overlapping is motivated by a chronological change of the meanings of the word, or whether or not it has conceptual or cognitive motivations. For possible sources of homonymic ambiguity, see, e.g., Bontly 2005 and Moldovan 2021, and also see Sennet 2016 for the discussions on the homonym *bank*.

(13) John saw a child.

a. John saw a boy.

b. John saw a girl.

A noun *child* in (13) can refer to either a male (boy) or female (girl). Namely, *child* is semantically underspecified for (biological) gender, whether this specific word lacks the distinction or the language lacks the grammatical gender distinction. The ambiguity caused by underspecification is observed in various nouns in various ways: *kid* (gender), *brother* (age), *wine* (colour), *desk* (material), etc. If General Number exhibits the ambiguity of this type, it means that the number property (singular, plural) is not specified in morphosyntax and/or in the lexicon.

3.3.2 Ambiguity tests

In order to investigate the nature of the neutrality of General Number, I use ambiguity tests introduced in previous literature (e.g., Cruse 1986, Rullmann and You 2006, Zwicky and Sadock 1975). Among the various ambiguity tests, those with ellipsis and reduced conjunctions are often used to determine the type of ambiguity of General Number (e.g., Bliss 2004 for Turkish, Kramer 2015, 2017 for Amharic, Nomoto 2013 for Malay, Rullmann and You 2006 for Mandarin, Paul 2012 for Malagasy, Sato 2009 for Indonesian).[7]

However, the linguistic analyses of the ambiguity of General Number have focused primarily on the distinction between the homonymic ambiguity and the ambiguity caused by underspecification. I present cases where the tests fail, and instead claim that the ambiguity tests are only valid in determining homonymic ambiguity (see Viebahn 2018, Sennet 2002 for a similar claim for the ambiguity tests in general). To refine the classification of the ambiguity, I also use a test with metalinguistic negation (Rullmann and You 2006) and introduce the polysemous ambiguity. With these refined diagnostics, I confirm that the ambiguity of General Number in Japanese, be it a nP bare noun or a DP bare noun, is derived by underspecification; i.e., semantically neutral and underspecified for number.

First, I focus on the homonymic ambiguity and the ambiguity caused by underspecification. Ambiguity tests using ellipsis and reduced conjunctions are commonly used to determine the type of ambiguity. It is assumed in the literature, as in (14), that if two interpretations of a noun survive in an elided element (thereby the whole sentence allows four-way interpretations), those are semantically neutral (underspecified), otherwise, they

[7]The conclusions reached in these studies indicate that General Number in these languages exhibits ambiguity caused by underspecification, i.e., General Number in these languages is underspecified for number.

are homonymic. (These diagnostics will be revised later.)

(14) Diagnostics of the ambiguity (Version 1) – Based on Cruse (1986), Laykoff (1970), Rullmann and You (2006), Zwicky and Sadock (1975), etc.

a. Pass the tests (4 way interpretations) –Underspecification

b. Fail the tests (2 way interpretations) – Homonyms

The results of the ambiguity tests of *bank* are shown in (15).

(15) John went to a bank, and Mary did so (= go to a bank), too.

a. John went to a financial institution, and Mary went to a financial institution.

b. *John went to a financial institution, and Mary went to a riverbank.

c. *John went to a riverbank, and Mary went to a financial institution.

d. John went to a riverbank, and Mary went to a riverbank.

In (15), the second clause undergoes ellipsis (and is replaced by *do so*). The elided cites contain the target expressions (*bank*), which are ambiguous as in (10) and (13). As in (15), *bank* does not allow four-way interpretations. It only allows two interpretations where two *bank*s (the overt one and the one in the elided cite) refer to the same entity: a financial institution as in (15a) or a riverbank as in (15d). Meanwhile, a cross-reference is not permitted, as in (15b) and (15c). These results indicate that the two extensions of *bank* are homonyms, i.e., they happen to have an identical form on the surface.

The test results of *child* are shown in (16), wherein the second clause that contains the target expression *child*, undergoes ellipsis (and is replaced by *do so*).

(16) John saw a child, and Mary did so (= see a child), too.

a. John saw a boy, and Mary saw a boy.

b. John saw a boy, and Mary saw a girl.

c. John saw a girl, and Mary saw a boy.

d. John saw a girl, and Mary saw a girl.

(Rullmann and You 2006:177)

In contrast to (15), the noun in (16) retains the two interpretations regarding sex (i.e., boy or girl). Consequently, the sentence in (16) is true in four different situations. *Child*s (the overt one and the one in the elided cite) may or may not refer to the same gender. *Child* is thus ambiguous, where its gender property is underspecified.

(17) and (18) show that the results in (15) and (16) are replicated in the ambiguity tests with reduced conjunctions. *Bank* allows only two interpretations where two *bank*s refer to the same entity (17a, d), and disallows cross-reference (17b, c). On the other hand, *child* allows all four possible interpretations, as in (18).[8]

(17) John and Mary went to a bank.

a. John went to a financial institution, and Mary went to a financial institution.

b. *John went to a financial institution, and Mary went to a riverbank.

c. *John went to a riverbank, and Mary went to a financial institution.

d. John went to a riverbank, and Mary went to a riverbank.

(18) John and Mary saw a child.

a. John saw a boy, and Mary saw a boy.

b. John saw a boy, and Mary saw a girl.

c. John saw a girl, and Mary saw a boy.

d. John saw a girl, and Mary saw a girl.

With the diagnostics in (14) and also with the results in (17) and (18), the judgements based on (15) and (16) are confirmed: *bank* has two distinct meanings (i.e., homonyms), while *child* is underspecified for gender features.

It is a common practice in linguistic literature on General Number in various languages to apply this test in the examination of ambiguity. For instance, Rullmann and You (2006) investigate the properties of bare nouns in Mandarin Chinese, and argue that a number feature in bare nouns is underspecified (semantically neutral). Consider (19) to see what the bare noun *shu* 'book' refers to:

(19) Zuotian wo mai le shu. Yuehan ye mai le. [Mandarin]
Yesterday I buy ASP book John also buy ASP
'Yesterday I bought one or more books. So did John.'

(Rullmann and You 2006:178)

The sentence in (19) is true irrespective of the number of books that each of John and I bought yesterday. The test in (19) shows that bare nouns in Mandarin are ambiguous with respect to number properties (i.e., singular or plural). With this result, Rullmann and You (2006) argue that a number feature is underspecified (semantically neutral) in bare nouns

[8] (17) and (18) obviously have yet another interpretation: John and Mary together saw a child in (15) or went to a bank in (16). In fact, perhaps, these interpretations are most salient in each sentence, but irrelevant for the discussion here.

in Mandarin, and suggest that the number neutrality of bare nouns stems from reference to kinds. A similar ambiguity (underspecification of number properties) is observed in various languages: e.g., Amharic (Kramer 2015), Indonesian (Sato 2009, 2017), Malagasy (Paul 2012), Malay (Nomoto 2013), and Turkish (Bliss 2004).

So far, the ambiguity tests have been used to distinguish between homonymic ambiguity and ambiguity caused by underspecification. However, a question arises: *Is the test in (50) valid?* I re-evaluate the test and diagnostics, considering a wider variety of data, and present a revised and refined test form.

3.3.3 Ambiguity tests: Refinement

In the previous subsection, I introduced the diagnostics of the ambiguity widely employed in the literature, as in (14), repeated here as (20).

(20) (=14) Diagnostics of the ambiguity (Version 1) – based on Cruse (1986), Laykoff (1970), Rullmann and You (2006), Zwicky and Sadock (1975), etc.

a. Pass the ambiguity tests (4 way interpretations) – Underspecification

b. Fail the ambiguity tests (2 way interpretations) – Homonyms

To re-examine the validity of the ambiguity tests and the diagnostics, I apply the tests to various types of ambiguities. I also introduce another test with meta-linguistic negation (Rullmann and You 2006). With test results for the ambiguities resulting from a mass-count distinction, a singular-plural distinction, a kind-existential distinction, and a specific-attributive distinction, I present the refined version as in (21).

(21) Diagnostics of the ambiguity (Final version)

a. Pass the ambiguity tests / Not disambiguated by negation – Underspecification

b. Pass the ambiguity tests / Disambiguated by negation – Polysemy (featural)

c. Fail the ambiguity tests – Homonyms (structural)

In order to achieve the objective in (21), I begin with a false case for the older version in (20). First, I consider the behaviour of *sheep* in English. While English, a typical number language, has a distinct overt plural marker *-s*, it still has many irregular plural forms. *Sheep* is one of them, being irregular in that it does not alter the form whether it is in a singular or plural reading. It resists the plural marking even in a plural context, as in (22). Namely, the bare form (uninflected form) allows both singular and plural interpretations, as in (23). Also, it can be referred back to by either a singular (24a) or a plural pronoun, as in (24b);

(22) I own many {sheep/*sheeps} on my farm.

(23) I took a picture of the sheep.
   a. I took a picture of the lamb.
   b. I took a picture of the lambs.

(24) a. I bought the sheep at auction yesterday. It is so cute.
   b. I bought the sheep at auction yesterday. They are so noisy.

The number feature of *sheep*, however, is not underspecified, since it is substantiated in the contexts that involve a number agreement:

(25) a. The sheep loves itself/himself/herself.
   b. The sheep love themselves.

(26) a. The sheep was named Shaun.
   b. The sheep {cost/*costs} 500 dollars each.

The examples in (25) show that appropriate forms of reflexive pronouns should be selected depending on the actual number of *sheep* in the context. *Sheep* also requires the number agreement with the predicate, as in (25) and (26).

Moreover, the uninflected form participates in the count syntax: a numeral, as in (27a), count-sensitive quantifiers, as in (27b), count-sensitive determiners, as in (27c), and count-sensitive demonstratives, as in (27d).

(27) a. I have 15 sheep on my farm.
   b. I have many sheep on my farm.
   c. I have a sheep in my backyard.
   d. This/These sheep will be enclosed with an electric fence.

With these, we can safely assume that *sheep* has a covert plural marker when it is in a plural reading, as in *sheep*-$\emptyset_{\mathrm{PL}}$. The analysis with a null plural marker is also supported by another interpretation of bare nouns. The examples in (28a) show that the bare noun *sheep* also allows a kind interpretation, which is commonly achieved by bare plurals in English (*cats*, *dogs*, *horses*, etc.), as in (28b).

(28) a. Sheep are / *Sheep is extinct in this region.
   b. Dodos are / *Dodo is extinct.

The availability of the kind interpretation of *sheep* is straightforward if we assume that it is a bare plural with a null plural marker. That is to say, *sheep* is *morphologically* neutral in number on the surface form (where the number feature is covertly specified), but not semantically neutral. This type of noun which realizes plurality with a null plural marker, includes *deer*, *fish*, *carp*, etc. All of these nouns employ the same form for both a singular and plural interpretation, but require a number agreement, and allow a kind interpretation. Although these nouns are irregular among English countable nouns, I believe that these nouns provide some insights into the ambiguity and the tests for it.

Crucially, these two interpretations of *sheep* (singular and plural) do survive over ellipsis:

(29) I love (my) own sheep, and so does Mary.

In a sloppy reading such that Mary loves her own sheep, the number of my sheep and the number of hers do not need to match. The interpretation of the ambiguity tests above wrongly predicts that the number features of *sheep* are underspecified, which is contrary to the facts demonstrated in (23) through (27).

Thus, the ambiguity tests do not necessarily indicate the (under)specification of features. Contrary to the assumptions made in the previous literature (e.g., Bliss 2004, Kramer 2015, Rullmann and You 2006), both types of ambiguity (i.e., homonymic ambiguity and ambiguity caused by underspecification) may pass the test. Meanwhile, it has been widely confirmed (e.g., Moldovan 2021, Viebahn 2018) that the ambiguity tests are valid for homonymic ambiguity. If two interpretations of a noun do not survive over conjunction or ellipsis (i.e., fail the test), then two interpretations of the noun are of the homonymic type.

The diagnostics require more scrutiny since the tests lead to false positive cases. Obviously, (30) is not comprehensive or decisive enough as a diagnostic tool, so it should be revised and refined further.

(30) Diagnostics of the ambiguity (Version 2): considering *sheep*

a. Pass the tests (4-way interpretations) – Underspecification, Homonyms

b. Fail the tests (2-way interpretations) – Homonyms

In order to refine the diagnostics, in addition to the nouns with zero-marked plurals (e.g., *sheep*, *fish*), I explore the ambiguities introduced by various functional features (mass-count, kind-existential, specific-attributive D; Moldovan 2021, Sennet 2002, Viebahn 2018), and present revised diagnostics as in (31). (The diagnostics in (31) are further revised later to distinguish polysemy and homonyms.)

(31) Diagnostics of the ambiguity (Version 3)

a. Pass the ambiguity tests – Underspecification, Polysemy (featural)

b. Fail the ambiguity tests – Homonyms (structural)

In this version, from the previous classification in (30), the homonymic ambiguity has been divided into two types: the polysemous ambiguity brought by different feature specifications (e.g., *sheep*), and the true homonymic ones brought by structural ambiguity (e.g., *bank*). This change is aimed at capturing the failed case introduced in (29), where an apparent "homonymic" word *sheep* passes the ambiguity test (and recategorizing *sheep* as "polysemy").

The ambiguity of definite expressions in English is suggestive of the existence of polysemous (featural) ambiguity. Donnellan (1966) observes two types of definite expressions, including specific (*referential* in Donnellan 1966) and attributive expressions. Consider the example in (32):

(32) The man wearing a pink polo shirt is a pickpocket.

If the speaker utters the sentence in (32) with a particular person in mind, whom she/he wants the listener to identify, the definite expression *the man* is specific. For instance, the speaker witnessed a man wearing a pink polo shirt picking the pocket of a woman. After he went away from her and faded away into the crowds, the speaker told the woman that she had gotten something stolen. The speaker found in the crowds the pickpocket, and uttered the line in (32), where *the man wearing a pink polo shirt* is meant to be *that guy over there!*.

If all the speaker knows about the man is that he always wears a pink polo shirt, the definite expression *the man* is attributive. For instance, the speaker witnessed a man wearing a pink polo shirt picking the pocket of a woman. After he went away and fled into a ball house where everyone seemed to dress themselves up, the speaker told the lady that she had gotten something stolen. The speaker suggested that she should look for the pickpocket in the ball house, and uttered the line in (32). Donnellan (1966) suggests, as in (33), that *whoever*, etc. is a test for an attributive definite expression.

(33) The man wearing a pink polo shirt, whoever he is, is a pickpocket.

Moldovan (2021) claims that the ambiguity between the two types of definite expressions is polysemy. Sennet (2002:85-86, slightly modified for simplicity) demonstrates that specific and attributive definite expressions can be conjoint, as shown in (34), where *The Prince* refers to *that* baby (specific) while (*The*) *Queen* refers to his mother, whoever she is (attributive).

(34) The Prince and Queen will die at dawn.
Context: Recently, the king secretly welcomed a queen and had a baby prince. People do not know who the queen is, but today the loyal family is throwing a ceremony to unveil the prince to the people. The speaker has been planning to assassinate all the loyal family members to incite a revolution early in the morning the next day. He points at the baby and other members of the loyal family on the stage, and utters the line above.

Assuming that the specific definite expression, but not the attributive definite expression, involves a feature [+Spe] on D[9], the distinction between these two expressions is also polysemous (featural ambiguity similar to that of the number properties of *sheep*), which is consistent with the claims by Moldovan (2021), and the judgement of (34).

With *sheep*-type nouns and definite expressions, I isolate the polysemous ambiguity from the homonymic ambiguity, as in (31), repeated here:

(35) (= 31) Diagnostics of the ambiguity (Version 3)
a. Pass the ambiguity tests – Underspecification, Polysemy (featural)
b. Fail the ambiguity tests – Homonyms (structural)

The next questions are focused on the characterization of true homonymic ambiguity, and the determination of the type of ambiguity when it passes the test. As discussed above, the homonymic type is determined by the ambiguity. If an ambiguous expression fails the test, then it is of the homonymic type. Typical homonymic expressions include *bank* as in (36), and a sentence with structural ambiguity as in (37).

(36) I went to a bank.
a. I went to a financial institution.
b. I went to a riverbank.

(37) She saw a man with binoculars.
a. She used binoculars to see a man.
b. She saw a man who held binoculars.

[9]It might be argued that various interpretations of definite expressions project different functional projections (e.g., SpePs, DefPs, RefPs, etc.). I do not follow this view since I claim that varieties of D properties are sorts of parameters. In English, definiteness is overtly marked on D, while specificity (or referentiality) is not as evident as definiteness. In Samoan, specificity is overtly marked on D by articles (Lyons 1999). In Japanese, neither definiteness nor specificity is morphologically or syntactically marked, but specificity is more dominant than definiteness in various constructions (e.g., floating numeral quantifiers; Huang and Ochi 2014, Kitahara 1993, Ochi 2012).

If two expressions constitute different structures, those are homonymic, as in (37).

I apply the analysis of the structural ambiguity to the functional projections in the nominal complex (IndP, #P, DP). To see more details on the homonymic type, I now look at kind readings and existential readings. The sentences in (38) and (39) show that, in English, kind readings and existential readings cannot be conjoint:

(38) *My beer won an award in Europe and spilt on the ground. (Viebahn 2018:758)

(39) ?The president is very nice and is always elected democratically. (Moldovan 2021:245)

In (38), as the logical subject of the first clause, *beer* refers to a certain kind of beer, to be precise, a label that the speaker made (a (sub)kind reading). As the logical subject of the second clause, *beer* refers to a specific portion of it (an existential reading). In (39), as the logical subject of the first clause, *the president* refers to an individual president. As the logical subject of the second clause, it is used as a generic expression. In either case, the ambiguous expressions, the *beer* and *president*, respectively, do not sustain the ambiguity over reduced conjunct.

If the assumption that expressions with structural ambiguity are homonyms, is on the right track, it also explains a mass-count ambiguity. As in (40), the count reading (an individual hen) and the mass reading (chicken meat) cannot be conjoint.

(40) *The chicken drank some water and _____ is tasty.

The sentence in (40) is infelicitous since the subject requirements of the predicates of each clause are contradictory. Suppose that living animals are mainly count-y, while meat is mainly mass-y (unless it refers to a whole individual body or individualized slices of meat). As the logical subject of the first clause, the *chicken* refers to a living individual animal (count reading). As the logical subject of the second clause, it is expected to refer to food (chicken meat; mass reading).

These results correctly suggest that the mass-count ambiguity is homonymic, or due to structural ambiguity. This is very straightforward, since, under the assumption in this thesis (following Borer 2005a, among many others), count and mass expressions differ structurally. Count expressions involve Ind(ividuation) phrases for countability, possibly #Ps for a singular-plural distinction, and DPs. Mass expressions lack IndPs as well as #Ps (but possibly with QPs and/or DPs). Thus, since the mass-count ambiguity of *fish* in English involves variable structures (i.e., homonymic), they do not pass the tests.

The remaining question in the current diagnostics in (35), repeated here as (41), is how to determine the ambiguity via underspecification or the polysemous (or featural) ambiguity since both types pass the tests.

(41) (= 35) Diagnostics of the ambiguity (Version 3)

a. Pass the ambiguity tests – Underspecification, Polysemy (featural)

b. Fail the ambiguity tests – Homonyms (structural)

I use negation to investigate polysemous ambiguity and ambiguity caused by underspecification, and show that the ambiguity caused by underspecification cannot be disambiguated by negation (e.g., Zwicky and Sadock 1975) or does not allow meta-linguistic negation (Rullmann and You 2006).

First, to compare polysemy and underspecification, examine (42), where *child*, whose gender feature is underspecified, is conjoint.

(42) *I didn't see a child, but in fact saw a {boy/girl}.

The example in (42) shows that the ambiguity of *child*, where gender features are underspecified, cannot be disambiguated by negation.

Next, examine (43), where *fish*, which is polysemous in terms of number features (the same structure, but featurally ambiguous), is conjoint.

(43) (?)I didn't feed his fish, but in fact fed both/all of his fish.

The example in (43) shows that the featural ambiguity of *fish* (due to singular/plural polysemy) can be disambiguated by negation. In the most natural and salient interpretation, *I didn't feed his fish* in (43) entails *I fed none of them*, which is contradictory to the second clause. However, the negation in (43) is intended to be meta-linguistic negation, where the negation takes place beyond the truth condition (see Rullmann and You 2006 for details). Although (43) is also odd due to the multiple use of *fish* in different settings, this reading is achievable by introducing a proper context and by comparing it with a clearer case: *I didn't read his book, but in fact read* ***both/all*** *of his book**s***.

Thus, considering the differences between polysemy and underspecification (which can be observed with negation), the ambiguity can be classified following the diagnostics in (44).

(44) (= 20) Diagnostics of the ambiguity (Final version)

a. Pass the ambiguity tests / Not disambiguated by negation – Underspecification

b. Pass the ambiguity tests / Disambiguated by negation – Polysemy (featural)

c. Fail the ambiguity tests – Homonyms (structural)

3.4 Ambiguity of bare nouns in Japanese

In this section, based on the diagnostics established in the previous section, as in (44), I investigate the nature of the number neutrality of General Number in Japanese. First, I demonstrate that ambiguous expressions in Japanese are compatible with the diagnostics in (44). Examine examples in (45)[10], where the ambiguity test is applied to the homonym *kaki*, which means oysters as well as persimmons.

(45) Haruko-wa kaki-o tabeta. Zin-mo _____ tabeta.
Haruko-TOP KAKI-ACC ate Zin-also _____ ate

a. Haruko ate oysters. Zin also ate oysters.

b. *Haruko ate oysters. Zin (also) ate persimmons.

c. *Haruko ate persimmons. Zin (also) ate oysters.

d. Haruko ate persimmons. Zin also ate oysters.

In (45), the target expression *kaki* is contained in the elided argument. (45) shows that two senses (i.e., "persimmon" and "oyster") of *kaki* do not allow four-way interpretations. If the first clause refers to oysters, the second clause should also refer to oysters. If the first clause refers to persimmons, the second clause should also refer to persimmons. This result is compatible with the above-mentioned diagnostics that multiple meanings of homonyms do not survive over ellipsis.

The same is true of structural ambiguity, which is also expected to not survive over ellipsis. Under the assumption in this thesis, the mass-count ambiguity is structural in that count expressions involve IndPs, whereas mass expressions do not. This prediction is borne out, as in (46), where the ambiguity of *sakana* 'fish' (which is ambiguous between individuals (count) and meat (mass)), does not survive over ellipsis.

[10]It is also possible to analyze (45) and (47) with a covert pronoun *pro* since Japanese is a pro-drop language. Since *pro* behaves in a similar way to its overt counterpart, the second clause in (45) can be paraphrased into *Zin also ate it*. In this analysis, it is clear that the sentence does not allow for four-way interpretations. However, when (45) and (47) are analyzed with argument ellipsis, it still comes to the same judgements as shown. It is commonly assumed (e.g., Takahashi 2008) that the availability of a sloppy reading indicates argument ellipsis, as shown in (i). In (i), in the sloppy reading where Haruko ate her own food while Zin ate his own food, the sentence still does not allow four way interpretations.

(i) Haruko-wa zibun-no kaki-o tabeta. Zin-mo _____ tabeta.
Haruko-TOP self-GEN KAKI-ACC ate Zin-also _____ ate

a. Haruko ate her own oysters. Zin also ate his own oysters.

b. *Haruko ate her own oysters. Zin (also) ate his own persimmons.

c. *Haruko ate her own persimmons. Zin (also) ate his own oysters.

d. Haruko ate her own persimmons. Zin also ate his own oysters.

(46) Haruko-wa sakana-o katta. Zin-mo _____ katta.
Haruko-TOP fish-ACC bought Zin-also _____ bought
(lit.) 'Haruko bought FISH. Zin bought, too.'

a. Haruko bought seafood, so did Zin.

b. *Haruko bought seafood, and Zin bought a pet.

c. *Haruko bought a pet, and Zin bought seafood

d. Haruko bought a pet, and so did Zin.

On the other hand, ambiguity caused by underspecification survives over ellipsis, as predicted by (44). Examine the Japanese example in (47), which shows that *kodomo* 'child' (which is underspecified for gender features) allows four-way interpretations.

(47) Haurko-ni-wa kodomo-ga hitori iru. Zin-ni-mo _____ iru.
Haruko-DAT-TOP child-NOM 1.CL have Zin-DAT-also _____ have

a. Haruko has a boy. Zin also has a boy.

b. Haruko has a boy. Zin has a girl.

c. Haruko has a girl. Zin has a boy.

d. Haruko has a girl. Zin also has a girl.

In (47), the sex of Haruko's child and that of Zin's child may or may not be the same. As also predicted from the diagnostics in (44), the gender feature of *kodomo* 'child' (ambiguity caused by underspecification) cannot be disambiguated by negation, as shown in (48).

(48) *Haruko-wa kodomo-o mi-nakat-ta-ga, zituwa, otokonoko-o mita.
Haruko-TOP child-ACC see-NEG-PAST-but in.fact boy-ACC saw
(lit.) 'Haruko did not see a child/children, but in fact (she) saw a boy/boys.'

The example in (48) is infelicitous since the two clauses are contradictory. Thus, the ambiguity of *kodomo* 'child' (whose gender properties are underspecified) passes the ambiguity test, as in (47), but fails to be disambiguated by negation, as in (48). These results are consistent with the diagnostics in (44), which require that the ambiguity caused by underspecification should pass the ambiguity test, whereas it cannot be disambiguated by negation.

Next, I show that bare nouns in Japanese can also be polysemy (in addition to homonyms or underspecification, as shown in (45) and (47), respectively). The example in (49) shows that different specifications of specificity survive over ellipsis. (Note that *kamikuzu* 'wastepaper' can be countable.)

(49) Sensei-wa kamikuzu-o hirotta. Sore-o mite gakusei-mo _____
teacher-TOP wastepaper-ACC picked.up that-ACC seeing student-also _____
hiroi-hajime-ta.
pick.up-begin-PAST
'The teacher picked up the wastepaper. The students also began to pick up (wastepaper).'
Context: Wastepaper was all over the floor of the classroom. The teacher found wastepaper beside the podium, and picked it up. Seeing the teacher's behaviour, students followed him, and picked up other pieces of wastepaper around them.

In (49), kamikuzu 'wastepaper' in the first clause is the specific one beside the podium, but the one in the second clause is non-specific.[11] Under the assumption that featural ambiguity is polysemous, *kamikuzu* in (49) is polysemy. This result is also compatible with the diagnostics in (44) that featural ambiguity survives over ellipsis.

I showed in the previous section that polysemous ambiguity (e.g., *fish*) survives over a conjunct and also can be disambiguated by meta-linguistic negation, whereas ambiguity via underspecification (e.g., *child*) survives over a conjunct, but is not disambiguated by meta-linguistic negation. With this, I test the number neutrality of bare nouns in Japanese, and categorize their ambiguity.

The example in (50) shows that the number neutrality of bare nouns in Japanese survives over conjunct.

(50) Kinoo boku-wa kesigomu-o katta. Haruko-mo _____ katta.
Yesterday I-TOP eraser-ACC bought Haruko-also _____ bought
'Yesterday I bought one or more erasers. Haruko bought, too (= Haruko bought one or more erasers).'

In (50), both Haruko and I may guy just one eraser, some erasers, or a number of erasers. It could be the case that Haruko bought 10 erasers while I bought just one, or that Haruko bought only one while I bought hundreds of boxes of erasers. The possibility of the cross-reference in (50), in the same way as (47), that the number neutrality of bare nouns in Japanese is not homonymic.

Next, examine (51) to see how the number neutrality of bare nouns interacts with negation.

[11] It can still be specific in Enç (1991), who discusses three types of specificity: epistemic, scopal, and partitive specificity. If the trash that the students picked up in (49) is the remnant of the trash in the classroom, it is a partitive specific description. Unless otherwise noted, however, I only consider epistemic specificity.

(51) *Haruko-wa kesigomu-o kaw-anakat-ta. Ik-ko/San-ko katta.
Haruko-TOP eraser-ACC buy-NEG-PAST 1-CL/3-CL bought
(Intended) 'Haruko didn't buy erasers. (She) bought {one/three}.'

The example in (51) shows that the number neutrality cannot be disambiguated via negation.

With (50) and (51), and with the diagnostics in (44), repeated here as (52) we can infer that the General Number in Japanese is underspecified for number, since it passes the ambiguity test, as in (50), and cannot be disambiguated by negation or does not allow meta-linguistic negation, as in (51).

(52) Diagnostics of the ambiguity (Final version)
a. Pass the ambiguity tests / Not disambiguated by negation – Underspecification
b. Pass the ambiguity tests / Disambiguated by negation – Polysemy (featural)
c. Fail the ambiguity tests – Homonyms (structural)

Last, I show that the ambiguity of the number properties of bare nouns is derived by underspecification, regardless of the types of bare nouns. As discussed more thoroughly in Section 3.5, number neutral bare nouns in Japanese are realized with two distinct structures: DP bare nouns (wide scope) and nP bare nouns (narrow scope). With this in mind, examine (53) to see how relative scope and ellipsis interact.

(53) Gakusei-tati-wa zyugyooryoo hikisage no syomei-o atumeteiru node,
student-PL-TOP tuition.fees reduction of signature-ACC collecting because
kinoo hotondo-no sensei-no ofisu-ni gakusei-ga kita. Kyoo mo ____
yesterday most-GEN teacher-GEN office-to student-NOM came today also ____
kita.
came
'Because students are collecting signatures for reducing tuition fees, one or more students came to the offices of most teachers yesterday. Today, one or more students came, too.'

In the narrow scope reading where different groups of students came to each office (each group contains one or more students), the number of students who came to each office may be just one or may be more than one, and the number of the students yesterday and today may or may not be identical. In the wide scope reading where a certain group of students (there might be just one student) visited most of the offices, the number of students who went around the offices yesterday and today may or may not be the same. Thus, bare nouns, irrespective of scope, show the same results regarding the interaction

with ellipsis. These results suggest that the number neutrality of either type of bare noun is not homonymic.

Next, examine (54), where a bare noun *gakusei* 'student' takes variable scope against negation.

(54) *Ofisu-ni gakusei-ga ko-nakat-ta. Hitori/San-nin/Minna kita.
office-to student-NOM come-NEG-PAST 1.CL/3.CL/all came
(lit.) 'One or more students did not come to (my) office. {One/three/all student(s)} came.'

Whether the bare nouns *gakusei* 'student' takes a narrow scope (no students came to the office), or a wide scope (a certain student or a group of students came to the office), it cannot interact with negation.

With the observations in (53) and (54), I claim that the nature of the neutrality is not different between these two types of bare nouns, and that both types of bare nouns are neutral in terms of number due to underspecification of number properties. In the next section, I explore how underspecification of number properties can be realized in nominal functional structures.

3.5 Sources of the Number Neutrality

With the conclusion in the previous section that the number neutrality of bare nouns in Japanese is semantic, and that the number features of bare nouns are underspecified, I now turn to determining the sources of the number neutrality in nominal architecture. As discussed in the previous sections, past literature on the nature of the number neutrality of General Number in various languages appears to reach a similar conclusion: i.e., the number neutrality is semantic (not morphosyntactic) and its number property is underspecified (e.g., Bliss 2004 for Turkish; Kramer 2015, 2017 for Amharic; Nomoto 2013 for Malay; Rullmann and You 2006 for Mandarin; Paul 2012 for Malagasy, Loewen 2011 and Sato 2009 for Indonesian, Zareikar 2018 for Azeri). However, it varies among languages (or among past studies) how to map General Number into syntactic structures: e.g., DPs without #Ps (Amharic; Kramer 2015, 2017)[12], DPs with IndPs but without #Ps (Azeri; Zareikar 2018), or NPs (Turkish; Bliss 2004).

In this section, in order to reveal the sources of the number neutrality of the bare nouns in Japanese, I introduce two types of bare nouns, that is, DP bare nouns and nP bare

[12]Note that #Ps in Kramer (2015, 2017) encompass both IndPs and #Ps in the functional structure employed in this thesis.

nouns (see Cyrino and Espinal 2015, Deprez 2005, Dobrovie-Sorin et al. 2006, among many others, for various similar claims in other languages). These two types of bare nouns pattern with indefinite DPs (e.g., *a student, some students*) and bare nominals (e.g., *students* or *shu* 'book' in Mandarin), respectively. I propose distinct structures for each type, and distinct ways to achieve number neutrality. DP bare nouns project IndPs and #Ps, where number features are not specified. nP bare nouns are structurally bare and project nPs (and lack IndPs and #Ps). In either type, bare nouns lack number specifications, thereby, number neutrality is achieved.

3.5.1 Two types of bare nouns

As discussed in the previous section, the number neutrality of bare nouns in Japanese stems from the underspecification of number properties, in a similar or the same way than number neutral bare nouns in other languages that possess General Number (e.g., Mandarin (Rullmann and You 2006)). With this, it might be assumed that bare nouns in Japanese also show properties of number neutral expressions. Crosslinguistically, bare nouns in languages with General Number and bare plurals in number languages share common properties (e.g., Armenian (Bale and Khanjian 2009), Turkish (Bliss 2004), English (Chierchia 1998a, 1998b, Carlson 1977), Hindi (Dayal 2011), Spanish (Espinal and McNally 2011), Hungarian (Farkas and de Swart 2003), Amharic (Kramer 2017), Mandarin (Rullmann and You 2006), Indonesian (Sato 2009)). For instance, bare nouns in Mandarin and bare plurals in English obligatorily take narrow scope, as in (55)[13] and (56), respectively.

(55) Ta xiang gen nianqing de xinlixuejia tantan. [Mandarin]
she wish with young MOD psychiatrist talk
a. 'She wishes to talk with young psychiatrists.' (narrow scope)
b. '*She wishes to talk with a/some young psychiatrist(s).' (wide scope)

(Rullmann and You 2006:184)

(56) I didn't see spots on the floor. (narrow scope only) (Chierchia 1998a:368)

In (55) and (56), the bare nominals can only take a narrow scope. The subject of the sentence in (55) wants to meet any young psychiatrist(s), whoever she/he is or they are. The speaker of (56) found no spots at all on the floor. (56) cannot be used in a situation where there are some spots that the speaker did not find (wide scope reading).[14]

[13] In (55), the wide scope reading (indicated with *a/some*) and its judgement are added based on the discussion in Rullmann and You (2006). Rullmann and You (2006) show that the sentence in (55) allows a definite reading (*She wishes to talk with the young psychiatrist*), which is irrelevant to the discussion here and is removed.

[14] See Le Bruyn et al. (2017) for possible flexible scope behaviours of bare plurals in English.

In addition to obligatory narrow scope, number neutral bare nominals show common properties, including kind reference, discourse anaphora, and atelic interpretations. Also, bare nominals are commonly analyzed as incorporated nominals (although it varies among languages and among the past studies which types of incorporation are claimed to involve) (e.g., Azeri (Zareikar 2018), Uzbek (Levy-Forsythe and Kagan 2020), Hindi (e.g., Dayal 2015) for languages with General Number; Brazilian Portuguese (e.g., Cyrino and Espinal 2015), French (Dobrovie-Sorin 2021) for number languages). It can be predicted that bare nouns in Japanese show these properties.

However, in contrast to bare nouns in Mandarin, as in (55), bare nouns in Japanese can take wide scope (e.g., Nakanishi and Tomioka 2004, Yoshida 2008), as shown in (57).[15]

(57) Sono byooin-wa kangosi-o sagasiteiru. (narrow or wide scope)
that hospital-TOP nurse-ACC look.for-PROG
a. Narrow: 'That hospital is looking for a nurse/nurses (to hire).'
b. Wide: 'There is a nurse/are nurses that hospital is looking for.'

(adopted from Nakanishi and Tomioka 2004:115)

On the one hand, there are common properties shared among bare nouns in the languages with General Number. On the other hand, Japanese deviates from the widely-acknowledged correlation between bare nominals and (obligatory) narrow scope that is observed in both number languages (e.g., English, Spanish) and classifier languages (e.g., Indonesian, Mandarin). To capture these two observations, I employ a dual analysis of bare nouns, where number neutral bare nouns in Japanese are realized with two distinct structures: nP bare nouns and DP bare nouns.

nP bare nouns take narrow scope, and are predicted to pattern with number neutral bare nominals in other languages (e.g., narrow scope, kind reference, atelic interpretations). DP bare nouns can take wide scope, and I claim that they are indefinite DPs.

Variable scope taking of bare nouns, as in (57) in Japanese, can also be observed with indefinite DPs in English, as shown in (58).

(58) I didn't see a spot on the floor. (narrow or wide scope) (Chierchia 1998a:368)

In contrast with bare plurals in (56), *a spot* allows either a wide scope reading (where there is a spot that the speaker did not find on the floor), or a narrow scope reading (where the speaker found no spots on the floor).

Recall that (in)definiteness or specificity is not overtly marked in Japanese. With the variable scope (that pattern with indefinite DPs in English) and the lack of overt morphology for (in)definiteness, I claim that bare nouns in Japanese that can take wide scope are

[15] See Section 3.5.3 for more details on relative scope.

DPs, in particular, specific indefinite DPs. Therefore, DP bare nouns are predicted to share properties with indefinite DPs. In Sections 3.5.3 to 3.5.7, I show that these predictions are borne out. Namely, nP bare nouns pattern with bare nominals in other languages, and DP bare nouns are specific indefinite DPs.[16]

The dual analysis, where bare nouns in Japanese are realized with two distinct structures, is also supported by the ambiguity test. As discussed in (53), repeated here as (59), the ambiguity test indicates that DP bare nouns and nPs bare nouns constitute different structures. Recall that, as discussed in Sections 3.3 and 3.4, failure to pass the ambiguity tests suggests that two ambiguous expressions are homonymic or structurally ambiguous.

(59) Gakusei-tati-wa zyugyooryoo hikisage no syomei-o atumeteiru node,
student-PL-TOP tuition.fees reduction of signature-ACC collecting because
kinoo hotondo-no sensei-no ofisu-ni gakusei-ga kita. Kyoo mo _____
yesterday most-GEN teacher-GEN office-to student-NOM came today also _____
kita.
came
'Because students are collecting signatures for reducing tuition fees, one or more students came to the offices of most teachers yesterday. Today, one or more students came, too.'

In (59), if the first clause is in the narrow scope reading where different groups of students visited each office yesterday, then the second clause should also be in the narrow scope reading. Conversely, if the first clause is in the wide scope reading where most offices were visited by the same group of students or just one specific student yesterday, then the same student(s) should go around today again. The sentences in (59) cannot be used in the situation where different groups visited the offices yesterday (narrow scope reading), while the same student(s) visited the offices today (wide scope reading).

According to the diagnostics in the previous section, the observation in (59) that the ambiguous sentences do not allow cross-reference (e.g., the narrow scope in the first clause and the wide scope in the second clause), indicates that the ambiguity is of the homonymic type. Namely, two scope interpretations involve different underlying structures. Thus, there are two types of number neutral bare nouns in Japanese, including DP bare nouns and nP bare nouns. These two types of bare nouns are realized with distinct underlying structures.

[16]There is in fact a third type, i.e., definite bare nouns. I focus on the indefinite in this thesis, unless otherwise needed.

3.5.2 Number neutrality and functional projections

With the distinct properties of DP bare nouns and nP bare nouns (that I discuss more in-depth in Sections 3.5.3 to 3.5.7), I also propose the structures in (60) for each type of bare nouns to show how differences in semantic properties of the two types are reflected on the structures, and especially how number neutrality is achieved equally in both types of bare nouns.

(60) a. DP bare nouns (wide scope) $[_{\text{DP}}\ [_{\#\text{P}}\ \emptyset_{\#}\ [_{\text{IndP}}\ \emptyset_{\text{Ind}}\ [_{\text{nP}}\ \text{n}\ \text{ROOT}\ ]]]$

b. nP bare nouns (narrow scope) $[_{\text{nP}}\ \text{n}\ \text{ROOT}\ ]$

DP bare nouns project IndPs and #Ps, where number features are not specified. nP bare nouns lack IndPs and #Ps. With the lack of number specification, both types of bare nouns achieve number neutrality.

In this section, before going into the individuation and number of bare nominals in Japanese and other languages, I briefly summarize how number neutrality can be achieved in nominal functional structures. I introduce three structures for number neutral bare nominals: (i) DPs that lack #Ps (English, Amharic), (ii) DPs with #Ps, whose number properties are not specified, and (iii) nPs (i.e., the structure lacks IndPs and #Ps) (Turkish).

3.5.2.1 Functional projections and range assignment

I first recapitulate the syntactic structures in the nominal spine that I employ in this thesis. As briefly introduced in Chapter 1, I propose a nominal architecture based on (but slightly modify) Borer's (2005a) nominal functional projections and derivations (also see Borer and Ouwayda 2010, 2021).

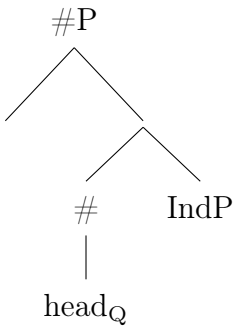
A "noun" becomes a noun by being specified as a categorial feature. It starts out as an acategorial root (or listeme for Borer 2005a), which is devoid of any specification for grammatical categories (noun, verb, etc.) or other functional features. A n head specifies the acategorial root as a noun. Alongside a category, various properties (e.g., individuation, number, definiteness/specificity) are specified on a functional head, which heads a phrase to determine its category (i.e., label), through the derivation. For instance, number features are specified on the # head by various elements to make the nominal a quantity expression. The functional head # merges with an IndP to form #P.

Following Borer, I use the term *assign range* and *range assignment* in addition to *specify a feature/property* and *specification*. Under this assumption, functional heads are considered to be open values, and their range is assigned by different range assigners. There

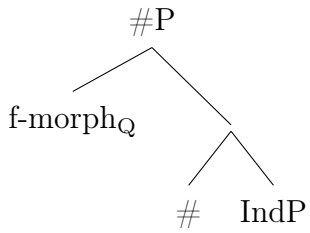
are three ways proposed to assign range as in (61): head features (involving movement), f-morphs, and indirect range assignment. The descriptions in (61) take quantification for instances, which takes place at the level of #Ps.[17]

(61) Range assignment (adopted from Borer 2005a:36)

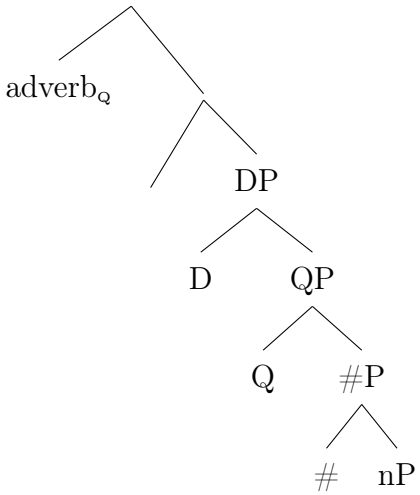
a. Head feature



b. f-morph



c. Indirect



[17] The nominal functional projections (or labels) employed in Borer (2005a) and in Borer and Ouwayda (2010) are modified to those employed in this thesis (IndPs, #Ps, QPs, DPs). Borer (2005a) uses Div(ision) Phrases for individuation in this thesis, while Borer and Ouwayda (2010) use Cl(assifier) Phrases instead. Since I use classifiers for both individuating classifiers and non-individuating classifiers in Chapter 5, I avoid using ClPs, and instead use IndPs.

Also, a phrase-internal structure is simplified from Borer (2005a). I return to nominal structures in Chapter 5, where I go into the properties of the specifier position(s).

As schematized in (61a), when a head feature Q assigns range to the functional head #, the noun head undergoes head movement if the head feature needs to be phonologically realized. Borer (2005a) argues that this type of quantification is not available in English, but it is attested in singulars in Hebrew. As in (61b), range of quantification can also be assigned by "independent grammatical functional formatives" (p.31), i.e., f-morphs, such as quantifiers (e.g., *many*, *much*, *three*, etc.) and articles (*a*, *the*). Since f-morphs are free morphemes, the lexical head does not move up to the #P level (unless there are other reasons to move). Conversely, functional heads may be left unspecified within the phrase. In such a case, the functional head should be assigned range indirectly from outside. For instance, as in (61c), adverbs of quantification (e.g., mostly) assign range to the # head or the Q head. Since there is no head feature in (61c) to lead the movement of the noun, it does not move. In this thesis, I largely leave out this type of range assignment system, although it is widely attested for nominal functional heads in English and in Japanese (e.g., adverbs of quantification, existential closure, generic operator).

3.5.2.2 Individuation and number

Several proposals from different theoretical perspectives have been submitted on the syntax of number and the grammaticized mass-count distinction. Of particular importance here is what (or how many) functional projections are involved for those properties. Since Ritter (1991), it is fairly common to include the # projection (or its kin; e.g., Num(ber)P) in nominal architecture as the locus of number specification, as well as the locus of the grammaticized mass-count distinction. Gebhardt (2009) and Kramer (2015) develop a feature-based analysis of number and the mass-count distinction. Gebhardt (2009) assumes the [group] feature (the feature for number specification) on the plural marker *-s* in English, which entails the presence of the [indiv(iduation)] feature. Namely, under the analysis in Gebhardt (2009), *-s* plays a role in both individuation and number in English.[18] In contrast, Borer (2005a) separates the specification of number from the grammaticized mass-count distinction (individuation). In such a view, plural markers individuate nouns, and individuating plurals do not specify number properties (Borer 2005a). The structures of count and mass nouns in English following this claim (and also in this thesis) are schematized in (62).

(62) a. *three books* $[_{DP}\ [_{\#P}$ *three* $[_{IndP}$ *book*.IND $[_{nP}$ ~~*book*~~]]]]

b. *too much wine* $[_{DP}\ [_{QP}$ *too much* [Q $[_{nP}$ *wine*]]]]

[18] For classifier languages, Gebhardt (2009) assumes distinct functional projections for each of the [indiv] and [group] features, the former of which is realized as classifiers.

In (62a), the head feature IND (whose phonological realization is *–s*; DIV in Borer 2005a) assigns range for individuation. The boundness of *-s* or its feature IND leads the lexical head to move to the IndP level to be spelt out as *books*. Above the IndP, the f-morph *three* assigns range to the # head. The lack of the Ind projection indicates that the nominal is mass, as in (62b). Mass quantity expressions are realized with QPs (Borer and Ouwayda 2010).

3.5.2.3 Bare plurals and number neutrality

Numerals specify the number property on # in (62a), not the plural marker. Namely, individuated nouns without number specifications in English (i.e., bare plurals) are number neutral. English bare plurals show the number neutrality in downward entailment contexts (negation, question, conditional). For instance, bare plurals are inclusive in a question, including one (or even smaller) in their interpretations (Krifka 1989), as in (63) and in negation, as in (64).

(63) a. A: Do you have children?
B: Yes, I have one child. /*No, I have (only) one child.

b. A: Did you eat apples today?
B: Yes, I ate half an apple. /*No, I ate (only) half an apple.

(64) *I don't have children. I only have one child.

In (63a) and (64), the bare plural *children* refers to one or more children rather than more than one child. Similarly, *apples* in (63b) refers to one or more apples rather than more than one apple. The answers excluding one render them ungrammatical. I consider the inclusive plural interpretation to be number neutrality.

In other contexts (e.g., upward entailment contexts), bare plurals are apparently not number neutral, as shown in (65). I follow Sauerland (2003) and Zweig (2009), however, in that bare plurals are number neutral, and number sensitive interpretations, as in (65), are derived from it pragmatically.

(65) Service dogs are available to help you. {*It/they} are all well trained.

Following Borer (2005a:130), I employ the structure in (66) for bare plurals in English, which lacks #Ps, thereby achieving number neutrality.

(66) cats $[_{\text{DP}}\ [_{\text{IndP}}$ *-s* $[_{\text{nP}}$ *cat* $]]]$

3.5.2.4 A null Ind head

In addition to plural markers, Borer (2005a) introduces various individuators among languages other than plural markers: *the* and *a(n)* in English, and numerals in Hungarian, etc. (See Mathieu 2012 for more varieties of individuators.) Borer also introduces a null Ind head for singulars in Hebrew. (See below for details.) Extending from the idea that individuation can be done by a null head, Zareikar (2015, 2018) argues that bare nouns in Azeri involve a null Ind head when bare nouns have count readings. The structure for *alma* 'an apple/apples' in (67) is presented in (68), based on the discussion in Zareikar (2018, 2018).[19]

(67) Alma dər-di-m. [Azeri]
apple pick-PAST-1.SG
'I picked an apple/apples.' (Zareikar 2018:2)

(68) alma 'an apple/apples' $[_{\text{IndP}}\ \emptyset_{\text{Ind}}\ [_{\text{nP}}\ \textit{alma}\ ]]$

Applying an analysis with a null Ind head in Zareikar (2018), there are two ways to achieve number neutrality. It is possible to assume that a null Ind head is the covert counterpart of a plural marker in English. If this is the case, *alma* 'an apple/apples' in Azeri in the number neutral reading is structured as in (69).

(69) alma 'an apple/apples' $[_{\text{DP}}\ [_{\text{IndP}}\ \emptyset_{\text{Ind}}\ [_{\text{nP}}\ \textit{alma}\ ]]]$

In (69), individuation is done by the null Ind head, but the structure lacks the #P. Because of the lack of number specification, it yields a number neutral interpretation, in the same way as (66) in English. This is the first way that bare nouns achieve number neutrality. In this way, bare nouns should show properties of individuation.

Alternatively, number neutrality can also be achieved with #Ps that lack number specifications, as in (70), adopted from Borer (2005a:130).

(70) alma 'an apple/apples' $[_{\text{DP}}\ [_{\#\text{P}}\ \emptyset_{\text{Ind}/\#}\ [_{\text{IndP}}\ \emptyset_{\text{Ind}/\#}\ [_{\text{nP}}\ \textit{alma}\ ]]]$

In (70), individuation and number are specified by the same null head $\emptyset_{\text{Ind}/\#}$. Such double range assignment by a covert head is analogous to singulars in Hebrew.

Borer (2005a) proposes a distinct mechanism to create singulars from a mechanism to create plural expressions. Whereas plural features are specified quantifiers or plural demonstratives in English, singulars are realized with a particular configuration on the range assignment. Examine the structure and derivation shown in (71), where the determiner or quantifier (e.g., *a/the*, *each*; described as D/Q) starts its derivation from the Ind

[19] For a similar claim on a null Ind head, see Cowper and Hall (2012) and Wilhelm (2008).

head, and assigns a range to the Ind head. It then undergoes a lexical head movement to assign range to the # head.

(71) $[_{\text{DP}}\ [_{\#\text{P}}\ \text{D/Q}_{\text{IND}/\#}\ [_{\text{IndP}}\ \sout{\text{D/Q}_{\text{IND}/\#}}\ [_{\text{nP}}\ \text{N}\ ]]$

For Borer, the identity of range assignment at Ind and # results in a singular interpretation.[20] For instance, in the phrase *the cat*, the determiner *the* assigns range to both Ind and #, thereby achieving a singular interpretation.

Meanwhile, range assignment to # with a covert head is not attested in English. It is attested in Hebrew, however. Borer (2005a) demonstrates that singulars in Hebrew are derived with a null head ("abstract head feature" or DIV in Borer 2005a) as well as double range assignment at Ind and #. The example in (72) shows the bare singular in Hebrew.

(72) 'etmol nolad tinoq ba-škuna. [Hebrew]
yesterday born.PASS.PAST baby in-the.neighbourhood
'A baby was born in the neighbourhood yesterday.' (Borer 2005a:201)

Tinoq 'baby' receives a specific indefinite reading here. In contrast to bare nouns in Japanese or Mandarin, *Tinoq* 'baby' in this example only allows a singular reading. To elucidate the derivation of bare singular, Borer (2005a) assumes a null head, as in (73).

(73) tinoq 'baby' $[_{\text{DP}}\ [_{\#\text{P}}\ \textit{tinoq}.\emptyset_{\text{Ind}/\#}\ [_{\text{IndP}}\ \sout{\textit{tinoq}}.\emptyset_{\text{Ind}/\#}\ [_{\text{nP}}\ \sout{\textit{tinoq}}\ ]]]]$

The null head $\emptyset_{\text{Ind}/\#}$ starts out at the Ind head. The lexical head *tinoq* 'baby' moves to it, where the null head individuates the noun, and further to the #P together. Borer (2005a) claims that this double range assignment to Ind and # leads to a singular interpretation. In contrast to the singular determiners and quantifiers in English in (71), the abstract head feature as a weak indefinite marker in Hebrew is also covert, and is not spelt out phonologically at the end of derivation. Putting aside the lexical head movement of the nouns, the null heads in (70) and (73) both serve for double range assignment at Ind and #.

Extending the analyses in Borer (2005a), I assume that interpretations (singular or plural) derived through double range assignment by a null head are parameterized. Regarding the approaches to number specifications, there exist (at least) two types of languages. As discussed in Wiltschko (2008), languages like English and Hebrew show singular-plural distinction with bivalent features [+/-PL]. In the [+/-PL] languages, the absence of [+PL] necessarily implies the presence of [-PL] as far as #Ps are projected, and

[20]For completion, the determiner or quantifier further moves to D to assign a range to D (dropped in (71) for ease of exposition).

[-PL] results in the singular interpretation. Singular nouns involve IndPs as well as #Ps. That singular markers (*a/an, one, each, every, this*) assign a range to # (i.e., in the absence of the [+PL] feature), necessarily implies that Ind is also assigned range by them. Thus, double range assignment and singular interpretations show a correlation on the surface, which is a realization of [-PL]. The nominal causes number neutral interpretations if #Ps are not projected as in bare plurals in (66).

On the other hand, languages including Halkomelem and Korean (as discussed in Chapter 4) do not show singular-plural distinction as the dominant number system in the language, and unmarked forms (i.e., in the absence of the monovalent [PL] feature) result in the number neutral interpretation (General Number). In Korean, the lack of [PL] on # implies that its number feature remains unspecified (unless the element on Ind or n carries the optional [PL] feature specified by, e.g., determiners or quantifiers), even though the noun is count (where IndPs are projected). This is how the structure and derivation in (70), repeated here as (74), are derived.

(74) alma 'an apple/apples' $[_{\text{DP}}\ [_{\#\text{P}}\ \emptyset_{\text{Ind}/\#}\ [_{\text{IndP}}\ \emptyset_{\text{Ind}/\#}\ [_{\text{nP}}\ \textit{alma}\ ]]]$

Thus, the structure and derivation in (74) are the second way that bare nouns achieve number neutrality. In this way, bare nouns should show properties of individuation, and should create individuals (although number specification (singular or plural) is still not specified).

The third way to achieve number neutrality is through a total lack of individuation and number. Bliss (2004) proposes the structure in (75) for number neutral bare nouns in Turkish.

(75) kitap 'book' $[_{\text{np}}\ \textit{kitap}]$

Bare nouns without IndP or #Ps, as in (75), refer to kinds, thereby interpreted as General Number.

Thus, there are three structures where bare nouns achieve number neutrality, as summarized in (76).

(76) Three structures for number neutrality

		Ind	#
1	Covert Ind and #	$\emptyset_{\text{Ind}/\#}$	$\emptyset_{\text{Ind}/\#}$
2	Covert Ind	$\emptyset_{\text{Ind}}$	Lack
3	Lack Ind and #	Lack	Lack

In Section 3.5.3 to 3.5.7, I show the properties of DP bare nouns and nP bare nouns, and propose that DP bare nouns employ the type 1 in (76), whereas nP bare nouns employ the type 3 in (76).

To close this section, I leave a note on discrepancies between interpretations and syntactic structures. Although General Number does have a plural interpretation, it does not guarantee the presence of an individuator (IndP) or a plural marking (#P). For instance, *furniture* in (77) is neutral in terms of number both semantically and morphosyntactically.

(77) John arranged the furniture. (Grimm and Levin 2012:12)

Simply put, John might have arranged one piece of furniture, a set of a kitchen table and chairs, or hundreds of desks and chairs to open a school. The features of number are not marked morphsyntactically, either. *Furniture* in (78) normally yields a "plural" interpretation, since the verb *list* requires multiple entities.

(78) Ed listed the furniture in the dining room. (Grimm and Levin 2012:10)

Also, *(too) much furniture* shows in a clearer way that grammatically mass nouns allow (or even require) a plural interpretation. The phrase surely induces the impression of many pieces of furniture, although the nominal complex itself does not involve individuation syntactically.

Conversely, while a kind reading is often linked to General Number (Chierchia, 1998a, Rullmann and You, 2006), bare plurals in Borer (2005a) require individuation when count nouns have a kind interpretation (*books*, *tigers*, etc.; cf. *furniture*, *water*). Nevertheless, such an interpretation does not cover the singular-plural distinction either syntactically or semantically (unless the noun denotes subkinds, which are the realization of kinds). Therefore, empirical facts are required to argue for or against the existence of the Ind head for General Number.

3.5.3 Relative scope

In this and the next four sections, I catalogue the properties of nP bare nouns and DP bare nouns, and show their similarities to number neutral bare nominals in other languages (which are structurally bare) and indefinite DPs, respectively. With these observations, I also propose nominal functional projections of these two types of bare nouns, and show how number neutrality is achieved in each structure.

As briefly discussed in Section 3.5.2, bare nouns in Japanese deviate from the well-known correlation between bare nominals and narrow scope. Recall the example in (79).

(79) I didn't see spots on the floor. (narrow scope only) (Chierchia 1998a:368)

The example in (79) can only be used in a situation where the speaker found no spots (narrow scope reading), but cannot be used in a situation where there is a certain spot

that the speaker did not find (wide scope reading). In contrast, the Japanese counterpart to (79) allows either a narrow scope reading or a wide scope reading (in a much lesser degree, though), as shown in (80).[21]

(80) Haruko-wa yuka no simi-o mi-nakat-ta. (narrow or wide scope)
Haruko-TOP floor of spot-ACC see-NEG-PAST
a. Narrow: 'Haruko did not see spots on the floor.'
b. Wide: '(?)There was a spot/were spots that Haruko did not see.'

Similarly, bare plurals in English obligatorily take narrow scope against intentional verbs (e.g., *want*, *look for*, etc.), as shown in (81),

(81) Miles wants to meet police officers. (narrow scope only)

To be specific, the example in (81) only allows a narrow scope reading where Miles wants to meet police officers, whoever they are, but does not allow a wide scope reading where there are police officers that Miles wants to meet. On the other hand, bare nouns in Japanese allow both wide and narrow scope readings against these verbs, as shown in (82) and (83).

(82) Sono byooin-wa kangosi-o sagasi-teiru. (narrow or wide scope)
that hospital-TOP nurse-ACC look.for-PROG
a. Narrow: 'That hospital is looking for a nurse/nurses (to hire).'
b. Wide: 'There is a nurse/are nurses that hospital is looking for.'

(Nakanishi and Tomioka 2004:115)

(83) Haruko-wa keisatukan-ni ai-tagat-teiru. (narrow or wide scope)
Haruko-TOP police.officer-DAT meet-want-PROG
a. Narrow 'Haruko wants to see police officers.'
b. Wide 'There is a police officer/are police officers that Haruko wants to see.'

Thus, bare nouns in Japanese allow wide scope readings. In those readings, bare nouns are the specific indefinite, and hence, project DPs (see Cyrino and Espinal 2015 for a similar observation and claim in Brazilian Portuguese).

[21] (?) is added to the wide scope reading in (79), as Yoshida (2008) judged a similar sentence to be unacceptable. Yoshida (2008) claims that bare nouns in Japanese do not take scope over negation. However, the speakers I consulted all judged the wide scope reading in (80) to be acceptable, although the narrow scope reading is more natural than the wide scope reading.

Whether or not bare nouns in Japanese take scope over negation, the variable scope taking of bare nouns in Japanese is observed in a sentence with intentional verbs, as in (82) (Nakanishi and Tomioka 2004). Yoshida (2008) agrees with the judgement in (82).

As Rullmann and You (2006) point out, a wide scope (specific) indefinite reading should not be confused with a definite reading, since bare nouns in Japanese (as well as in Mandarin as pointed out in Rullmann and You 2006) also allow a definite reading, as shown in (9), repeated here as (84).

(84) Tiisana kyoositu no mae de gakusei-ga tugi no zyugyoo-o matteiru.
small classroom of front at student-NOM next of class-ACC waiting
Gakusei-wa sumaho-de konsyuu no kadai-o kakuninsiteiru.
student-TOP smartphone-with this.week of assignment-ACC checking
'A student/students is/are waiting for the next class in front of the small classroom. The student(s) is/are checking the assignment(s) this week.'

In (84), the second instance of *gakusei* is definite, referring back to the first instance of it in the first sentence.

I evade the caveat by Rullmann and You (2006) that definite and specific (wide scope) indefinite expressions should not be confused, by showing that bare nouns in Japanese can take an intermediate scope. It is widely observed, as in (85), that the indefinite can take the intermediate scope as well as the widest and narrowest scopes (Abusch 1993, Borer 2005a, Kratzer 1998; but also see Fodor and Sag 1982).

(85) Every professor rewarded every student who read a book he recommended.
ok Narrowest / ok Widest / (?)Intermediate (Borer 2005a:147)

The sentence in (85) is marginally acceptable in a situation where "every professor selected a specific book for the reading of which he rewarded students, but that book was not necessarily the same for all professors" (the intermediate scope reading; Borer 2005a:146). Kurafuji (2019:9) shows that bare nouns allow an intermediate scope reading in Japanese as well:

(86) Taitei-no zyosei kyaku-wa, dezaato-ga oisi-kereba, yorokob-u.
most-GEN female customer-TOP dessert-NOM delicious-COND be.pleased-PRES
'Most female customers will be happy if a dessert is delicious.'
ok Narrowest / ok Widest / ok Intermediate

The examples in (86) are true in a situation where "each female customer orders a different dessert, and most of them are happy if the particular dessert that each of them ordered is delicious (and they each don't care about the desserts the others ordered" (the intermediate scope reading; Kurafuji 2019:9).

Provided that the indefinite can take the intermediate scope as in (85) and that the definite only takes the wide(st) possible scope, the availability of the intermediate scope

in (86) indicates that the bare noun *dezaato* 'dessert' can be the wide scope indefinite. The variable scope readings of bare nouns in (80), (82), and (83) are thus also valid, and differentiate Japanese from English (where bare plurals obligatorily take narrow scope). As expected, bare plurals in English cannot allow the widest or intermediate scope readings, as shown in (87).[22]

(87) Every professor rewarded every student who read books he recommended.
ok Narrowest / *Widest / *?Intermediate (Borer 2005a:147)

Slucing, which is often used as a diagnostic for indefiniteness, also indicates that the bare nouns in a wide scope reading in (82) and (83) are indefinite, as shown in (88) and (89), respectively.

(88) Sono byooin-wa kangosi-o sagasi-teiru-ga, dono kangosi-ka siranai.
that hospital-TOP nurse-ACC look.for-PROG-but which nurse-Q know-NEG
'That hospital is looking for a nurse/nurses, but I don't know which one(s).'

(89) Haruko-wa keisatukan-ni ai-tagat-teiru-ga, dono keisatukan-ka
Haruko-TOP police.officer-DAT meet-want-PROG-but which police.officer-Q
sir-anai.
know-NEG
'Haruko wants to see a police officer/police officers, but I don't know which one(s).'

In these examples, the second clauses force the bare nouns (*kangosi* 'nurse' and *keisatukan* 'police officer', respectively) in the first clauses to take wide scope and also to be indefinite. Also, note that the bare nouns are still number neutral.

Thus, number neutral bare nouns in Japanese take variable scope. Wide scope bare nouns are the specific indefinite, and hence, project DPs.

3.5.4 Kinds

Bare nouns in Japanese allow singular or plural readings, as shown in (90), thereby those are called General Number (Corbett 2000).

(90) Gakusei-ga kesigomu-o katta.
gakusei-NOM eraser-ACC bought
'A student/Students bought an eraser/erasers.'

[22]The judgement of the intermediate reading is altered from ?? (Borer 2005a) to *?, following Borer's discussions and the marking convention in this thesis.

One important fact in (90) is that the bare nouns are not just used in the number neutral interpretation, but they are also used as arguments by themselves in the subject and the direct object position, respectively. As in its literal translation, i.e., **Student bought book*, English does not allow bare singular arguments (with some exceptions as in *go to school*). Chierchia (1998a) argues that number neutrality and argumenthood, the two properties of General Number, have their basis in the kind denoting nature of nouns in languages like Mandarin and Japanese. Chierchia's (1998a) oft-cited Nominal Mapping Parameter classifies languages by the behaviour of their bare nouns: an argumental noun is kind denoting with a mass extension, while a predicative noun denotes a property. In languages with a [+arg, -pred] setting (e.g., Mandarin, Japanese, and other classifier languages), bare nouns can act as arguments freely and are thus kind denoting. Chierchia (1998a:354) lists four key properties of languages of this type: (i) generalized bare arguments, (ii) the extension of all nouns is mass, (iii) no plural morphology, and (iv) generalized classifier system. In a [+arg, + pred] setting, such as in English and other Germanic languages, the [+arg] nouns denote kinds, and the [+pred] nouns denote entities. Bare forms of the [+pred] nouns cannot be arguments, but instead their bare plural forms refer to kinds and can be arguments (Carlson 1977). There is a third type apart from the above-mentioned two settings under the analysis of the Nominal Mapping Parameter, namely, a [-arg, +pred] setting. Languages like Romance languages do not allow bare nominal arguments, and always require the existence of a determiner (be it overt or covert) in order for a noun to be argumental.

I partially follow Chierchia (1998a) in that narrow scope bare nouns in Japanese, as well as bare plurals in English, denote kinds. I deviate from Chierchia, however, and argue that bare nouns in Japanese are surface instantiations of two distinct underlying structures. Namely, DP nouns (wide scope) are full DPs, equivalent to indefinite DPs headed by *a* or *some* in English, whereas nP bare nouns (narrow scope) are bare structurally, and project nPs.

Here, I summarize the similarities and differences between bare nouns in Japanese and bare plurals in English. First, as introduced in (90) as well as in Chierchia (1998a), Japanese bare nouns are argumental. So are English bare plurals, as in (91).

(91) a. Dogs are barking all night.
b. Computers route modern planes (Chierchia 1998a:367)

Second, bare nouns in Japanese, as well as bare plurals in English, allow kind readings, as shown in (92) and (93), where the bare noun in Japanese and the bare plural in English, respectively, are compatible with the kind-denoting predicate *zetumetu-suru*/*extinct*.

(92) Zou-wa zetumetu-sita.
elephant-TOP extinct-did
'Elephants are extinct.'

(93) Dodos are extinct.

It is well-known that English bare plurals also allow existential interpretations, as in (94), in which the bare plural *firefighters* is ambiguous as to whether it is used in a kind reading or in an existential reading.

(94) Firefighters are available.

I follow Carlson (1977) in that existential interpretations are not properties of bare plurals themselves, but are derived from quantifiers introduced by the predicates.

On the other hand, however, DP bare nouns (wide scope) in Japanese do not allow the kind reading. Consider (95) and (96) to see what the bare noun *kyooryuu* 'dinosaur' refers to.

(95) Kyooryuu-ga zetumetusi-nakat-ta.
dinosaur-NOM extinct-NEG-PAST
a. Wide: 'There were some dinosaurs that were not extinct.'
b. Narrow: 'Dinosaurs aren't extinct.' (Kinds)

(96) Kyooryuu-ga hotondo-no tairiku-de zetumetu-sita.
dinosaur-NOM most-GEN continent-in extinct-did
a. Wide: 'There were some dinosaurs that were not gone from most continents.'
b. Narrow: 'In most continents, dinosaurs were extinct.'

In (95), in the wide scope reading, where there were one or more subkinds of dinosaurs that were not extinct, *kyooryuu* 'dinosaur' refers to subkinds. Similarly, in (96), *kyooryuu* 'dinosaur' refers to subkinds in the wide scope reading.

Thus, I argue that nP bare nouns (narrow scope) in Japanese, but not DP bare nouns (wide scope), refer to kinds, akin to English bare plurals. I consider this to be another piece of supporting evidence to claim that there are two types of bare nouns in Japanese.

I also claim that wide scope bare nouns are DPs, and that following Deprez (2005) and Nomoto (2013), subkinds are an instantiation of an object reading derived from a kind reading. Namely, subkind reading involves individuation. With this, I claim that DP bare nouns (wide scope) project IndPs as well as DPs.

3.5.5 Telicity

In English, types of nominal expressions determine the telicity of a verb phrase. Compare the examples in (97a, c) from Yoshida (2008:421) and (97b) from the discussion in Borer (2005b).

(97) a. Bill ate an apple in one minute/*for one minute.
b. Bill ate some apples in one minute/*for one minute.
c. Bill ate apples *in one minute/for one minute.

Indefinite nouns, as in (97a) and (97b), lead the verb phrase to be telic, as it can be modified by an adverbial phrase *in one minute*, which targets a bounded event. Bare plurals, as in (97c), lead the verb phrase to be atelic, as those can be modified by an adverbial *for one minute*, which targets an unbounded event.

Borer (2005b) points out that indefinite plurals (97b) require individuals, whereas bare plurals (97c) do not. Namely, in (97b), Bill necessarily eats at least one apple, whereas, in (97c), Bill might eat some apples, or just eat chunks of apple. With this, Borer (2005b) argues that bare plurals do not create individuals (thereby those are number neutral), and singulars or their plurals are created at the # level, which she argues bare plurals lack.

The observations in Borer (2005b) that the indefinite brings a telic interpretation and creates individuals, while narrow scope bare nominals (bare plurals in English) bring an atelic interpretation and do not create individuals, are replicated in Japanese, as shown in (98). Recall that DP bare nouns (wide scope) are indefinite DPs, whereas nP bare nouns take narrow scope and pattern with bare plurals in English.

(98) a. Bill-wa ip-pun-de ringo-o tabe-ta.
Bill-TOP one-minute-in apple-ACC eat-PAST
'Bill ate an apple/some apples in one minute.'
b. Bill-wa ip-pun-kan ringo-o tabe-ta.
Bill-TOP one-minute-for apple-ACC eat-PAST
'Bill ate apple for one minute.'

(Yoshida 2008:422)

In (98a), *ippunde* 'in one minute' indicates a telic interpretation. In this interpretation, the bare noun *ringo* 'apple' does imply the existence of one or more apples. This indicates, in a similar way to the indefinite in English as in (97a, b), that the bare noun in (98a) is indefinite DPs. In (98b), *ippunkan* 'for one minute' indicates an atelic interpretation. In this interpretation, the bare noun *ringo* 'apple' does not imply the existence of one apple

or more. This indicates. in a similar way to bare plurals in English, as in (97c), that the bare noun in (98b) is a narrow scope bare noun (nP bare noun).

Crucially, the number of apples in (98a) is still unknown, although it implies individuals. This indicates that DP bare nouns (wide scope) may refer to individuals, but can still be number neutral. On the other hand, nP bare nouns (narrow scope) are number neutral without creating individuals. These observations are compatible with the proposals for the functional structures of bare nouns. Wide scope bare nouns are indefinite DPs, and project IndPs, #Ps, and DPs. Although they project IndPs and #Ps, (thereby creating individuals), their number features are not specified at #Ps (thereby achieving number neutrality). This structure is analogous to bare singulars in Hebrew, where a null head assigns range to both Ind and #, as discussed in Section 3.5.2. On the other hand, nP bare nouns, which project nPs, but lack IndPs and #Ps, which also yields the number neutrality.

3.5.6 Discourse anaphora

Wide scope and narrow scope bare nouns behave differently as to how they interact with pronouns. In Brazilian Portuguese, as shown in (99) and (100), the narrow scope bare nouns, which are used as a complement of the verb *have*, cannot be referred back to by entity-denoting pronouns (*ela* 'it', or *elas* 'them'), while bare nouns with other verbs can.

(99) O João tem maçã. Comprou {ø/#ela/#elas} ontem.
the João has apple bought ø/it/them yesterday
'João has an apple (João is an apple-haver). He bought apples yesterday.'

(100) O João correu maratona este ano, e depois criticou {ø/ela/elas}.
the João ran marathon this year and then criticized ø/it/them
'João ran the marathon/marathons this year, but then he criticized it/them.'

(Brazilian Portuguese; Cyrino and Espinal 2015:488)

With these distributions, Cyrino and Espinal (2015) claim that bare nouns are NPs (taking narrow scope) when they are used as a complement of the verb *have*, while with other verbs, bare nouns project DPs (taking wide scope). The example in (101) shows that a similar observation is possible in Japanese.

(101) Gakusei-tati-wa zyugyooryoo hikisage no syomei-o atumeteiru node,
student-PL-TOP tuition.fees reduction of signature-ACC collecting because
hotondo-no sensei-no ofisu-ni dansi-gakusei-ga kita. Sensei-tachi-wa
most-GEN teacher-GEN office-to male-student-NOM came teacher-PL-TOP

sorezore {ø/kare-no/karera-no} hanasi-o kiita.
each ø/he-GEN/them-GEN talk-ACC listened
'Because students are collecting signatures for reducing tuition fees, one or more male students came to the offices of most teachers. Each teacher listened to them.'

a. Narrow scope (most > student): ø/*kare/#karera

b. Wide scope (student > most): ø/kare/karera

When the bare noun *dansi-gakusei* 'male student' takes a narrow scope against the quantifier *hotondo* 'most', the bare noun cannot be referred back to by *kare* 'he'. *Karera* 'they' is possible but refers to the whole group of male students who came to someone's office, and does not refer to each group of male students who came to the office of a teacher. On the other hand, when the bare noun *dansi-gakusei* 'male student' takes a wide scope against *hotondo* 'most', overt pronouns as well as a null pronoun can be used to refer back to the bare noun. Thus, DP bare nouns (wide scope), but not nP bare nouns (narrow scope) can be referred back to by entity-denoting pronouns (e.g., *he, they*).

Note that the unacceptability in (101a) does not stem from indefinite expressions themselves. Indefinite expressions with numerals allow either type of pronoun, as shown in (102).

(102) Hotondo-no sensei-no ofisu-ni {hitori-no/ hutari-no} dansi-gakusei-ga kita.
most-GEN teacher-GEN office-to 1.CL-GEN/ 2.CL–GEN male-student-NOM came
Sensei-tachi-wa sorezore {ø/kare-no/karera-no} hanasi-o kiita.
teacher-PL-TOP each ø/he-GEN/them-GEN talk-ACC listened
'One student /Two male students came to the offices of most teachers. Each teacher listened to them.'

As in (102), whether the noun *dansi-gakusei* 'male student' takes a wide scope or a narrow scope against *hotondo* 'most', it can be referred back to by overt pronouns as well as a null pronoun.

In English, although, as in the translation in (100), a bare plural can be an antecedent of *they/them*, a similar observation to (99) and (102) can be found in other constructions in English as well. For instance, English bare plurals do not interact with pronouns. Compare examples in (103).

(103) a. John is trying to find some police officers and Mary is trying to find them, too.

b. John is trying to find police officers and Mary is trying to find them, too.

(adopted from Chierchia 1998a:370)

In (103a), the pronoun *them* in the second clause requires the indefinite *some police officers* in the first clause to scope over *try*. (103a) is used in a situation where John has some police officers in mind (wide scope), but it cannot be used in a situation where John is trying to find any police officers, whoever they are (narrow scope). The bare plural in (103b), however, is not affected by the pronoun, and still takes the narrow scope. In Japanese, as shown in (104) and similar to (100) and (103a), the pronoun *karera* 'them' forces the bare noun *keisatukan* 'police officer' to take wide scope.

(104) Hanako-wa keisatukan-ni aitagatteiru. Zin-mo karera-o
Hanako-TOP police.officer-DAT meet-want-PROG Zin-also them-ACC
sagasiteiru.
look.for-PROG
'Hanako wants to meet (some) police officers. Zin is also looking for them.'

With the contrast in referencing by pronouns, I claim following Cyrino and Espinal (2015) that wide scope bare nouns are DPs, which can be referred back to by entity-denoting pronouns, whereas narrow scope bare nouns are nPs.

3.5.7 Noun/Head Incorporation

As well as reference to kinds, bare nouns are also commonly regarded as incorporated or pseudo-incorporated nominals (Baker 1988 and subsequent works for Mapudungun, Espinal 2010 for Catalan, Levy-Forsythe and Kagan 2020 for Uzbek, Massam 2001 for Niuean, Paul 2009, 2012 for Malagasy, Zareikar 2018 for Azeri, Luo 2022 for Mandarin). In this and the next sections, I investigate whether bare nouns exhibit the morphosyntactic and semantic properties of various types of incorporation. In this section, I claim that bare nouns are not head-incorporated nominals. In the next section, I claim that bare nouns do not show properties of pseudo-incorporated nominals, and that the narrow scope bare nouns, but not the wide scope bare nouns, show the properties of semantic incorporation (Farkas and de Swart 2003, van Geenhoven 1998).

First, I show that number neutral bare nouns (case-marked) do not show the properties of incorporated nominals. I compare case-marked bare nouns with verbal nouns (VNs; nouns describing an event and showing argument taking properties; e.g., *benkyoo* 'study'). I show that VNs are incorporated nominals, and exhibit differences in syntactic and semantic properties from bare nouns.

Baker (1988) and his subsequent works (but also see Baker 2014) analyze bare nouns adjacent to a verb in Mapudungun (Araucanian; Chile, Argentina) as incorporated nominals. Consider (105) and (106) that show *waka* 'cow' as an incorporated nominal and an

incorporated nominal, respectively.

(105) Ñi chao kintu-le-y ta-chi pu waka. [Mapundungun]
my father seek-PROG-IND.3sS the-ADJ COLL cow
'My father is looking for the cows.' (Baker 2009: 149, citing Salas 1992:195)

(106) Ñi chao kintu-waka-le-y.
my father seek-cow-PROG-IND.3sS
'My father is looking for the cows.' (Baker 2009:149)

In (105), the noun *waka* 'cow' is modified by the definite marker and the collective marker. In (106), it is incorporated to form a complex verbal root. The properties of noun incorporation are listed in (107) (Baker 1988, 2009, Borik and Gehrke 2015, Dayal 2011, Massam 2009, Mathieu 2009a).

(107) Properties of Noun Incorporation
a. Lexical restrictions
b. Headness and adjacency between the noun and the verb stem[23]
c. Incompatibility of modifiers
d. Asymmetry between internal and external arguments
e. Obligatory narrow scope
f. Number neutrality

The properties listed in (107) are sufficient but not necessary conditions. Bare nominals in a language that are commonly analyzed as noun incorporation may lack some of these properties, while having some of these properties does not mean that bare nominals in a language should be incorporated nominals. In what follows, I show that the latter is true of Japanese, namely, bare nouns in Japanese are number neutral but not (head-)incorporated nominals, lacking the properties from (107a) to (107d).

3.5.7.1 Lexical restriction

Firstly, noun incorporation is subject to lexical restriction or to name-worthiness (107a). For instance, Levy-Forsythe and Kagan (2020) point out that the incorporated direct object should denote a generic activity, hence often having an idiomatic meaning. Consider (108) to see how incorporation alters the meanings of the verbal complex.

[23]In the theoretical assumptions of this thesis, the nominal head is more likely to be a nP. I follow the past studies and use the term *head* in this section for ease of exposition,

(108) a. Shoir ko‘z yumdi. [Uzbek]
poet eye close.PAST.3SG
‘The poet passed away.’

b. Shoir bitta ko‘z(-ni)/ ko‘z-ni yumdi.
poet one eye-ACC eye-ACC close.PAST.3SG
‘The poet closed an eye/the eye.’ (not ‘The poet passed away.’)

(Levy-Forsythe and Kagan 2020:138)

In (108a), the direct object *ko‘z* ‘eye’ is bare, which Levy-Forsythe and Kagan (2020) argue is the case of noun incorporation. In (108b), the direct object is marked with a case marker, which is an indicator of unincorporated nominals. Crucially, the incorporated nominal in (108a) allows the idiomatic meaning, i.e., passing away, while the unincorporated nominal does not, but only allows the literal meaning, as in (108b).

Which type the verb belongs to also matters. Light verbs are more likely to allow noun incorporation, but those that denote specific activities do not. Levy-Forsythe and Kagan (2020) introduce the example in (108a) as a case of noun incorporation with a light verb.

Noun incorporation is also observed in Japanese with verbal nouns (VNs). Noun incorporation, but not case-marked bare nouns, in Japanese shows a lexical restriction, and often yields idiomatic readings. VNs form a complex predicate in tandem with a light verb *suru*. As shown in (109), the VN + *suru* constructions have two forms, including the unincorporated form (case-marked), as in (109a), and the incorporated form (case unmarked), as in (109b). (Note that case-marked nouns are still considered bare.)

(109) a. benkyoo-o suru
study-ACC do
‘to study’

b. benkyoo-suru
study-do
‘to study, to discount’

As also shown in (109b), the incorporated form, but not the unincorporated form, yields an idiomatic reading (to discount). Idiomatic readings are also available with other case-less VNs as in ryoori-suru (cooking-do) ‘deal with easily, defeat easily’, guuguru-suru (google+do) ‘search on the internet’, etc. When these VNs are case-marked, the idiomatic readings are no longer available.[24]

[24]Needless to say, while (109a) does not allow the idiomatic reading, idiomatic readings are not limited to incorporated nominals, as in (i).

Note that the incorporated form is not the case of dropping a case marker. In casual conversations in Japanese, a nominative case marker and an accusative case marker can be dropped, as shown in (110).

(110) Haruko(-ga) benkyoo(-o) hajimeta.
Haruko-NOM study-ACC started
'Haruko started studying./*Haruko started discounting.'

Unlike the incorporated nominal as in (109b), dropping case markers as in (110) is allowed only in casual conversations. Also, the light verb *suru* is not compatible with entity-denoting nouns, as in **hon-suru* (book-do), **pen-suru* (pen-do), etc. Moreover, another light verb *yaru* 'do' (a synonym of *suru*) does not allow noun incorporation, as in *benkyoo-o yaru* and **benkyooo-yaru*. Namely, noun incorporation is limited to the VN (caseless) + *suru* constructions.

Thus, caseless VNs, but not case-marked bare nouns, show the properties of incorporated nominals (i.e., lexical restriction, idiomatic readings). The unincorporated form (case marked), i.e., bare nouns, as in (109a) and the incorporated form (caseless), i.e., part of a VN-*suru* compounds, as in (109b), show more differences in syntactic and semantic properties, as we see through this section.

3.5.7.2 Adjacency

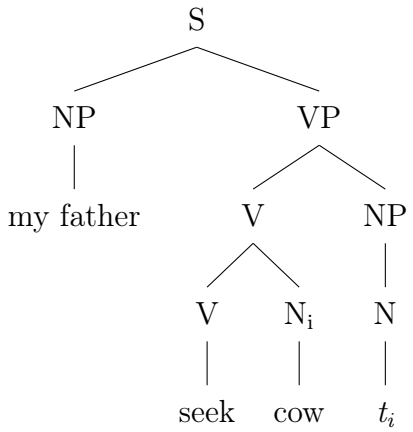
Secondly, incorporated nominals are expected to involve a nominal head and a verbal head (stem), as summarized in (107b). Since the incorporated element is the head, it should form single units with the verb stem morphosyntactically and probably prosodically as well. In (106), repeated here as (111), the object *waka* 'cow' is adjoined to the verb stem, and the functional markers (progressive, indicative) follow the incorporated verbal complex.

(111) Ñi chao kintu-waka-le-y. [Mapudungun]
my father seek-cow-PROG-IND.3sS
'My father is looking for the cows.'

Baker (1988) argues for a head movement analysis of noun incorporation, and presents the simplified structure of (112) for (111), where the bare noun *waka* 'cow' undergoes a head movement to adjoin to the verb *kintu* 'seek'.

(i) hara-(o) kiru
stomach-ACC cut
a. Literal 'cut the stomach'
b. Idiomatic 1 'hara-kiri, seppuku (samurai's ritual suicide)'
c. Idiomatic 2 'take the responsibilities for undesirable results'

(112) The structure of (111) (Baker 2009:150)



In Japanese, while the VN-*suru* compounds (noun incorporation) do not affect the prosody of VNs, bare nouns have their own prosody. As in (113) and (114), accent patterns alter in compounds or in periphrastic verbs (Kawahara 2015, Kubozono 2008). (The period indicates mora boundaries. L and H indicate low pitch and high pitch, respectively.)

(113) a. ta.ne
HL
'seed'

b. ta.ne.ma.ki
LHHL
'seed-sowing, (lit) seed-scattering'

(114) a. ka.i.ko
HLL
'dismissal'

b. ka.i.ko.su.ru
HLLLL
'fire, (lit.) dismissal-do'

With this in mind, see the example in (115), where the bare noun *tane* 'seed' sustains its accent pattern as a noun that patterns with (113b) and differs from (114b).

(115) ta.ne.o ma.ku
HLL HL
'sow seeds'

Bare nouns are not morphologically fused with the verb. As in (116), compounding undergoes so-called rendaku, or the sequential voicing of the initial consonant of the second part of the compound (Ito and Mester 1986, Vance 1996, 2015). However, rendaku does not occur even when the accusative case marker drops in the colloquial usage, as in (116c).

(116) a. ne-o kiru
price-ACC cut

b. negiru

c. ne kiru
price cut

(for a-c) 'knock the price down, ask for a discount'

Adjacency shows differences between the caseless VN-*suru* forms (incorporated nominals) and case-marked bare nouns. Caseless VNs (incorporated nominals) must be adjacent to the verb *suru*, as in (117b), and resist scrambling, as in (118b).

(117) a. Haruko-wa benkyoo-o takusan sita.
Haruko-TOP study-ACC a.lot did
'Haruko studied a lot.'

b. *Haruko-wa benkyoo takusan sita.
Haruko-TOP study a.lot did
(Intended)'Haruko studied a lot.'

(118) a. Benkyoo-o, Haruko-wa _____ si-nakat-ta.
study-ACC Haruko-TOP _____ do-NEG-PAST
'Haruko did not study.'

b. *Benkyoo, Haruko-wa _____ si-nakat-ta.
study Haruko-TOP _____ do-NEG-PAST
(Intended) 'Haruko did not study.'

On the other hand, bare nouns are syntactically independent of the verb, and therefore fail to intervene between verbs and suffixes. As shown in (119), the prefix *o-* in tandem with the *nina*(*-ru*) ending, alters the verb into its honorific form. (Note that the prefix *o-* is different from the accusative marker *–o* morphosyntactically as well as orthographically.)

(119) a. home-ru
praise-PRES
'praise'

b. o-home-nina-ru
HON-praise-HON-PRES
'praise (respectful form.'

The examples in (120b) and (120c) show that bare nouns cannot intervene between these markers and the verb stem.

(120) a. Sensei-wa gakusei-o o-home-nina-ru
teacher-TOP student-ACC HON-praise-HON-PRES
'The teacher praises students.'

b. *Sensei-wa o-gakusei(-o)-home-nina-ru.

c. *Sensei-wa o-home-gakusei(-o)-nina-ru.

3.5.7.3 Modifiers

Since noun incorporation involves a nominal head and a verbal head, the incorporated nominal should not be used with modifiers (adjectives, relative clauses). The analysis with head movement of the noun head to the verb head by Baker (1988) is also compatible with the observation that incorporated nominals should not be used with modifiers.

The possibility of attaching modifiers shows differences between the caseless VN-*suru* forms (incorporated nominals) and case-marked bare nouns in Japanese. Whereas, as in (121a), case-marked bare nouns can be with a modifier *eigo no* 'of English', caseless VNs (incorporated nominals) resist it, as in (121b).

(121) a. Haruko-wa eigo no benkyoo-o sita.
Haruko-TOP English of study-ACC did
'Haruko studied English./ (lit.) Haruko did English-study.'

b. *Haruko-wa eigo no benkyoo-sita.
Haruko-TOP English of study-did
(Intended) 'Haruko studied English./ (lit.) Haruko did English-study.'

The example in (122) shows that the VN + *suru* forms can take a direct object (marked with *o*). This indicates that the VN + *suru* forms act as compound transitive verbs, where the VNs are incorporated into the verb stems.

(122) Haruko-wa eigo-o benkyoo-sita.
Haruko-TOP English-ACC study-did
'Haruko studied English.'

As shown in (123), on the other hand, bare nouns in Japanese can be syntactically complex, involving an adjective, a coordination, and a relative clause.

(123) Sensei-wa akai kaban-ni kinoo katta pen-to nooto-o ireta.
teacher-TOP red bag-in yesterday bought pen-and notebook-ACC put.in
'The teacher(s) put (the) pen(s) and notebook(s) that she/he/they bought yesterday in red bag(s).'

Thus, caseless VNs show adjacency to the verb stem (a property of incorporated nominals), whereas case-marked bare nouns do not.

3.5.7.4 Subject/Object asymmetry

Only the internal argument of a verb can be incorporated, as shown in (107c). Provided that the head movement of noun incorporation obeys the Head Movement Constraint (Chomsky 1986a, Travis 1984), only the verbal complement (i.e., the internal argument or applied internal arguments) can be incorporated. As discussed above, the VN+*suru* forms are limited to internal arguments. As shown in (124), on the other hand, bare nouns in the subject position in Japanese can be General Number.

(124) Kodomo-ga keeki-o tabe-ta.
child-NOM cake-ACC eat-PAST
'One or more children ate (a/the) cake(s).'

Thus, bare nouns (case-marked) in Japanese do not show syntactic properties of incorporated nominals, but also show clear contrasts with VNs, which are incorporated nominals.

3.5.7.5 Semantic properties of head incorporation

Semantically, both VNs and narrow scope bare nouns in Japanese show the properties of incorporated nominals (narrow scope, number neutrality), but wide scope bare nouns only show the number neutrality.

VNs are event nominals, but neutral in terms of the number of events or the number of types of events. For instance, *benkyoo-suru* (study-do) does not tell how many times one studies or how many subjects one studies.

Narrow scope bare nouns in Japanese, by definition, show the properties of incorporated nominals, including the narrow scope reading and the number neutrality. However, this does not suffice to call them incorporated nominals, because they fail to show the lexical and morphosyntactic properties of incorporated nominals as discussed thus far. Moreover, since the wide scope bare nouns, by definition, can take the wide scope, as in (125), I also eliminate the possibility that the wide scope nouns are incorporated nominals, which commonly take narrow scope obligatorily.

(125) Sono byooin-wa kangosi-o sagasiteiru. (narrow or wide scope)
that hospital-TOP nurse-ACC look.for-PROG
a. Narrow: 'That hospital is looking for a nurse/nurses (to hire).'
b. Wide: 'There is a nurse/are nurses that hospital is looking for.'

(adopted from Nakanishi and Tomioka 2004:115)

3.5.7.6 Incorporated nominals and bare nouns in Japanese

Thus, as we have seen and summarized in (126), the behaviours of bare nouns in Japanese show striking differences from VNs (incorporated nominals) and cannot be explained using noun incorporation.[25]

(126) Properties of Noun Incorporation

Properties	Bare Nouns	Verbal Nouns
Lexical restrictions	NO	YES
Headness and adjacency of the noun and the verb stem	NO	YES
Asymmetry of internal and external arguments	NO	YES
Obligatory narrow scope	YES/NO	??
Number neutrality	YES	YES

3.5.8 Pseudo-incorporation and semantic incorporation

Incorporation may involve a larger unit than a noun or a head. As Massam (2001) introduces under the name of pseudo-incorporation, NPs can adjoin the verb stem, and exhibit different morphosyntactic and semantic properties from noun incorporation. Even when a bare nominal does not show the morphosyntactic properties of pseudo-incorporation, it is still possible to analyze it as a semantically incorporated nominal. I follow van Geenhoven (1998) that narrow scope bare nominals are semantically incorporated nominals. For instance, bare plurals in English do not show morphosyntactic properties of pseudo-incorporation (e.g., adjacency), but they are still semantically incorporated nominals because of their obligatory narrow scope.

In this section, I claim that bare nouns (whether DPs or nPs) in Japanese do not show morphosyntactic properties of pseudo-incorporation. Narrow scope bare nouns, however, show the semantic properties of pseudo-incorporated nominals. That is, those involve semantic incorporation.

Massam (2001) identifies the incorporation of nominals in Niuean (Oceanic) with different morphosyntactic and semantic properties from those of the head-incorporated

[25]Besides the head movement analysis, there are many other applicable syntactic analyses of noun incorporation: analyses with root incorporation (Wiltschko 2008), roll-up movement (Barrie 2012), and XP-movement (Mathieu 2009b). For an overview of analyses of incorporation and what is at issue, see Baker (2009), Borik and Gehrke (2015), Dayal (2011), Massam (2009), and Mathieu (2009a). I leave it open whether bare nouns in Japanese should be incorporated nominals as these analyses suggest, although these analyses are unlikely to fully explain the syntactic and semantic properties of these bare nouns in Japanese.

nominals in other languages. The examples in (127) show the unincorporated nominal in (127a) and the incorporated nominal in (127b).

(127) a. Takafaga tūmau nī e ia e tau ika. [Niuean]
hunt always EMPH ERG he ABS PL fish
'He is always fishing.'

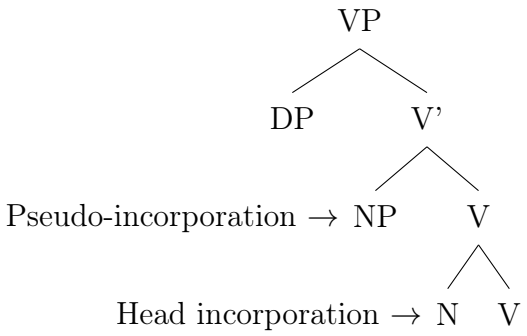
b. Takafaga ika tūmau nī a ia.
hunt fish always EMPH ABS he
'He is always fishing.' (Massam 2001:157)

In (127b), the nominal element *ika* 'fish' does not carry the absolutive case marker and the plural marker, while that in (127a) does. The case in (127b) still appears consistent with the analysis of noun incorporation outlined above. Consider (128), however:

(128) Ne inu kofe kono a Mele. [Niuean]
PAST drink coffee bitter ABS Mele
'Mary drank bitter coffee.' (Massam 2001:158)

In (128), the seemingly incorporated element *kofe kono* appears to contain the adjective. Besides the head noun, Niuean incorporation also contains adjectives, quantifiers, and coordination structures. Considering the syntactic complexity of the incorporated elements, Massam (2009) argues that an NP adjoins the verb. The simplified structure illustrates the structural difference between head incorporation and pseudo-incorporation, as shown in (129).

(129) Head incorporation and Pseudo-incorporation (Dayal 2015:52)



At the bottom of the structure is an instance of noun incorporation, where the nominal head adjoins the verbal head to form a complex head. In the second layer from the bottom is the locus of pseudo-incorporation, where an NP is attached to the verb (note that it is a V rather than a V' or VP that the NP adjoins). The properties of pseudo-incorporation

are listed in (130) (Borik and Gehrke 2015, Dayal 2011, 2015, Levy-Forsythe and Kagan 2020, Massam 2001, 2009).

(130) Properties of Pseudo-incorporation
   a. Reduced nominal structure
   b. Independence and Proximity
   c. Obligatory narrow scope
   d. Number neutrality
   e. Non-specific, non-referential
   f. Atelic interpretation

3.5.8.1 Reduced nominal structure

Firstly, pseudo-incorporated nominals are not necessarily single heads, but may have more complex structure, i.e., phrasal, as in the Niuean case of (129). This analysis is applicable to bare nouns in Japanese. Bare nouns in Japanese can be syntactically complex (i.e., NPs rather than just the N head). Examine (131).

(131) Sensei-wa akai kaban-ni kinoo katta pen-to nooto-o ireta.
teacher-top red bag-in yesterday bought pen-and notebook-acc put.in
'The teacher(s) put (the) pen(s) and notebook(s) that she/he/they bought yesterday in red bag(s)'

However, its applicability should not be over expanded. Borik and Gehrke (2015) claim that the elements adjoining pseudo-incorporated nominals vary among languages. Massam (2001) points out that the pseudo-incorporation in Niuean does not involve tensed relative clauses. In Uzbek (Levy-Forsythe and Kagan 2020), pseudo-incorporated objects allow relative clauses in certain contexts, as shown in (132), but do not allow demonstratives, as shown in (133).

(132) Anvar hammani hayratlan-tir-adi-gan rasm chiz-adi.[Uzbek]
Anvar everyone.ACC astonish-CAUS-IMPRF.3SG-PTCPL picture draw-IMPRF.3SG
'Anvar draws (a) picture(s) that astonish(es) everyone.'

(Levy-Forsythe and Kagan 2020:127)

(133) Anvar bu rasm-*(ni) chizdi. [Uzbek]
Anvar this picture-ACC draw.PAST.3SG
'Anvar drew this picture.' (Levy-Forsythe and Kagan 2020:126)

As shown in (131), bare nouns in Japanese can be syntactically complex, involving adjectives, a coordination structure, and a relative clause.[26] Complex bare nominals (e.g., ones with a relative clause) take either wide or narrow scope, as shown in (134).

(134) Sensei-tati-wa zibun no gakusei-ni kyoozyu-ga kaita hon-o
teacher-PL-TOP self of student-DAT professor-NOM wrote book-ACC
syookaisita.
introduced
'The teachers introduced book(s) that the professor wrote to their students.'

In (134), *hon* 'book' takes either narrow or wide scope against *sensei-tati* 'teachers'. Each teacher might introduce (a) different book(s) to her/his student(s) (wide scope), or might introduce (a) certain book(s) to her/his student(s) (narrow scope). Thus, bare nouns in Japanese (whether DPs or nPs) are not limited to reduced structures.[27]

3.5.8.2 Independence and Proximity

Secondly, pseudo-incorporated nominals are not as morphosyntactically fused with or close to the verb stem as head incorporation does. Pseudo-incorporated nominals in Uzbek tend to be adjacent to the verb. The example in (135) shows that the direct object *kitob* 'book' and the verb cannot be intervened by the indirect object.

(135) Men Masha-ga kitob (*Masha-ga) berdim. [Uzbek]
I Masha-DAT book (Masha-DAT) give.PAST.1SG
'I gave the book to Masha.' (Levy-Forsythe and Kagan 2020:128)

However, certain elements can also be inserted between the pseudo-incorporated nominals and the verb, including a focus particle, as shown in (136), where *ham* 'also' comes between the object and the verb.

(136) Anvar rasm ham chizdi. [Uzbek]
Anvar picture also draw.PAST.3SG
'Anvar also drew (a) picture(s).' (Levy-Forsythe and Kagan 2020:128)

The bare nouns in Uzbek generally need to be adjacent to the verb, but their adjacency is not as strict as head-incorporation.

[26] Note that, as pointed out by Borik and Gehrke 2015, case-marking by itself is not sufficient to exclude the possibility of pseudo-incorporation (but also see Kwon and Zribi-Hertz 2006 for discussions of incorporation in Korean).

[27] Also, possessives or demonstratives can be attached to bare nouns, and those still can take variable scope. However, I leave out nouns with possessives or demonstratives since they are not general number.

Massam (2001) describes a more peculiar case of adjacency in Niuean. Since the language requires the predicate to be fronted in a neutral context, sentences take a VOS order. However, as shown in (137), when nominals are pseudo-incorporated, they should move with the verb, leading to the VOS order.

(137) a. [Ko e tau kamuta] fakamua a lautolu. [Niuean]
PRED ABS PL carpenter before ABS they
'They were carpenters before this.'

b. [Ha he fale gagao] a ia.
PRED in house sick ABS she
'She is in the hospital.' (Massam 2001:165)

In contrast to Uzbek and Niuean, bare nouns in Japanese and the verb can be rather freely intervened, and bare nouns are scrambled, as shown in (138a), where the bare noun *hon-o* undergoes a short scrambling beyond the dative argument *Zin-ni*. Japanese allows these relatively freely (as far as the pragmatic factor requires), including a long-distance scrambling as in (138b), where the bare noun *hon-o* is scrambled out of the embedded clause.

(138) a. Haruko-wa hon-o Zin-ni _____ ageta.
Haruko-TOP book-ACC Zin-DAT _____ gave
'Haruko gave (a) book(s) to Zin.'

b. Hon-o, Boruto-wa [Haruko-ga Zin-ni _____ ageta]-to omotteiru.
Book-ACC Bolt-TOP Haruko-NOM Zin-DAT _____ gave-COMP thinking
'Bolt thinks that Haruko gave (a) book(s) to Zin.'

Thus, bare nouns in Japanese do not show the morphosyntactic properties of pseudo-incorporated nominals, as in (139a) and (139b).

(139) Properties of Pseudo-incorporation	Japanese bare nouns
a. Reduced nominal structure	NO
b. Independence and Proximity	NO
c. Obligatory narrow scope	
d. Number neutrality	
e. Non-specific, non-referential	
f. Atelicity	

3.5.8.3 Obligatory narrow scope and number neutrality

Semantically, DP and nP bare nouns show different results for the properties in (139). nP bare nouns show more semantic properties of incorporated nominals than DP bare nouns. While both DP and nP bare nouns show number neutrality, DP bare nouns take wide scope, whereas nP bare nouns obligatorily take narrow scope.

3.5.8.4 Referentiality

As shown in (101), repeated here as (140), nP bare nouns (narrow scope) are not referential, and cannot be referred back to by entity-denoting pronouns *he/them*, whereas DP bare nouns (wide scope) are referential and can be referred back to *he/them*.

(140) Gakusei-tati-wa zyugyooryoo hikisage no syomei-o atumeteiru node,
student-PL-TOP tuition.fees reduction of signature-ACC collecting because
hotondo-no sensei-no ofisu-ni dansi-gakusei-ga kita. Sensei-tachi-wa
most-GEN teacher-GEN office-to male-student-NOM came teacher-PL-TOP
sorezore {ø/kare-no/karera-no} hanasi-o kiita.
each ø/he-GEN/them-GEN talk-ACC listened
'Because students are collecting signatures for reducing tuition fees, one or more male students came to the offices of most teachers. Each teacher listened to them.'

a. Narrow scope (most > student): ø/*kare/#karera

b. Wide scope (student > most): ø/kare/karera

3.5.8.5 Atelicity

Pseudo-incorporated nominals are imposed on aspectual restrictions, as Dayal (2011) observes in Hindi. In (141a), the number neutral bare noun *kitaab* 'book' (that Dayal 2011 argues to be a pseudo-incorporated nominal) requires a non-telic event, i.e., compatible with a *for*-phrase. On the other hand, as in (141b), when the sentence is telic (used with an *in*-phrase), the bare noun is no longer number neutral, but it forces a singular interpretation (i.e., singular indefinite).

(141) a. Anu-ne tiin ghanTe tak kitaab paRhii. [Hindi]
Anu-ERG 3 hours for book read-PFV
'Anu read books for three hours.' = one or more books

b. Anu-ne tiin ghanTe meN kitaab paRhii.
Anu-ERG 3 hours in book read-PFV
'Anu read a book in three hours.' = exactly one book (Dayal 2011:142)

The contrast in (141) suggests that pseudo-incorporated nominals, as in (141a), require an atelic event,

In Japanese, as discussed in the previous section, nP bare nouns (narrow scope) require an atelic event (i.e., compatible with a *for*-phrase), as shown in (142).

(142) Hutatu-no kouen-de Haruko-wa {san zikan/ *san zikan de} hon-o yonda.
2.CL-GEN park-in Haruko-TOP 3 hour 3 hour in book-ACC read
'Haruko read one or more books {for 3 hours/*in 3 hours} in two parks.' (narrow scope)

DP bare nouns (wide scope), on the other hand, do not show restrictions on (a)telicity, and are compatible with either a *for*-phrase or a *in*-phrase, as shown in (143).

(143) Hutatu-no kouen-de Haruko-wa {san zikan/ san zikan de} hon-o yonda.
2.CL-GEN park-in Haruko-TOP 3 hour 3 hour in book-ACC read
'There is a book or books that Haruko read {for 3 hours / in 3 hours} in two parks.' (wide scope)

3.5.8.6 Pseudo-incorporated nominals and bare nouns in Japanese

The properties of nP bare nouns and DP bare nouns that we have seen thus far are summarized in (144).

(144) Properties of Pseudo-incorporation

	Properties	nP	DP
Syntactic	Reduced nominal structure	NO	NO
	Independence and proximity	NO	NO
Semantic	Obligatory narrow scope	YES	NO
	Number neutrality	YES	YES
	Non-specific, non-referential	YES	NO
	Telicity	YES	NO

While the bare nouns of either type do not pattern with pseudo-incorporated nominals syntactically, narrow scope bare nouns show semantic properties of them. With this, I claim that narrow scope bare nouns are derived through semantic incorporation (Dayal 2011, Farkas and de Swart 2003, van Geenhoven 1998). This analysis supports the claim that nP bare nouns pattern with bare plurals in English, which are also argued to be semantically incorporated nominals. This analysis is also partially consistent with Chierchia's parameter, in that bare nouns in Japanese with [+arg, -pred] settings denote kinds and are argumental without determiners. I deviate from Chierchia (1998a) in that, while the [arg,

pred] settings are language parameters in Chierchia (1998a), the settings are properties of nominal phrases in a language, not of languages. DP bare nouns, on the other hand, do not show either syntactic or semantic properties of incorporated nominals, but show similarities to full indefinite DPs.

3.5.8.7 Incorporation of the subject

Before closing the section, I leave comments on the (semantic) incorporation of the subject of the sentence, in particular, how the subject can be analyzed as a semantically incorporated noun.

As shown in (145), bare nouns appear in the direct object position as well as the subject and indirect positions.

(145) Sensei-ga gakusei-ni hon-o syookaisita.
teacher-NOM student-DAT bok-ACC introduced
'One or more teachers introduced one or more books to one or more students.'

In the same way as the direct object, the subject can take either narrow or wide scope, as in (146).

(146) Gakusei-ga atikoti-ni arawareru.
student-NOM everywhere-at appear
a. Narrow 'Students are everywhere. (= There are no places where you cannot find any students)'
b. Wide 'There is a student/are some students who can be found everywhere.'

When bare nouns in the subject position take wide scope, I claim they are not incorporated nominals (which are expected to take narrow scope), but indefinite DPs. When bare nouns in the subject position take narrow scope, their derivation needs further explanation.

It is often assumed that incorporation is available only for the direct object (e.g., Dayal 2015), or that incorporation of the subject/agent is fairly restricted (Cagri 2009). As noted by Öztürk (2009), however, pseudo-incorporation should not be limited to the direct object, since pseudo-incorporation does not require head movement. The widely-observed limitation of incorporation to the direct object stems from independent factors: e.g., the subject should be outside of vPs to check the EPP feature of T, the position where the subject cannot be pseudo-incorporated. As far as the subject is within a certain domain of the verb (e.g., vP), it should be able to be pseudo-incorporated (Öztürk 2009 or semantically incorporated (Dayal 2015). For instance, Öztürk (2009) argues that in Turkish (where the EPP movement of the subject to the TP is not obligatory), the subject

incorporation is widely observed. Dayal (2015) argues that post-verbal subjects (which stay within vP) in Romance languages are semantically incorporated nominals.

I argue that in Japanese, the subject movement to check the EPP on T is not obligatory (at least, not obligatorily overt), and that the subject can stay in-situ within the vP (e.g., Kishimoto 2009, Kitaoka 2014, Kuroda 1988). For instance, Kishimoto (2009) shows, as in (147), that the instrumental subject takes scope below negation, and stays in-situ within the vP.

(147) Kodomo-tati-dake-de ryoori-o tukur-anaka-ta
child-PL-only-INST dish-ACC cook-NEG-PAST
'Only children did not cook dishes.' (only > NEG, *NEG > only)

In (147), the instrumental subject *kodomo-tati-dake-de* scopes below negation. Clearly, no element can overtly move up to the TP level to check the EPP on T. The same mechanism appears to work in (146) in the narrow scope reading, where the nominative-marked subject scopes below the predicate. Thus, I claim that the subject that takes narrow scope stays in-situ within the vP, where it can be analyzed as a semantically incorporated nominal.[28]

I argue that incorporation of the subject in Japanese is semantic, but not pseudo-incorporation. I assume that pseudo-incorporation in Japanese requires adjacency of the incorporated nominal and the verb, and morphologically reduced structure (Miyagawa 1991, Öztürk 2009). Examine the examples in (148) to (150) to see what elements in a sentence can be pseudo-incorporated how.

(148) a. sensei-ga gakusei-ni kin-no-kunsyoo-o zyuyo-go (unincorp.)
teacher-NOM student-DAT golden-of-decoration-ACC award-after
'after the teacher awarded a golden decoration to the student'

b. sensei-ga gakusei-ni kin-no-kunsyoo-zyuyo-go (pseudo-incorp.)
teacher-NOM student-DAT golden-of-decoration-award-after
'after the teacher awarded a golden decoration to the student'

(Miyagawa 1991:15)

(149) a. zikken-ga syuuryoo-go (unincorporated)
experiment-NOM complete-after
'after the experiment is over'

b. zikken-syuuryoo-go (pseudo-incorporated)
experiment-complete-after
'after the experiment is over' (Miyagawa 1991:16)

[28]Note that, unlike the object, the subject largely resists scrambling in Japanese (Ko 2005, Saito 1985). This restriction is also compatible with the analysis that the vP-internal subject can stay in-situ (and semantically incorporated).

(150) a. kodomo-ga taisoo-tyuu (unincorporated)
child-NOM exercise-while
'while the child exercises'

b. *kodomo-taisoo-tyuu (incorporation intended)
child-exercise-while
(intended) 'while the child exercises' (Miyagawa 1991:16)

The object of a transitive sentence, as in (148), and the theme subject of an unaccusative sentence, as in (149), enable them to be pseudo-incorporated, but the subject of an unergative sentence cannot. The object of a transitive sentence and the theme subject of an unaccusative sentence are adjacent to the verb in the underlying structure, thereby fulfilling the adjacency requirement of pseudo-incorporation. On the other hand, since the subject of an unergative sentence is not close enough to the verb, it cannot be pseudo-incorporated (but, I claim, close enough (i.e., vP internal) to be semantically incorporated). In addition to the adjacency requirement, pseudo-incorporated nominals need to be caseless, i.e., morphologically reduced. These two properties (adjacency and reduced structure) are not observed in the subject incorporation in (145) and (146), and hence, I argue that the subject incorporation is semantic.

3.6 Summary of Chapter 3

This chapter investigated the syntactic and semantic properties of bare nouns in Japanese. I first showed that the number neutrality of General Number in Japanese is semantic. I proposed that there are in fact two types of bare nouns, including DP bare nouns (wide scope) and nP bare nouns (narrow scope). DP bare nouns take wide scope (i.e., specific), and are indefinite DPs with a null Ind and # heads. The underspecification of features on # yields a number neutral interpretation. Individuation-hood and number properties of wide scope bare nouns are observed in the subkind reading and telicity. nP bare nouns are structurally bare, and pattern with bare nominals in other languages (e.g., bare plurals in English; bare nouns in Mandarin). nP bare nouns, as well as bare nominals in other languages, show common properties, including obligatory narrow scope, kind reference, atelicity, and properties of pseudo or semantic incorporation. nP bare nouns project nPs, but lack indPs and #Ps. The lack of the #P projection yields the number neutral interpretation. This chapter also concludes that bare nouns in Japanese can be individuated in the absence of classifiers, and that individuation is encoded by a null Ind head.

4

Plural expressions and plural markers

4.1 Problems and Proposals

In the previous chapter, I answered the question pertaining to whether Japanese, a typical classifier language, exhibits a grammaticized mass-count distinction in the absence of classifiers. This distinction refers to a mass-count distinction at the grammatical/syntactic level as opposed to the conceptual level as discussed in Chapter 2. Under the theoretical assumptions taken in this thesis, the presence of individuation is considered to be the grammaticized mass-count distinction, which is realized structurally with Ind(ividuation) Phrases. I proposed that number neutral bare nouns, in particular, DP bare nouns (wide scope), involve IndPs (headed by a null Ind head) and also #Ps in certain cases.

If Japanese possesses a residual way for bare nouns to manifest the grammaticized mass-count distinction in the absence of classifiers (e.g., by virtue of a null Ind head), then it further leads to the prediction that non-bare nouns (e.g., plural nouns, nouns with quantifiers/demonstratives) also exhibit the grammaticized mass-count distinction.

In order to examine this prediction, in the present chapter, I first investigate the properties of individuation and number for non-bare nouns. I further investigate the grammaticized mass-count distinction in Japanese in comparison with that in English, a typical number language, and in Mandarin, a typical classifier language. By showing diverse

mass-count phenomena widely observed in Japanese, I propose that count-sensitive quantifiers/demonstratives, as in (1), and plural markers, as in (2),[1] manifest the mass-count distinction in a manner closer to English than to Mandarin.

(1) a. count-sensitive quantifiers

{tasuu/musuu/iku-tu-ka}-no hon
{many.number/no.number/what-CL-QUES}-LIN book

'many/a number of/some books'

b. count-sensitive demonstratives

{kore-ra/sore-ra/are-ra}-no hon
{this-PL/that-PL/that-PL}-LIN book

'these/those books'

(2) Plural marking in Japanese

a. *-tati* with common nouns: e.g., *gakusei-tati* 'students'

b. *-tati* with proper names: e.g., *Shohei-tati* 'Shoheis'

c. plurals via reduplication: e.g., *yama-yama* 'mountains'

d. null plurals with plural quantifiers/demonstratives:
e.g., {tasuu/korera}-no student-$\emptyset_{PL}$ "many/these students'

I then turn to plurals in Japanese, since the claim that plural expressions involve the grammaticized mass-count distinction, does not necessarily mean that plural markers themselves individuate nouns. It is worth exploring (but not widely investigated in past literature) whether plural markers in classifier languages are individuators.

It appears that the most widely-held assumption is that classifier languages lack individuating plurals. This assumption is derived from a well-known co-occurrence generalization of plural markers and classifiers. Greenberg (1972) and Sanches and Slobin (1973) suggest that a language with a generalized classifier system should not have an obligatory number marking:

(3) Co-occurrence generalization (Sanches and Slobin 1973)
"... if a language includes numeral classifiers as its dominant mode of forming quantification expressions, then... it will not have obligatory marking of the plural on nouns"

[1]Pre-nominal modifiers are commonly mediated by the linker *-no*. Its syntactic properties and derivation have enjoyed rigorous discussions in past literature. For instance, Watanabe (2006) and subsequent works argue that *-no* is inserted post-syntactically. Saito and Murasugi (1990) argue that the properties of *-no* depend on the phrase that *-no* is attached to. I tentatively follow Watanabe (2006) in this chapter, and discuss *-no* in greater depth in Chapter 6.

This generalization has been supported by typological studies (e.g., Allan 1977), and further developed into a stronger version, according to which classifiers and plural markers are in complementary distribution (e.g., Borer 2005a, Li 1999, T'sou 1976). Suppose that "obligatory number marking" (e.g., *-s* in English) involves individuation. The generalization leads to the prediction that classifier languages lack individuating plurals.

Moreover, while plural markers are considered to be individuators in number languages (e.g., *-s* in English; Borer 2005a)[2], a number of past studies have also argued that plurals are polysemous in nature, and that various types of plurals are mapped across nominal functional projections according to their respective functions: e.g., individuating plurals on IndPs (Borer 2005a), lexical plurals on nPs (Acquaviva 2008), and counting plurals on #P (Mathieu 2012, 2014). Wiltschko (2008) classifies plurals by function and assigns various locations (head or adjunct) to plural markers. Namely, even plurals in number languages may or may not individuate nouns. More work is needed to refine the criteria for the individuation of plurals.

In order to examine the prediction that Japanese, a classifier language, lacks individuating plural markers, I first set criteria to determine the structural positions of various plurals (e.g., individuating plurals, counting plurals, etc.) (Acquaviva 2008, Mathieu 2012, 2014, Wiltschko 2008, 2021). I then examine the properties of individuation and number of plural markers, including the *-tati* plurals, plurals via reduplication, and null plurals with count-sensitive quantifiers/demonstratives. I propose that *-tati* plurals serve as individuators when used with proper names and plurals via reduplication. For the sake of completion, I also argue that count-sensitive quantifiers/demonstratives are used with a null Ind head to individuate nouns (thereby, manifesting the grammaticized mass-count distinction). I also briefly introduce an alternative approach by Wiltschko (2008), and point out its drawbacks, based on the observations derived from abundance plurals in English and *-tati* plurals in Japanese.

The *-tati* plurals in Japanese exhibit fascinating properties that are not observed with their counterparts in number languages such as English. Their properties include the availability of various interpretations, distributions, optionality, and specificity effects (e.g., Kurafuji 1999, 2004, Nakanishi and Tomioka 2004, Nomoto 2013, Ochi 2012, Ueda and Haraguchi 2008, among many others). As such, the topic of plurals in Japanese, as well as in other East Asian languages or classifier languages in general, has been extensively discussed and debated in the literature (e.g., Hirose 2004, Hosoi 2005, Kaneko 2007, Kurafuji 1999,

[2]Even in number languages, plural markers do not always (obviously) serve for individuation and/or counting: e.g., pluralia tantum (e.g., *glasses, pants*), abundance plurals (e.g., *The river discharges its waters into the lake*(Acquaviva 2008:1)), etc.

2004, Mizuguchi 2004a, Nakanishi and Tomioka 2004, Ochi 2012, Ueda and Haraguchi 2008, Tatsumi 2017b, Tomioka 2021 for Japanese; Iljic 1994Li 1999, Li 2013, Kim and Meng 2021, Wu 2019 for Mandarin; Kim and Melchin 2018, Kim 2011, Kim 2005, Park 2022, Park 2008 for Korean; Carson 2001 for Malay; Jenks 2011 for Thai; Dalrymple and Mofu 2012 for Indonesian). Although the structural and semantic properties of *-tati* have enjoyed rigorous discussions from various viewpoints in the past literature, there are still many issues on individuation and number that are unanswered or even unquestioned. Moreover, while the *–tati* plurals with common nouns have been discussed in a number of works, other forms of plurals in Japanese (e.g., the *-tati* plurals with proper names, plurals via reduplication, null plurals with plural quantifiers/demonstratives) have escaped attention in theoretical literature (cf. Sudo 2014, 2017). The aim of this chapter is to fill some of these gaps.

Crucially, the present analysis of plurals in Japanese is in line with the heterogeneous view of plurals (e.g., Mathieu 2014, Wiltschko 2021), according to which plurals can be mapped across various locations in nominal functional projections (nP, IndP, #P, DP) in a language and/or across languages. In Section 4.5, I illustrate that Japanese possesses a wide range of plural markers that are mapped across nominal functional projections.

This chapter is organized as follows. In Section 4.2, I propose a set of criteria in order to determine the grammaticized mass-count distinction based on observations in English and Mandarin, with which, in Section 4.3, I explore mass-count phenomena in Japanese. There, I propose that in Japanese, the grammaticized mass-count distinction is manifested by count-sensitive quantifiers/demonstratives and plural markers. From Section 4.4 onwards, I provide a theoretical analysis of plurals. Applying the heterogeneous views of plurals (e.g., Mathieu 2014, Wiltschko 2021), I introduce the classification of plurals and their structures in Section 4.4. I apply these to plurals in Japanese in Section 4.5 to show whether individuation is involved and how each type of plural is generated. I propose that *-tati* plurals show the properties of individuation when used with proper names and plurals via reduplication. In Section 4.6, I introduce an alternative approach to the heterogeneous view based on Wiltschko (2008), and introduce observations that challenge the structures and classifications of plurals in Wiltschko (2008). Section 4.7 provides a summary of the chapter.

4.2 Grammaticized Mass-Count Distinction

In order to investigate the grammaticized mass-count distinction at the level of extended nominal projections (e.g., IndPs, #Ps, DPs) in Japanese throughout the following sections,

I first set criteria for the syntactic countability of non-bare nouns or modified nouns, as in (4), based on various expressions that involve individuation and/or number in English and in Mandarin (Borer 2005a, Cheng and Sybesma 1999, Chierchia 1998a, Li 1999).

(4) Grammaticized mass-count distinction
   a. Plural markers (number morphology) and bare nouns
   b. Direct numeral modification and the use of classifiers
   c. Count and mass sensitive quantifiers, determiners, and demonstratives

I focus on languages at each end of the spectrum of the number-classifier typology: English, a number language that practically lacks (sortal/count) classifiers, and Mandarin (and later Japanese), typical classifier languages that virtually lack obligatory plural making. Although this is an oversimplified dichotomy for a thorough typological study, it provides a good starting point for exploring the similarities and differences between number languages and classifier languages.

Note that these criteria are not used to classify languages into number languages (showing the grammaticized mass-count distinction) and classifier languages (lacking thereof), but instead used to determine whether or not a *nominal phrase* involves individuation in its derivation. If nouns satisfy the syntactic countability criteria outlined in (4), they are considered grammatically count. On the other hand, nouns that meet none of these criteria are considered grammatically mass. Meeting (some of) the criteria in (4) in a language indicates that the language shows the grammaticized mass-count distinction, irrespective of whether use of number morphology is predominant, use of count classifiers is predominant, or count syntax is fairly a marked structure in the language (which is the case in Japanese).

4.2.1 Plural marker

Genuine plural marking is a common indicator of countability. Number languages, as the name indicates, employ overt morphology to express number properties. Descriptively, in English, plurality is expressed by a plural marker *-s* (in unmarked environments):

(5) a. books
   b. many books
   c. *many book
   d. *waters
   e. *many waters

In (5), the phrase *books* require a plural marker when its referent is a plural entity, while *water* is not compatible with it (except for cases of coercion, which I will discuss very soon). Thus, the former noun is grammatically count, while the latter is not.

Theoretically, plural markers are linked to individuation. For instance, Borer (2005a) proposes that the plural marker is a manifestation of the grammaticized mass-count distinction (i.e., individuation; *division* in her term) in English and other number languages, and that it resides in IndPs. The number properties (e.g., plural, singular) are expressed at a different level (#Ps). Regardless of whether adhering to the descriptive view or Borer's theoretical analysis (or related analyses), plural markers can be regarded as a sign of the grammaticized countability.

Mass-to-count coercion effects, as in (6), also suggest that plural marking is relevant for expressing grammaticized countability.

(6) a. *At a restaurant*: Three beers, please.

b. *At a restaurant*: We have only two beers, Canadian and Budweiser.

In (6a), the mass-y noun *beer* is counted with two units of serving (Universal Packager: Bunt 1985, Pelletier 1975). The exact referent is determined contextually, but options for counted units are fairly limited to culturally or conventionally shared ideas (e.g., bottles, glasses, but normally not buckets or spoons unless particular and peculiar contexts allow these). In (6b), *beer* is counted with its (sub)kinds, that is, labels (Universal Sorter; Bunt 1985, Pelletier 1975). The presence of plural marking signals that the noun (which would otherwise be used in a mass context) is being used in a count context.

In Mandarin, as shown in the previous chapter, bare nouns are General Number, that is, allowing either plural interpretations or singular interpretations, as in (7a). Bare nouns are also used for mass-y nouns, as in (7b).

(7) a. shu
book
'book, books'

b. shui
water
'water'

In (7a), bare nouns can denote plurality without plural morphology, like *–s* in English. With this, bare nouns in Mandarin are often claimed to be all mass grammatically (e.g., Chierchia 1998a, Li 2013). Thus, the number neutral interpretation as in (7a) is often considered as supporting evidence for the lack of the grammaticized mass-count distinction in the language (or classifier languages in general, including Japanese).

In fact, Mandarin Chinese does have a morpheme, -*men*, which is often called a plural marker, as in (8) (e.g., Li 1999).

(8) xuesheng-men [Mandarin]
student-PL
'students'

It is widely argued, however, that –*men* does not function as a genuine/additive plural marker like the English counterpart (e.g., Li 1999). The count-sensitivity of -*men* is hard to test, since -*men* is only used with human nouns (or, at best, animal nouns). Following Borer (2005a), I tentatively assume (without further scrutiny) that –*men* manifests the mass-count distinction. The grammaticized countability denoted by plural marking is summarized in (9).

(9) Plurality and the grammaticized mass-count distinction

Language	**type**	**Form**	**Examples**
English	Count	-*s*	*books*, *waters* (coercion)
	Mass	bare	*water*
Mandarin	Count	-*men*	*gakusei-tati* 'students'
	Mass	bare	*shu* 'book', *shui* 'water'

As shown in (9b), use of bare nouns can be considered the indicator of mass syntax in English, in contrast to plural marking, which indicates count syntax. I refrain from providing a detailed description and analysis of it as there appear to be several significant counterexamples to this assertion: e.g., proper nouns/names (*John*, *Ottawa*), complements of a preposition (*go to school*), and vocatives (*Teacher!*).

For the same reason, I leave out the possibility of count-to-mass coercion (i.e., Universal Grinder; Cheng et al. 2008, Pelletier 1975) as an indicator of grammatically mass nouns, for instance, *Dog is all over the wall.* In Mandarin as in (9d) (and in Japanese as will be seen in later sections), bare nouns can be seen as an exponent of mass syntax. Note, however, that not all bare nouns, at least in Japanese, are mass grammatically. As shown in the previous chapter, bare nouns may involve IndPs.

4.2.2 Direct numeral modification and use of classifiers

The way in which numerals interact with a noun also indicates syntactic countability. In English, count-y nouns can be modified by numerals directly, as in (10), and do not

require classifiers when a noun is counted. Meanwhile, mass-y nouns require classifiers to be counted or to be measured, as in (11).

(10) three books

(11) a. *three water(s)
b. three bottles of water
c. three spoons of vinegar

In comparison, even count-y nouns in Mandarin normally require a classifier in the equivalent context of (10):

(12) a. san-ben shu [Mandarin]
3-CL book
'three books'
b. *san shu
3 book
'three books'

In Mandarin, as shown in (12), for a noun to be modified by a numeral, an appropriate classifier should be attached to the numeral/noun. Since a noun cannot be modified by a numeral directly, such nouns by themselves are mass grammatically. Instead, classifiers create count nouns from mass terms. Therefore, Mandarin also has classifiers for mass-y nouns, as in (13).

(13) a. san-ping shui [Mandarin]
3-CL water
'three bottles of water / three bottle-full of water'
b. *san shui
3 water

I call classifiers of the type in (12) *sortal classifiers*, while those in (13) *mensural classifiers* (Tang 1990). Some have argued (e.g., Cheng and Sybesma 1999) that typical classifier languages, such as Mandarin (and Cantonese), manifest the mass-count distinction at the level of classifiers. Under such a view, the different behaviours of sortal and mensural classifiers are claimed to indicate different statuses of the (grammaticized) mass-count distinction. In this Chapter, I tentatively follow Cheng and Sybesma (1999) and subsequent works that view sortal classifiers, though not mensural classifiers, as manifestations of the mass-count distinction.[3]

[3]In Chapter 5, I discuss in greater depth the properties and classifications of classifiers in Japanese. I propose that both sortal and mensural classifiers can be used in either a count context or a mass context.

The Mandarin language features an additional type of classifier, referred to as *-xie*, which is commonly referred to as a *plural* classifier (e.g., Wu 2019). *-Xie* is used in very limited environments, as in (14): with *yi-* 'one' or with demonstratives.

(14) {yi/zhe/na}-xie xuexheng [Mandarin]
one/this/that-XIE student
'some/these/those students'

Currently, there is no consensus regarding the true nature of this morpheme. *Yixie* is often translated into English as *some* (Rullmann and You 2006), or *–xie* is often called a plural classifier (although it is compatible only with *yi-* 'one' among numerals) (Wu 2019). I tentatively assume that *–xie* is a peculiar type of classifier. Leaving further scrutiny of *–xie* for future research, of particular importance here is that *–xie* is count sensitive, and thus brings mass-to-coercion effects, as in (15).

(15) yi-xie shui [Mandarin]
one-XIE water
a. Count: 'some waters' (portions, bottles, glasses, etc.)'
b. *Mass: 'some water'

When *yixie* is used with a mass-y noun like *shui* 'water', it leads to coerced meanings and otherwise results in ungrammaticality. That *yixie* or *-xie* leads to coerced meanings also suggests that it plays a certain role in individuation and/or counting. I refine the definition of classifiers in Chapter 5, including sortal and mensural classifiers in classifier languages.

It is not uncommon, however, that Mandarin nouns and numerals appear without classifiers, as in (16).

(16) a. si (ge) ren [Mandarin]
4 CL person
'4 people'
b. wu (zhang) binge er (tiao) yu
5 CL loaf 2 CL fish
'5 loaves and 2 fish' (Her 2012:1676, 1669, respectively)

On this ground, Her (2012) and Yi (2021) claim that Mandarin is in fact not an obligatory classifier language, and that classifiers are just *normally* required in counting contexts. Even though the use of such constructions is still restricted, I classify the nominals in (16) as examples of direct numeral modification.

The grammaticized mass-count distinction in relation to numerals is summarized in (17).

(17) Numerals and the grammaticized mass-count distinction (to be modified in Chapter 5)

Lang./Type	**Form**	**Examples**
English		
Count	Direct mod.	*three books*
Mass	Classifiers	*three bottles of beer*
Mandarin		
Count 1	Direct mod.	*san ren* (3 person)
Count 2	Sortal CLs	*3-ben shu* (3-CL book)
		yi-/zhe-xie shu one-/this-XIE book 'some/these books'
	(coercion)	*yi-/zhe-xie shui* one-/this-XIE water 'some waters'
Mass	Mensural CLs	*3-ping shui* (3-CL water)

4.2.3 Count-sensitive modifiers

In English, count-sensitive modifiers are also considered as instances of count syntax, as in (18), while mass-sensitive modifiers are instances of mass syntax, as in (19).

(18) a. {many/a few/few/each/these} books
b. *{many/a few/few/each/these} water

(19) a. {much/a little/little} water
b. *{much/a little/little} book(s)

In Mandarin, such modifiers are not widely observed (or discussed) (Cheng and Sybesma 1999, 2012, Kuo and Yu 2012). Most, if not all, quantifiers (in particular, ones for quantity) seem to be compatible with either count-y nouns or mass-y nouns, as in (20).

(20) a. hen duo bi [Mandarin]
very many pen
'a lot of pens'
b. hen duo shui
very much water
'a lot of water'

Also, some of the Mandarin equivalents of (18) in English require classifiers, as in (21), wherein the mass-count distinction appears to be manifested by the classifier, not by *each*.

(21) mei ge pen
every CL pen
'each pen'

Thus, I conclude that Mandarin lacks count sensitive modifiers. The grammaticized mass-count distinction denoted by count or mass sensitive modifiers is summarized in (22).

(22) Countability sensitive modifier and grammaticized mass count distinction

Language	**Type**	**Form**	**Examples**
English	Count	count sensitive modifiers	*many, a few, few books*
	Mass	mass sensitive modifiers	*much, a little, little water*
Mandarin	Count	N/A	N/A
	Mass	N/A	N/A

4.2.4 Count and mass in English and in Mandarin

Thus, I consider clues listed in (4), repeated here as (23), to determine if count syntax is involved in the derivation of a nominal in a language. The count and mass expressions are summarized in (24). The table is revised for classifiers in Japanese in Chapter 5, by refining classifications of classifiers.

(23) The grammaticized mass-count distinction

a. Plural marker (Number morphology) and bare nouns

b. Direct numeral modification and the use of classifiers

c. Count and mass sensitive modifiers (quantifiers, determiners)

(24) Grammaticized mass and count in English and Mandarin (to be refined in Chapter 5)

Form	**English Count**	**English Mass**	**Mandarin Count**	**Mandarin Mass**
Plural	*books* *waters* (coercion)	N/A	*-men*	N/A
Numeral	*3 books*	N/A	*3 ren* '3 persons'	N/A
Classifier	N/A	*3 bottles of water*	*3-ge xuesheng* '3 students' *yi-xie shu* 'some books' *yi-xie shui* 'some water' *zhe-xie shu* 'these books' *zhe-xie shui* 'these waters'	*3-ping sui* '3 bottles of water'
Bare Nouns	N/A	*water*, *furniture*	N/A	*xuesheng* 'student'
Countability sensitive modifiers	*many books* *a few books* *few books*	*much water* *a little water* *little water*	N/A	N/A

4.3 Mass-Count Phenomena in Japanese

As discussed in the previous sections, there are some differences between English and Mandarin with regards to their count and mass syntax. Mandarin seems to have minimal count syntax, with the exception of the putative plural marker *-men*, the use of classifiers (Cheng and Sybesma 1999), and sporadic instances of direct numeral modification (Yi 2021). Among the widely held views regarding the grammaticized mass-count distinction (which I argued against in the previous chapters and in this chapter, too) is that classifier languages lack it. The lack of a genuine plural marker and of direct numeral modification, and obligatory use of classifiers, are often regarded as evidence for this claim (e.g., Chierchia 1998a). These three criteria are mostly met by Mandarin, with a few exceptions. It is worth noting that, as demonstrated in (25), these criteria are also present in the Japanese language.

(25) a. hon
book
'book/books'

b. san-nin-no hon
3-CL-LIN book
'three books'

c. *san hon
3 book

As in (25a), plural marking is not obligatory for plural interpretations. As in (25b, c), classifiers are required when numerals modify nouns, and the lack of classifiers results in ungrammaticality.

In contrast to the observations in (25), however, close scrutiny shows that Japanese has various ways to achieve grammaticized countability. It is not uncommon or new to argue that there is a mass-count distinction in classifier languages. As introduced in Chapter 2, a conceptual mass-count distinction is observed at least in Mandarin and Japanese, whatever functions it has in syntax (Cheung et al. 2012, Inagaki and Barner 2009, Sudo 2016). If it is only classifiers that involve count syntax, then this would imply that nouns cannot be individuated in the absence of classifiers (except some irregular cases, as in *3 ren* '3 persons' in Mandarin). This is not borne out in Japanese, however. I proposed in Chapter 3 that the close scrutiny of General Number reveals that bare nouns involve individuation (and also #Ps in certain cases).

In this section, I further illustrate that individuation is involved in the absence of classifiers in various quantificational constructions in Japanese that match the criteria in

(23), repeated here as (26).

(26) grammaticized mass-count distinction

a. Plural marker (number morphology) and bare nouns

b. Direct numeral modification and the use of classifiers

c. Count and mass sensitive modifiers (quantifiers, determiners)

4.3.1 Plural marker

As demonstrated thus far, Japanese bare nouns can be interpreted without specifying particular number properties, as seen in (27a). While the use of bare nouns, as in (27a) is prevalent, there are also multiple methods in Japanese to indicate plurality. First, similar to *–men* in Mandarin Chinese, Japanese also has a morpheme *–tati*, which is often called a plural marker, as in (27b).

(27) a. gakusei
student
'student, students'

b. gakusei-tati
student-PL
'students'

When *–tati* is attached to a noun, its referent should be a plural entity, as shown in (28).

(28) Gakusei-tati-ga sankasita. *hitori/hutari datta.
student-PL-NOM joined one.CL/two.CL be.PAST
'Students joined. {*There was/There were} students.'

Normally, *-tati* is attached only to human nouns, though it is not impossible to mark plurality to non-human nouns with *–tati*. As in (29a), *-tati* is often attached to animals. Inanimate entities can be marked with *–tati*, although this is much less common than with animals and it brings some other implications (e.g., empathy, affection) (e.g., Nomoto 2013).

(29) a. raion-tati
lion-PL
'lions'

b. kutu-tati
shoe-PL
'shoes'

c. hon-tati
book-PL
'books'

Although I leave it open to later sections whether *–tati* individuates nouns, and although use of *–tati* with non-human nouns is spreading recently (Murahata 2019), of particular importance here is that *-tati* is not used with mass-y nouns in plural readings, as in (30).[4]

(30) *mizu-tati
water-PL
(lit.) 'waters'

Although Japanese does not have a generalized plural marking system, I consider *–tati* as a case of grammaticized countability in the same way as *–s* in English.[5]

Reduplication is an alternative method of indicating plurality. Despite some studies on the topic (Sudo 2014, Sudo 2017), reduplication has received little attention from a theoretical standpoint, likely due to its infrequent usage. Sudo (2014, 2017) introduces the examples of reduplicated nouns in (31), which are "most of the existing reduplicated nouns" (Sudo 2017:27).[6]

(31) Reduplicated nouns in Japanese

a.	hito-bito	'persons'
b.	yama-yama	'mountains'
c.	kuni-guni	'countries'
d.	mura-mura	'villages'
e.	hoshi-boshi	'stars'
f.	kami-gami	'gods'
g.	hi-bi	'days'
h.	hana-bana	'flowers'

[4]As in (i), *-tati* appears compatible with a mass noun. In such a case, however, the affection interpretation is obligatory, and the noun must be specific.

(i) ??wain-tati
wine-PL
'my lovely wine/my lovely bottles/collection of wine'

[5]See Section 4.4 for more detailed descriptions of distributions and restrictions on *–tati*, as well as syntactic analysis of it.

[6]The second part of the reduplication undergoes so-called *rendaku* (sequential voicing) in certain cases. If the initial consonant of the second part of the reduplicated nouns is a voiceless consonant, they are altered to "voiced" counterparts (e.g., Kawahara 2015, Kubozono 2008, Vance 1996, 2015). Note that /h/ normally corresponds to /b/, not /p/, in "voicing" in Japanese.

As shown in (31), reduplication for plurality does not take place on mass-y nouns. If it ever happens, as in (32), all the informants I consulted interpreted it as having coerced meanings.

(32) ??mizu-mizu
water-water
'bottles of water (or kinds of water)'

Therefore, it is appropriate to view reduplication as a type of count syntax. The summary of syntactic countability in Japanese concerning plurality and bare nouns is presented in (33).[7]

(33) Plurality and grammaticized mass-count in Japanese

a.	Count	Plural marker	*gakusei-tati*	'students'
		Reduplication	*yama-yama*	'mountains'
		General Number	*gakusei*	'student, students'
b.	Mass	bare	*mizu*	'water'

4.3.2 Direct numeral modification and use of classifiers

In Japanese, it is generally not permitted to modify nouns directly with numerals; instead, a generalized classifier system is utilized. As in (34), nouns, whether count-y nouns or mass-y nouns, normally require classifiers that render them countable.

(34) a. san-nin-no gakusei
3-CL-LIN student
'3 students'

b. yon-hiki-no raion
4-CL-LIN lion
'4 lions'

c. go-hai-no mizu
5-CL-LIN water
'5 cups/glasses of water'

However, classifiers may not always be necessary for expressing large and approximate numbers, and therefore, they can be considered optional in such instances (Nomoto 2013, Sudo 2014, 2016; also see Yi 2021 for similar phenomena in Korean and to a lesser degree, in Mandarin). Compare (35) and (36) to see when classifiers can be optional.

[7] To be precise, as discussed in Chapter 3, bare nouns (General Number) can be either count or mass. I proposed in Chapter 3 that DP bare nouns (wide scope) project IndPs (and #Ps), whereas nP bare nouns (narrow scope) are structurally bare and project nPs.

(35) a. gakusei go-sen (nin)
student 5-1000 CL
'5,000 students'

b. gakusei go-*?(nin)
student 5-CL
'five students'

c. gakusei-ni-hyaku-roku-?(nin)
student-2-100-6-CL
(lit.) '206 students'

(36) a. go-sen(-nin) no gakusei
5-1000-CL LIN student
'5,000 students'

b. go-*?(nin) no gakusei
5-CL LIN student
'5 students'

c. ni-hyaku-roku(-nin) no gakusei
2-100-6-CL LIN student
'206 students'

When a quantifier is a large and appropriate number, classifiers can be dropped, as in (35a) and (36a). In the case of small numbers, classifiers are nearly mandatory, if not entirely obligatory, whether the numeral quantifiers are placed post-nominally (35b) or pre-nominally (36b). The acceptability of a precise numeral depends on the position of the numeral quantifier. Post-nominally, dropping a classifier is far less common, as in (36c), while pre-nominal classifiers can be dropped whether the numeral is approximate or precise, as in (36c). The idea of being large is not grammatically determined (cf. Yucatec Mayan in Bale and Coon 2014; Shan (Tai Kadai) and Ch'ol (Mayan) in Little et al. 2020).

There is another type of direct numeral modification, as in (37) to (39). In such cases, numerals should precede a noun (without a linker *no*), and should be a small number or base, as in ((38b).

(37) a. san-sensyu
3-player
'three players'

b. *sensyu san
player 3

c. *san-nin-sensyu
3-CL-player

(38) a. ?Yon-zyuu sensyu
4-10 player
(Intended) '40 students'

b. sensyu yon-zyuu
player 4-10

c. *yon-zyuu-nin-sensyu
4-10-CL-player

(39) a. san-siai
3-game
'three games'

b. *siai san
game 3

c. *mittu siai
3-CL game

Although classifiers are essential for numerals in Japanese, it is not unusual for numerals to directly modify nouns (or with the linker *–no*, which is inserted post-syntactically (phonologically); Watanabe 2006, 2008, 2010).

Grammaticized countability in relation to numeral modification is summarized in (40).

(40) Numerals and grammaticized mass-count distinction in Japanese (to be modified in Chapter 5)

Type	**Form**	**Examples**
Count	Direct Modification	*san siai*(3 game)
		gakusei go-sen (student 5,000)
		go-sen no gakusei (5,000 of student)
	Classifiers	*3-nin no gakusei* (3-CL of student)
		gakusei 3-nin (student 3-CL)
		5-hai no mizu (5-CL of water)
		mizu 5-hai (water 5-CL)
Mass	N/A	N/A

4.3.3 Count-sensitive modifiers

As demonstrated in the previous section, Mandarin seems to lack a distinction between mass- or count-sensitive modifiers (Kuo and Yu 2012), whereas Japanese utilizes quantifiers

that are sensitive to count, similar to those found in English (e.g., *many*, *few*, *a few*, etc.), as shown in (41).

(41) a. tasuu-no gakusei/*mizu
many.number-LIN student/water
'many students/water'

b. musuu no gakusei/*mizu
no.number of student/water
'countless students/water'

c. nan-zen-toiu gakusei/*mizu
what-1000-say student/water
'thousands of students/water'

The examples including *mizu* in (41b) are acceptable in cases of coercion. In such cases, what is counted or quantified is not water, but containers of water (e.g., bottles, cans, glasses, etc.), portions of water (e.g., drops) or (sub-)kinds of water (e.g., many products of mineral water). The coercion effect also suggests that those quantifiers are count-sensitive.

It is interesting to note that Japanese does not appear to have mass-sensitive modifiers (cf. *much*, *little* in English).[8] That is, quantifiers are classified into count-sensitive ones or mass-count neutral ones. While count-sensitive modifiers suggest the presence of count syntax, the lack of mass-sensitive quantifiers also provides another clue for investigation of individuation and number in Japanese. It is intriguing to note that this type of unbalanced distribution can also be observed in classifiers and coercion.[9]

There are also count-sensitive determiners in Japanese. *Dono* (*-mo*) 'any' (Sudo 2016, Watanabe 2006) and *sorezore* 'each' require count-y nouns, as in (42) and (43).

(42) a. dono gakusei mo
which student also
'any student'

b. *dono mizu mo
which water also
(lit.) 'any water'

[8] Kobuchi-Philip (2021) and Muromatsu (1998, 2003) argue that *taryou* 'a lot of', *tairyoo* 'a lot of' and *shooryou* 'some' are mass-sensitive. However, *taryou* and *tairyou* are fairly acceptable, except that some oddity is detected for *shooryoo no hon* '(intended) a few books'

[9] Erbach et al. (2021) conducted a series of experiments and claim that *nan-byaku-toiu* 'hundreds of' is not compatible with *yuubinbutu* 'mail', whose English counterpart is a *furniture*-type noun. Although, with this, Erbach et al. (2021) argue for the existence of *furniture*-type nouns in Japanese, *nan-byaku-toiu yuubinbutu* '(lit.) hundreds of mail' is fairly natural, if not completely natural. Also, other Japanese nouns whose English counterparts are *furniture*-type nouns are compatible with the count-sensitive modifiers introduced in this chapter.

(43) a. sorezore-no gakusei
each-LIN student
'each student'

b. *sorezore-no mizu
each-LIN water
(lit.) 'each water'

Distributive quantification can also be expressed with reduplication in Japanese, as in (44) and (45).

(44) a. ura-ura 'each port'

b. tihoo-tihoo 'each region'

(45) a. sono hito sono hito
that person that person
'each person'

b. sono tihoo sono tihoo
that region that region
'each region'

Unlike the reduplication for plurality that was discussed in Section 4.2.1, these forms of reduplication are quite productive. Importantly, these types of *each* also resist quantifying mass-y objects as in (46).

(46) a. *mizu-mizu 'water-water'

b. *ame-ame 'rain-rain'

c. *kona-kona/-gona 'powder-powder'

Plural demonstratives also involve count syntax. While demonstratives *kore*/*sore*/*are* 'this/that' are all compatible with singular and plural nouns, plural demonstratives *korera*/*sorera*/*arera* 'these/those' necessarily lead to plural interpretations. Only count-y nouns (or coerced mass-y nouns) allow plural demonstratives[10]:

(47) a. korera no gakusei
these of student
'these students'

b. *korera no mizu
these of water
(lit.) 'these water'

[10]See Section 4.4 for an abundance reading in (47).

Grammaticized countability in relation to count sensitive modifiers is summarized in (48).

(48) Count/Mass sensitive modifier and grammaticized mass-count distinction

Type	**Form**	**Examples**
Count	Count sensitve modifiers	*tasuu-no gakusei* 'many students'
		musuu no hon (many of book)
		nan-byaku-toiu kodomo
		(what-hundred-say child)
		dono hon mo (any book also)
		sorezore-no gakusei (each student)
		korera no gakusei (these of student)
Mass	Mass sensitive modifiers	N/A

4.3.4 The grammaticized mass-count distinction in Japanese

Grammaticized countability in Japanese (as well as in English) is summarized in (49). It is clear that there are as many ways (or even more) to create syntactic countability in Japanese as in English.

(49) Grammaticized mass and count in English and Japanese (to be refined in Chapter 5)

Form	**English Count**	**English Mass**	**Japanese Count**	**Japanese Mass**
Plural	*books* *waters*(coercion)		*-tati*	
Bare Nouns		*water*, *furniture*	*gakusei* 'student' *hon* 'book' (General Number)	*mizu* 'water' *gakusei* 'student'
Numeral	*3 books*		*3 sensyu* '3 players'	
Classifier	*3 bottles of water*		*3-nin-no gakusei* (3-CL-LIN student) *3-bon-no mizu* '3 bottles of water'	
Countability Sensitive Modifiers	*many books* *a few books* *few books*	*much water* *a little water* *little water*	*tasuu, musuu* 'a number of' *dono–mo* 'any' sorezore 'each' *korerano* 'these' *sorerano, arerano* 'those'	

Contrary to a frequently discussed pattern, numerals do no always necessitate the use of classifiers in certain situations. Moreover, similar to English, there exist quantifiers and demonstratives in Japanese that can only be used with count nouns: e.g., *tasuu* 'many', *musuu* 'countless' for quantifiers, and *dono* 'any', *sorezore* 'each' for demonstratives. Thus, the observations in the above sections demonstrate that non-bare nouns in Japanese involve count syntax, although these are not dominant in the individuation/number system. In the rest of this chapter, I investigate how such nouns, focusing on plural nouns, are individuated, and how these build up nominal functional projections (IndPs, #Ps, DPs).

Another finding in (49) is the one-side distribution of count-related phenomena in Japanese. Although there are numerous methods to indicate countability, there is almost no noteworthy way to indicate mass in Japanese. Since Japanese has General Number, contrast appears between neutrality and count, while it appears between count and mass in English. Therefore, mass is unmarked as default, and mass-sensitivity is peripheral in Japanese.

This dichotomy is also true for plurality, as seen in the ensuing sections, and in classifiers, as seen in Chapter 5, where, as noted above, the classification of classifiers will be revisited, and the table in (49) is modified accordingly.

4.4 Plurals and Individuation

This chapter aims to explore the characteristics of plural expressions in Japanese and how they can be represented in syntactic structures, specifically, within IndPs and #Ps. I have shown thus far that count-sensitive quantifiers/demonstratives and plural markers manifest the grammaticized mass-count distinction. However, this claim itself still leaves open the question of whether plural markers in Japanese are individuators. In this section, to establish a framework to analyze plurals in Japanese (that show diverse peculiar characteristics) in Section 4.5, and to set how to determine individuation, I introduce various plural expressions in English and in other languages, and illustrate their derivations and structures, focusing on individuation and number.

4.4.1 Structural properties of individuation and number

Borer (2005a) separates projections for the specification of number from that of the grammaticized mass-count distinction (individuation; "division" in her term). In such a view, plural markers individuate nouns, and individuating plurals do not specify number properties (Borer 2005a). According to this claim (and also in this thesis), the structures of count

and mass nouns in English are schematized in (50). (I follow Borer and Ouwayda 2010 in assuming that #Ps and QPs are projected separately, in order to structurally distinguish count and mass.)

(50) a. *three books* [$_{DP}$ [$_{\#P}$ *three* [# [$_{IndP}$ *book*-s_{Ind} [$_{nP}$ ~~*book*~~]]]]]

b. *too much water* [$_{DP}$ [$_{QP}$ *too much* [Q [$_{nP}$ *water*]]]]

In (50a), the head feature IND (DIV in Borer 2005a) is realized as a plural marker (described as s_{Ind}), and assigns range for individuation. The boundness of -s_{Ind} leads the lexical head to move to the IndP level to be spelt out as *books*. Above the IndP, the f-morph *three* assigns range to the # head. The lack of the Ind projection indicates that the nominal is mass, as in (50b). Mass quantity expressions are realized with QPs. Of significance, the numeral *three* specifies the number property of # in (50a), not the plural marker. Borer (2005a) provides evidence, as elaborated in subsequent sections, to demonstrate that bare plurals lack specified number features (i.e., number neutral).

4.4.2 Plurals and Individuation

In English, the plural marker individuates nouns (Borer 2005a), and hence, is merged as a head feature of the Ind head. In the literature, it has been argued that inclusive plurals, which encompass *one* in certain instances (i.e., devoid of number specification), indicate individuation (Krifka 1989, 1995, Mathieu 2012, 2014). It has also been widely argued, however, that plurals are structurally polysemous in nature. Namely, plurals are realized with various underlying structures, and plural markers are mapped across nominal functional projections: e.g., individuating plurals on Ind (Borer 2005a), lexical plurals on n (Acquaviva 2008), counting plurals on # (Mathieu 2012, 2014), plurals as agreement markers on # (Borer and Ouwayda 2010), and higher plurals (Krifka 2008; also see Rothstein 2021 for a review for plurals). Wiltschko (2008) classifies plurals by their functions (modifier plurals, head plurals) and assigns various locations to plural markers (root, n, #, D) (see also Butler 2011, Kim and Melchin 2018, Kim and Meng 2021). In this section, reviewing a variety of plurals in English and other languages, I identify four types of plural expressions, as in (51).

(51) Plurals

a. Bare plurals (e.g., *books*) [$_{DP}$ [$_{IndP}$ -s_{IND} [$_{nP}$ book]]]]

b. Modified plurals (e.g., *three books*)
[$_{DP}$ [$_{\#P}$ Q$_{\cdot\#}$ [$_{IndP}$ -s_{IND} [$_{nP}$ *book*]]]]

c. Counting plurals (e.g., *burtogaal.a-at* 'oranges' (Arabic))
[$_{DP}$ [$_{\#P}$ *burtogaal.*a_{IND}.$at_{\#}$ [$_{IndP}$ ~~*burtogaal.*a_{IND}~~ [$_{nP}$ ~~*burtogaal*~~]]]]

d. Lexical plurals (e.g., *waters*; abundance plural)
[$_{DP}$ [$_{nP}$ [[$_{n}$ *-s*] [$_{Root}$ *water*]]]

4.4.2.1 Bare Plurals: Inclusivity as an indicator of individuation

In the structure assumed in this thesis, the plural marker in English individuates nouns, but does not specify number properties (singular, plural). I first review Borer (2005a) to observe that bare plurals are in fact number neutral. In this view, bare plurals are non-quantified individualized nouns, which are individuated as indicated by *–s* on the surface, but lack any accompanying elements that specify the number property. Examine (52) to see at least how many circles should be completed:

(52) My kid sister drew circles (all morning) (Borer 2005a:121)

According to Borer, the phrase *circles* in (52), although it is syntactically individuated (indicated by the plural marker *-s*), does not necessarily imply the existence of complete individual circles, but the sentence allows the interpretation that no single complete circle is drawn, as well as the ones with single or plural complete circles. With this, Borer argues that individuation does not involve the creation of a singular, and therefore bare plurals are number neutral despite their name.

Next, inclusive plurals, i.e., plurals that can be interpreted to include one, in downward entailment environments (or weakly referential environments), are claimed to be individuators (Mathieu 2012, 2014). As discussed in the previous chapter, for instance, in conditionals, as in (53), a question, as in (54), or negation, as in (55), bare plurals in English can be inclusive, their interpretation including *one* (cf. Farkas and de Swart 2010).

(53) If you have children, please raise your hand.

(54) A: Do you have children?
B: Yes, I have one child. / *No, I have (only) one child.

(55) I don't have children. *I just have one.

To strictly adhere to the instruction in (53), you should raise your hand even if you have only one child. In (54), the bare plural *children* refers to one or more children rather than exclusively more than one child. Therefore, if you have only one child, you still should answer yes. Similarly, in (55), the bare plural *children* refers to one or more children

rather than exclusively more than one child. Therefore, if you have only one child, it is contradictory to the first negative sentence.

These also show that bare plurals are individuated, but not specified for number. Thus, the fact that a bare plural allows an inclusive interpretation (or neutral interpretation), I claim, indicates that the plural individuates the noun. (Borer 2005a, Mathieu 2012, 2014).

Note that this is only for bare plurals. As seen below, modified/quantified plurals (e.g., *three books*) are individuated, but do not allow inclusive interpretations. Also, this is not applicable to bare nouns (General Number). I showed in the previous chapter that bare nouns in Japanese are number neutral but in fact individuated. I presented several clues to support the idea that bare nouns are individuated, but the neutrality of bare nouns or General Number alone does not imply individuation (although my analysis of the wide scope bare nouns (which involve individuation) in Japanese led to a similar structure as proposed for bare plurals in English).

To reflect the number neutrality of bare nouns in English, Borer (2005a:130) proposes the structure in (56) for English bare plurals.[11]

(56) Bare plurals in English $[_{\text{DP}}\ [_{\text{IndP}}\ \text{N-}s_{\text{Ind}}\ [_{\text{nP}}\ \sout{\text{N}}]$

In (56), the Ind head (*-s*) has a feature IND, which causes the lexical head N to move to the IndP level. In other words, descriptively, the plural marker individuates a noun. In contrast to modified plurals (e.g., *three books* in (50)), the structure in (56), however, lacks the #P projection, which reflects the number neutrality of bare plurals. Thus, the structure of a bare plural *books* in English is shown in (57).

(57) Bare Plurals *books* $[_{\text{DP}}\ [_{\text{IndP}}\ \textit{book-}s_{\text{Ind}}\ [_{\text{nP}}\ \sout{\textit{book}}]$

4.4.2.2 Modified plurals

Although I have just claimed that the inclusive interpretation indicates individuation, not all nouns with an individuating plural allow an inclusive plural interpretation. Consider (58):

(58) If you have two children, please raise your hand.

To make (58) true, one should raise a hand only when she/he has two kids (or more). Unlike bare plurals, the plural expressions *two children* cannot be interpreted inclusively. However,

[11] The open value of the D head should be assigned range through, e.g., existential closure or a generic operator. Unless necessary, I leave out the specification on D, focusing instead on number and individuation.

the use of numerals should indicate that the nominal participates in count syntax (i.e., individuated). Numerals, as well as other quantifiers and determiners, bring interpretations with a number specification (singular or plural) in English. The structure and derivation of modified plurals in English are shown in (59).

(59) Modified plurals (English)
three books [$_{\text{DP}}$ [$_{\#\text{P}}$ *three.*# [$_{\text{IndP}}$ *book*s_{Ind} [$_{\text{nP}}$ ~~*book*~~]]]]

The structure in (59) is for English-type languages, in which quantified nouns are also marked with a plural marker. In Hungarian, in contrast to English, quantified nouns are not compatible with plural marking, as shown in (60).

(60) a. hajó-k [Hungarian]
ship-PL
'ships'

b. öt hajó(*-k)
five ship-PL
'five ships' (Ortmann 2000:251-252)

According to the proposal in Borer (2005a), numerals in Hungarian serve to individuate a noun in a manner similar to how the plural marker functions in bare plurals. The structure in (61) is created for (60b) based on Borer's claim.

(61) Modified plurals (Hungarian)
öt hajó [$_{\text{DP}}$ [$_{\#\text{P}}$ *öt.*# [$_{\text{IndP}}$ ~~*öt*~~.IND [$_{\text{nP}}$ *hajó*]]]]

In (61), the numeral *öt* 'five' assigns range on individuation to the Ind head, which individuates the noun to make it countable. Since the noun is grammatically count, the # head can be specified for number features as well. To do so, the numeral rises to the # level, where the numeral assigns range on quantification to the # head. In these cases, the Ind and # heads have no phonological realizations, or no syntactic objects, whether covert or overt.

Zareikar (2018) submits a similar, but yet another, structure for quantified nouns without plurals in Azeri. Similar to Hungarian, Azeri numerals are not compatible with the plural marker.

(62) iki oğlan-(*lar) [Azeri]
two boy-PL
'two boys' (Zareikar 2018:32)

Zareikar (2018) proposes a null Ind head (a null plural marker, so to speak) that individuates nouns in Azeri. In addition to its use in plural expressions, the item in question is also utilized in diverse count syntax, such as General Number and classifier constructions. The structure in (63) is created for the plural expression in (62), where the null Ind head assigns range to the Ind head IND.

(63) Modified plurals (Azeri)
iki oğlan [$_{\text{DP}}$ [$_{\#\text{P}}$ *iki.*# [$_{\text{IndP}}$ *oğlan.*$\emptyset_{\text{IND}}$ [$_{\text{nP}}$ ~~*oğlan*~~]]]]

I assume that in a way similar to how the -s_{Ind} requires the lexical head to move to it in (56), the lexical head *oğlan* moves to the IndP level in (63), although the null head does not need support to be phonologically realized. Unless individuation and number are assigned by DP-external elements (e.g., indirect quantification for #), even a null head should be supported by an overt noun head.

4.4.2.3 Exclusive plurals

Thus far, plurals as individuators have been observed. It has also been pointed out, however, that not all plurals individuate. Mathieu (2014:166-167) observes that there are various ways to pluralize in Arabic, including sound plurals, broken plurals, plurals of singulatives, and double plurals. Sound plurals and broken plurals are classified as individuating plurals (*classifying plurals* in his term). Sound pluralization is achieved by affixation, as in (64b), and the plural allows the inclusive interpretation in (64c) as does the English equivalent.

(64) Sound plurals in Arabic
a. Singular mudarris- 'teacher'
b. Plural mudarris-uun (NOM)/ mudarris-een (ACC/GEN) 'teachers'
c. hal qaabalt mudarriseen?
Q met.you teacher-PL.ACC
'Did you meet teachers?'

In (64c), she/he would answer yes if she/he met one teacher or more. Thus, it is the inclusive plural. This observation can also be reproduced with broken plurals as in (65), which are created via the alternation of part of the stem.

(65) hal ʕindik ʔatfaal? [Arabic]
QUES have.you children
'Do you have children?'

In (65), the broken plural noun *ʔatfaal* 'children' allows an inclusive interpretation, and hence she/he can answer yes if she/he has only one child.

In contrast, Mathieu (2014:168-170) observes distinct behaviours with plurals of singulatives. Arabic contains a series of collective nouns, which employ a bare form (without any plural morphology) to denote a plural entity, as in (66). The (plural) referent of collective nouns can be singled out by singulativization (done by gender shift), as in (67).

(66) Collective nouns in Arabic

a. burtogaal 'oranges'

b. baqar 'cows'

c. waraq 'leaves'

(67) Singulativized collective nouns in Arabic

a. burtogaal.a(h) 'an orange'

b. baqar.a(h) 'a cow'

c. waraq.a(h) 'a leave'

Importantly, singulativized collective nouns can be pluralized further, as in (68), thereby Mathieu (2014) argues that singulatives are a manifestation of individuation.

(68) Plurals of singulativized collective nouns in Arabic

a. burtogaal.a-at 'oranges'

b. baqar.a-at 'cows'

c. waraq.a-at 'leaves'

As the singulativization process has already individuated the noun, the plural form used in (68) must serve a different function. Significantly, as Mathieu (2014) observes, pluralizing singulativized collectives results in an exclusive plural form. Consider (69).

(69) Exclusive plurals in Arabic

hal ʕindik burtogaal.a-at?
QUES have-you oranges.FEM-PL (FEM = singulativizer in this case)

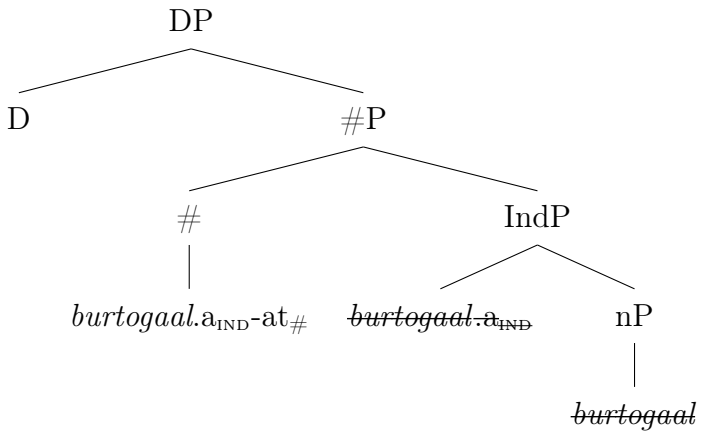
(Intended): 'Do you have oranges?' (Mathieu 2014:170)

To provide a thorough response to the question posed in (69) (if ever the sentence itself is judged acceptable), the listener should answer no, if she/he has only one orange. Namely, *burtogaal* 'oranges' in (69) should be interpreted as more than one orange, in contrast to

the sound plural *mudarriseen* 'teachers' in (64) and the broken plural *ʔatfaal* 'children' in (65). The fact that the plural of singulatives is exclusive implies that it is a counting plural rather than an individuating plural. (For similar claims on non-individuating plurals, see Bale and Khanjian 2009 for Armenian, Dali 2020, Dali and Mathieu (2021) for Tunisian Arabic, Borer and Ouwayda 2010 for Arabic, Zareikar 2018 for Azeri).

Following Mathieu (2012, 2014), I put the counting plural on #, as in (70).

(70) Plural of singulativized collectives (Arabic)
burtogaal.a-at [$_{\text{DP}}$ [$_{\#\text{P}}$ *burtogaal*.a$_{\text{IND}}$-at$_{\#}$ [$_{\text{IndP}}$ ~~*burtogaal*.a$_{\text{IND}}$~~ [$_{\text{nP}}$ ~~*burtogaal*~~]]]]



In (70), the noun *burtogaal* 'orange' undergoes a series of movement to enable the head feature to be phonologically realized as *-a(h)*, and then to enable the head feature # to be phonologically realized as *–at*, resulting in *burtogaal-a-at*.[12]

4.4.2.4 Lexical Plurals

Furthermore, it has been widely reported that plural markers can be attached to a mass-y noun without resulting in mass-to-count coercion. Consider (71) to see what the plural of mass refers to:

(71) The river discharges its waters into the lake. (= lots of water) (Acquaviva 2008:1)

[12]For two native speakers I consulted with, the sentence in (i), where the coerced mass noun is pluralized, is marginally acceptable when given a proper context (while others strongly disagree with the judgement). The bare plural *beers* in (i) is intended to mean more than one label of beer (subkind coercion), that is, it is exclusive, not allowing just one label in its interpretation. If (ever) this sentence is acceptable, it suggests the existence of a counting/exclusive plural in English (which in turn suggests the existence of a null Ind head that causes the mass-to-count coercion effect).

(i) *?This restaurant does not serve beers. They only have Canadian.

Water in (71) is pluralized morphologically, but it does not signify a plural entity of countable objects (let alone, there is no distinction between inclusive and exclusive interpretations). Despite the existence of the plural marker on the noun, *water* still refers to a mass entity, and hence it is not individuated.

Acquaviva (2008) points out that it rather expresses the abundance of the entity, and calls these sorts of plurals *lexical plurals*. In contrast to productive plurals (individuating plurals, counting plurals), lexical plurals are restricted to certain lexical items and to certain meanings. The observations that lexical plurals do not involve either individuation or counting, in tandem with this idiosyncrasy on the distributions and meanings, lead researchers to assign lexical plurals on the n head. Similar observations and a similar structural analysis of lexical plurals, in particular abundance plurals, are found in many languages: e.g., Amharic (Kramer 2016), Arabic (Mathieu 2014), Azeri, Persian (Zareikar 2018), Greek (Tsoulas 2008, Alexiadou 2011), Indonesian (Dalrymple and Mofu 2012), Innu-Aimun (Gillon 2015), and see Corbett 2000 and Lowenstamm 2008, as well as Acquaviva 2008, for a descriptive overview.[13]

The structure of lexical plurals (abundance plurals) is shown in (72).

(72) Lexical plurals (e.g., *waters*; abundance plurals)
waters $[_{DP}\ [_{nP}\ [_{n}\ n_{PL}\ \textit{water}\ ]]]$

I add [PL] to n to indicate this type of plural. This feature appears to cause a plural agreement, as in ***these*** *waters* ***are***.... Although I leave the nature of this "feature" open for future research, this "feature" requires further explanation of the plural agreement with abundance plurals (which I assume are still mass syntactically), and the definition and criteria of count syntax (and individuation). Such analysis also appears to have implications for pluralia tuntam: e.g., *trousers, *this trouser, *two trousers, these trousers, the trousers are*.... In Section 4.6, I briefly discuss the property of abundance plurals within the framework of Wiltschko (2008).

Plurals on nPs are not limited to abundance plurals. Kim and Melchin (2018) argue that a plural marker in Korean *-tul* is an nP modifier, based on the analysis of plurals in Wiltschko (2008). Wiltschko (2008) proposes that plurals can be either head plurals (i.e., on the # head, or other heads) or modifier plurals (adjoining to the root, n, # , or D). (See Section 4.6 for details.) Kim and Melchin (2018) employ idiosyncrasies as a clue for nP modifiers, based on the observation that *–tul* shows irregular distributions. They observe irregular distributions of *–tul*, in comparison to the Animacy Hierarchy, as in (73), in which Corbett (2000) points out that the distribution of plural marking follows

[13] See Section 4.5.5 for a possible case in Japanese.

cross-linguistically:

(73) Animacy Hierarchy (simplified):
human > non-human animate > inanimate

If a plural marking is possible at a point in the hierarchy, nouns in all the above-listed classes are also allowed. For instance, if a language allows non-human animate nouns to be pluralized, human nouns are highly likely to be pluralized as well in the language, whereas inanimate nouns (below-listed than the non-human animate) may or may not be pluralized.

Korean *–tul* is peculiar in this regard, i.e., it is attached to human and inanimate nouns, but much less often to non-human animate nouns, as in (74).

(74) a. salam-tul sey myeng
person-PL three CL
'three people'

b. chayk-tul sey kwun
book-PL three CL
'three books'

c. ??kilin-tul sey mari
giraffe-PL three CL
'three giraffes' (Kim and Melchin 2018:14)

With these, Kim and Melchin (2018) argue that *–tul* shows some idiosyncrasies in its distribution, whereby, it should be considered an nP modifier.

Although in Section 4.6 I discuss and abandon the head-modifier plural distinction proposed by Wiltschko (2008) (whose analysis Kim and Melchin 2018 largely rely on), I follow the claim that idiosyncrasies of certain lexical items are signs of lexical plurals (on nPs). With this, I introduce other types of lexical plurals in Japanese in Section 4.5, which show peculiarities for certain lexical items.

4.4.2.5 Plurals at the DP level

So far, plurals from the nP to the #P level have been observed. These varieties lead to an exploration of plurals at n even higher level, e.g., DPs, which I call "DP plurals".

I introduce two instances of plurals at the DP level: plurals in Yucatec Maya (Butler 2011), the plural marker *-men* in Mandarin (Kim and Meng 2021). Both Butler (2011) and Kim and Meng (2021) analyze plurals in each language based on an analysis by Wiltschko (2008), who proposes that plurals can be either head plurals (i.e., on the # head or other heads) or modifier plurals (adjoining to the root, n, #, or D). (See Section 4.6 for details.)

Extending from Wiltschko (2008), Butler (2011) presents syntactic properties (concord, agreement, conjunct, etc.) and semantic properties (the possible lack of plural interpretations, specificity) of plurals in Yucatec Maya that suggest that the plural morpheme adjoins DPs. Kim and Meng (2021) also present properties of a plural marker in Mandarin, *-men* (definiteness, interactions with pronouns), with which they argue that *-men* adjoins DPs. Although, as discussed in Section 4.6, I do not fully follow the analysis of the typology of plurals in Wiltschko (2008), the cases in Yucatec Maya and Mandarin convincingly show that plurals or pluralities can be found at the DP level. Syntactically, scope relations against demonstratives or other elements on D suggest certain plurals are at the DP level. Semantically, specificity or definiteness brought by a plural marker suggests that the plural marker is at the DP level. Tentatively assuming that plural markers are on the head (at odds with Wiltschko 2008), a possible structure of DP plurals is shown in (75).[14]

(75) DP plurals (e.g., *haizi-men* (kid-PL) in Mandarin)
haizi-men [$_{DP}$ haizi.$\emptyset_{\#}$.$\emptyset_{Ind}$-men [$_{\#P}$ ~~haizi~~.$\emptyset_{~~Ind~~}\emptyset_{\#}$ [$_{IndP}$ ~~haizi~~.$\emptyset_{~~Ind~~}$ [$_{nP}$ ~~*haizi*~~]]]]

4.4.2.6 Plurals and Individuation

(76) summarizes the different types of plurals in English that have been presented thus far.

(76) Many a plural

a. Bare Plurals *books* [$_{DP}$ [$_{IndP}$ *book*.IND [$_{nP}$ ~~*book*~~]]]

b. Modified plurals (e.g., *three books*)
three books [$_{DP}$ [$_{\#P}$ *three*.# [$_{IndP}$ *book*.IND [$_{nP}$ ~~*book*~~]]]]

c. Modified plurals (Azeri; e.g., *iki oğlan* '(lit.) two boy')
iki oğlan [$_{DP}$ [$_{\#P}$ *iki*.# [$_{IndP}$ *oğlan*.$\emptyset_{IND}$ [$_{nP}$ ~~*oğlan*~~]]]]

d. Modified plurals (Hungarian; e.g., *öt hajó* '(lit.) five ship')
öt hajó [$_{DP}$ [$_{\#P}$ *öt*.# [$_{IndP}$ ~~*öt*~~.IND [$_{nP}$ *hajó*]]]]

e. Counting plurals (Arabic; e.g., *burtogaal.a-at* 'oranges')
[$_{DP}$ [$_{\#P}$ *burtogaal*.a_{IND}.$at_{\#}$ [$_{IndP}$ ~~*burtogaal*.a_{IND}~~ [$_{nP}$ ~~*burtogaal*~~]]]]

f. DP plurals (Mandarin: e.g., *haizi-men* 'kids')
haizi-men [$_{DP}$ haizi.$\emptyset_{\#}$.$\emptyset_{Ind}$-men [$_{\#P}$ ~~haizi~~.$\emptyset_{~~Ind~~}\emptyset_{\#}$ [$_{IndP}$ ~~haizi~~.$\emptyset_{~~Ind~~}$ [$_{nP}$ ~~*haizi*~~]]]]

Individuating plurals play an important role in the individuation process, and are not directly relevant to number properties. Even though counting plurals (e.g., plurals of

[14] I include in the structure the IndP and #P. However, I leave open whether DP plurals always involve individuation and number specification. In the next section, I briefly discuss associative plurals in Japanese, which I argue reside at the DP level. Nakanishi and Tomioka (2004) claim that associative plurals do not necessarily involve individuation.

singulartives in Arabic) involve the concept of individuation, they do not serve as individuators. Instead, they express properties related to numerical quantity. Numerals or a null head can individuate nouns in certain cases. Lexical plurals, despite the name, do not denote plurality or refer to a plural entity, but instead they denote, e.g., abundance of the entity. Plurals that show idiosyncrasies to certain lexical items can also be considered lexical plurals on nPs (e.g., *-tul* in Korean; Kim and Melchin 2018). Plurals can also appear at the DP level (e.g., Yucatec Maya (Butler 2011); Mandarin (Kim and Meng 2021)). In the next section, I apply to plurals in Japanese these varieties of plurals and the criteria to determine the height of a plural in the structure.

4.5 Plurals in Japanese

In the last chapter and in the sections so far in this chapter, I have argued that Japanese (and also Chinese to a lesser degree) shows residual ways to manifest the grammaticized mass-count distinction in the absence of classifiers (bare nouns, count-sensitive quantifiers/demonstratives, plurals). With the claim that nominal phrases in Japanese involve individuation in the absence of classifiers, it is worth exploring whether plural markers are also individuators in Japanese. However, because of the co-occurrence generalization of classifiers and plural markers that is observed cross-linguistically (Greenberg 1972, Sanches and Slobin 1973, T'sou 1976), it is often (or widely) assumed that plurals in Japanese are a different type of plural than that in English (e.g., Nakanishi and Tomioka 2004). Therefore, it is still unanswered whether or not overt plural markers in Japanese (e.g., *-tati*, plurals via reduplication) themselves are individuators, and thereby manifest the grammaticized mass-count distinction. Also, since I introduced in Section 4.4 various locations in nominal functional projections (nP, IndP, #P, DP) where various types of plurals sit, it is necessary to discern which projection in the nominal structure hosts which plural marker in Japanese.

In this section, I explore the syntactic (and semantic) properties of plural markers in Japanese, including *-tati* plurals, as in (77)[15], plurals via reduplication, as in (78), and null plurals with plural quantifiers/demonstratives, as in (79), in comparison to plural markers in English and other languages.

(77) a. sensei-tati
teacher-PL
'(the) teachers'

[15]The *-tati* plurals have more meanings than the additive plural, as in (77). I discuss later in this section that *-tati* itself is polysemous in nature, and various types of *-tati* are mapped across nominal functional structures.

b. Haruko-tati
Haruko-PL
'Harukos (persons all named Haruko)'

(78) ie-ie
house-house
'houses'

(79) korera-no gakusei-$\emptyset_{PL}$
these-LIN student-$\emptyset_{PL}$
'these students'

I propose that *-tati* plurals used with proper names and plurals via reduplication individuate nouns in a similar way to *-s* in English, and also show that plurals in Japanese are spread across nominal functional projections from nPs to DPs. This claim provides supporting arguments and examples for the heterogeneous syntax of plurals (e.g., Borer and Ouwayda 2010, Mathieu 2014, Wiltschko 2021).

4.5.1 Varieties of *-tati*

First, I introduce varieties of *-tati*, which show different syntactic and semantic properties, as discussed later in the next two sections. A noun with *–tati* denotes a plural entity, as in (80); it cannot be referred back to by a singular pronoun, as in (81), analogous to *–s* in English.

(80) gakusei-tati
student-PL
'(the) students'

(81) Haruko-wa gakusei-tati-ni sono hon-o syookaisita-ga, {*kare/karera}-wa
Haruko-TOP student-PL-DAT that book-ACC introduced-but {he/they}-TOP
sono hon-o yom-anaka-ta.
that book-ACC read-NEG-PAST
'Haruko introduced that book to (the) students, but {*he/they} did not read that book.'

I call plurals that refer to a monotonous group (e.g., a group of people who are all students) **additive** plurals, and describe these with a plural marker *-s* in the translation, as in 'students'.

It is well-known that *-tati* also allows an **associative** reading (e.g., Hirose 2004, Nakanishi and Tomioka 2004, Ochi 2012, Ueda 2014, Ueda and Haraguchi 2008). In addition to the additive reading, the example in (80) can be used for a group of people that is

represented by a student or students, but also includes non-student members (e.g., their parents, non-student friends, teachers, administrative staff in the university, etc.). I describe the associative plurals with cumbersome translations, as in "(the) student(s) with their associate(s)," to clarify the difference from the additive plurals.

Associative readings become more salient when *-tati* is used with proper names, as in (82).

(82) Haruko-tati
Haruko-PL
a. Additive: 'Harukos, people all named Haruko'
b. Associative: 'Haruko and her associate(s)'

As in (82b), the most salient interpretation of *-tati* with a proper name is the associative plural interpretation, which refers to a group of people that is represented by a person named Haruko, but also includes another person/people surrounding Haruko (e.g., her friend, family, etc.).[16] However, of particular importance in this chapter is the fact that *-tati* can also be used with proper names in an additive plural interpretation, as in (82a), in a similar way to a proper name with a plural marker in English (e.g., *Marys* for people all named Mary).

In addition to the additive-associative contrast, *-tati* is peculiar in that it commonly brings a specific interpretation, which is described with '(the)' in the translations, as in '(the) students'.[17] However, whereas the specific interpretation is more salient in many cases, Nakanishi and Tomioka (2004) demonstrate that *-tati* can be non-specific. In this chapter, I focus on *tati* with a non-specific interpretation, distinguishing *-tati* with a specific

[16] Associative plurals include peculiar cases as in (i) (Tatsumi 2017b). When the nominal phrase to which *-tati* is attached denotes a plural entity (e.g., a couple, siblings, Haruko and Zin), adding *-tati* may not bring any substantial meaning to the phrase. I consider, following (Tatsumi 2017b), that *-tati* in these examples is also a variety of associative plural. These types of associative plurals also suggest that, as argued below, associative plurals are attached to DPs. (See den Besten 1996 for a similar observation and claim in associative plurals/construction in Afrikaans.)

(i) a. huuhu-tati
couple-PL
'the/a couple'
b. Haruko to Zin-tati
Haruko and Zin-PL
'Haruko and Zin'

[17] It seems that the literature has not reached a consensus regarding the true nature of this property: e.g., specificity (e.g., Ochi 2012, Hosoi 2005), definiteness (e.g., Kurafuji 2004, Nakanishi and Tomioka 2004, and referentiality (e.g., Nomoto 2013). As pointed out by Ochi (2012), however, of importance on this point is that *-tati* often brings a property that is commonly associated with D. While I describe it as specificity, I leave for future research the true nature of the property that *-tati* brings.

interpretation from *-tati* with a non-specific interpretation (described without articles, as in 'students', in the translations). The *tati* with a specific interpretation is excluded when I discuss in dividuation, since specificity (or definiteness) makes it hard to determine whether a plural allows an inclusive plural interpretation, which I argued in Section 4.4 is a sign of individuation. Also, specificity itself causes a similar effect to individuation, picking out an entity from the context (e.g., pragmatic individuation (e.g., Zhang 2018, 2020); or nominal grounding (Langacker 2008)).

Besides plurality, *-tati* involves other meanings.[18] Examine the examples in (83) to see what *-tati* brings.

(83) a. (?)neko-tati
cat-PL
'(my lovely) cats/(my lovely) cat(s) and their associate(s)'

b. ??kutu-tati
shoe-PL
'my lovely shoes/my lovely shoes and their associate(s)(accessories)'

c. ??wain-tati
wine-PL
'my lovely wine/my lovely wine and others'

As in (83), *-tati* often involves affection, in particular, when it is used with an inanimate entity. For instance, the example in (83) can be used by a shoe-collector. I call it **affection plurals**. The affection reading is available no matter which plural reading (additive or associative) is intended. For instance, *neko-tati* in (83a) can be used to describe either a group of cats for which the speaker feels affection (additive plural + affection readings), or a cat/cats and their associate(s) (e.g., other pets) for which the speaker feels affection (associative plural + affection readings). Similarly, *wain-tati* in (83c) might include other alcohol or drinks.

As will be seen in the next section, the additive *-tati*, the associative *-tati*, and the affection *-tati* show different distributions and functions. Especially, it is noteworthy that, as in (83c), the associative *-tati* and the affection *-tati* can be used with a mass term. Thus, I consider that the affection plurals are yet another variety of *-tati*, in addition to the additive and associative plurals. Namely, these three *-tati*s are polysemous. As briefly discussed in the next section, I consider affection plurals as lexical plurals (on nPs), since they show peculiar meanings and idiosyncrasies for certain lexical items.

[18] Nomoto (2013) claims that affection as in (83), and politeness as in (86) are not asserted meanings of the plural, but the conventional implicature. For simplicity, I also use "meanings" for these components brought by *-tati*.

The variety of *-tati* that I examine in this chapter is listed in (84).

(84) a. Additive plurals with common nouns (specific, non-specific):
e.g., *gakusei-tati* 'students'

b. Additive plurals with proper names (specific, non-specific):
e.g., *Haruko-tati* 'Harukos'

c. Associative plurals with common nouns:
e.g., *gakusei-tati* 'a student/students and their associate(s)'

d. Associative plurals with proper names:
e.g., *Haruko-tati* 'Haruko and her associate(s)'

e. Affection:
e.g., *neko-tati* 'my lovely cats (and their associate(s))',
wain-tati 'my lovely wine (and others)'

In this chapter, I focus on *-tati* with common nouns in an additive and non-specific interpretation, and *-tati* with proper names in an additive and non-specific interpretation. This section investigates *-tati* with common nouns, as in (84a, c), as well as other types of *-tati*, as in (84d, e). The next section investigates *-tati* with proper names in an additive interpretation, as in (84b).

I explore the individuation of *-tati*, and also discuss specific additive plurals and associative plurals for comparison to argue for the heterogeneous syntax of plurals (e.g., Mathieu 2014). I propose that *-tati* with proper names manifest the grammaticized mass-count distinction (i.e., *-tati* resides on the Ind head), whereas *-tati* with common nouns (additive, non-specific) are counting plurals (thereby, residing on the # head). I map the affection plural to nPs, and the specific *-tati* and associative plurals to DPs, following the analyses of DP plurals (e.g., Butler 2011, Kim and Meng 2021, Wiltschko 2008). The proposals in this chapter for structural locations of various (overt) plural markers in Japanese are summarized in (85).

(85) Varieties of *-tati* and their projections

	Type	Specificity	Nouns	Structure
a	Additive	Non-specific	common nouns	#P
b	Additive	Non-specific	proper names	IndP
c	Additive	Specific	CNs/PNs	DP
d	Associative	Spe./Non-Spe.	CNs/PNs	DP
e	Affection	Specific	CNs/PNs	nP

Before going into the detail of *-tati*, I briefly discuss other plural markers in Japanese, since

-tati is not the sole element that leads to plurality. At least three more suffixes have been reported to indicate plurality, as in (86).

(86) a. sensei-ra

b. sensei-domo

c. sensei-gata
teacher-PL
'teachers'

The plural markers in (86a) through (86c) are less common and more restricted than *-tati*. Each of the markers in (86) imposes restrictions on formality or politeness (Nomoto 2013), while *-tati* is neutral in this respect. For instance, *-ra* weakly implies humbleness.[19] *-Domo* has a stronger sense of humbleness for the listener, or the speaker's disrespect to the person denoted by the noun: e.g., *makeinu-domo* (loser+PL). *-Gata* describes the speaker's respect to the person denoted by the noun: e.g., *sensei-gata* (teacher-PL). Therefore, because of the pragmatic effects (which are associated with specificity, which makes it hard to examine individuation), I exclude the plural markers in (86) from the discussion in this chapter unless otherwise necessary.

4.5.2 *-Tati* plural (1): Common nouns

4.5.2.1 Distribution

-Tati is mainly used with a human noun, as in (87), sometimes used with animals, as in (88), and rarely used with inanimate things, as in (89) and (90).

(87) amerika-zin-tati
America-people-PL

a. Additive: '(the) Americans'

b. Associative: '(the) American(s) and their associate(s)'

c. Affection: '*my lovely Americans/my lovely American(s) and their associate(s)'

(88) neko-tati
cat-PL

a. Additive: '?(the) cats'

b. Associative: '?(the) cat(s) and their associate(s)'

c. Affection: '?my lovely cats/my lovely cat(s) and their associate(s)'

[19] *-Ra* is more commonly used with pronouns (e.g., *kare-ra* (he-PL) and demonstratives (e.g., *kore-ra* (this-PL)).

(89) kutu-tati
shoe-PL

a. Additive: '*shoes/pairs of shoes'

b. Associative: '*shoes/(a) pair(s) of shoes and their accessories'

c. Affection: '??my lovely shoes/my lovely shoes and their accessories'

(90) wain-tati
wine-PL

a. Additive: '*(the) wines/(the) bottles of wine'

b. Associative: '*(the) wine(s)/bottles of wine and its/their accessories'

c. Affection: '??my lovely wine/my lovely wine and its accessories'

The distributions of -*tati* described in (87) to (90) are straightforward when arguing for three types of "plurals" as introduced in Section 4.5.1.1: **additive** plurals, as in (87) and possibly (88), **associative** plurals (without an affection implication), as in (87) and (88), and **affection plurals**, as in (88) to (90).[20]

It is common among world languages that only subparts of nouns can be pluralized. Corbett (2000) argues that the distribution of plural marking follows the Animacy Hierarchy (p.56, simplified), as in (91).

(91) Animacy Hierarchy (simplified):
human > non-human animate > inanimate

If a plural marking is possible at a point in the hierarchy, nouns in all the above-listed classes are also allowed. For example, if a language allows non-human animate nouns to be pluralized, human nouns are highly likely to be pluralized, whereas inanimate nouns (below-listed than the non-human animate nouns in the hierarchy in (91)) may or may not be pluralized. -*Tati* with additive plurality follows the hierarchy. As shown in (87) to (90), the additive plurals are only compatible with human nouns and possibly non-human animate nouns.

On the other hand, associative plurals are compatible with all types of nouns (human, animal, inanimate)[21], although inanimate entities with associate -*tati* plurals must involve an affection implication. Affection plurals are normally used with animals and inanimate

[20] As noted above, and as I shall discuss below, -*tati* with affection is compatible with a mass term, as in *wain-tati* (wine-PL). For simplicity, I still call it "affection plurals".

[21] Corbett (2000) claims that the Animacy Hierarchy applies to both additive and associative plurals (Corbett 2000:84). However, the distributions of -*tati* in (87) to (90) show the contrary. In particular, it is noteworthy that associative plurals are compatible with a mass term (if the affection is implied), as in (89) and (90).

entities. For inanimate entities, the meaning of affection is almost obligatory. Thus, the three types of "plurals" (additive, associative, affection) show different distributions. With these, I claim that these three types of plurals are polysemous, and involve distinct underlying structures.

4.5.2.2 Semantic effects

More salient than its distribution are the semantic properties of *–tati*. First, as introduced above, *-tati* brings three interpretations (additive, associative, affection). The additive plurals are, I claim, genuine plurals that are similar to plurals in English (but see below on the specificity effect).

Aside from what types of nouns they can be used with (as discussed in (87) to (90)), these plurals also show differences in countability. As discussed in Section 4.3, additive plurals with *-tati* manifest the mass-count distinction, i.e., they are incompatible with mass terms unless these lead to mass-to-count coercion effects. On the other hand, as in (90), affection plurals (and associative plurals in tandem with affection plurals) can be used with a mass term without causing mass-to-count coercion. Theoretically, Nakanishi and Tomioka (2004) claim that nouns with associative plurals are compatible with non-individuated denotations: e.g., in *gakusei-tati* 'student-PL' has only to represent the referent (a group of people), but does not need to have countable denotations.

Moreover, it is widely argued that *-tati* brings a specific reading (Kurafuji 1999, 2004, Nakanishi and Tomioka 2004, Nomoto 2013, Ochi 2012, among many others). However, Kurafuji (1999, 2004) and Nakanishi and Tomioka (2004) demonstrate that *-tati* can be non-specific. Since I focus on the non-specific *-tati* in this chapter, I first discuss the properties of the non-specific *-tati*. Examine (92) to see the "meaning" of *kodomo* 'kid'.

(92) kouen-ni kodomo-tati-ga ita.
park-in child-PL-ACC existed

a. 'There were children in the park.' (non-specific)

b. '?(The) children were in the park.' (specific)

(Nakanishi and Tomioka (2004):120, (b) is added based on their discussion)

The sentence in (92) is likely to be said as a description of what the speaker saw, as in (92a), rather than an explanation of *the* kids' whereabouts, as in (92b). The context in (92b) (specific) is still possible, but much less natural than (92a) (non-specific).

Non-specific interpretations of *–tati*-marked nouns are more salient when they are used with a scope taking element, i.e., *-tati*-marked nouns can take a narrow scope. Taking

a narrow scope is not straightforward if *-tati* only leads to a specific interpretation (i.e., wide scope). Consider (93) from (Nakanishi and Tomioka 2004:121):

(93) Kono kouen-de-wa itumo kodomo-tati-ga asondeiru.
this park-in-TOP always kid-PL-NOM playing
a. 'In this park, there are always children playing.' (non-specific)
b. '??In this park, there are some children who are always playing.' (specific)

In the most salient interpretation of (93), *kodomo-tati* 'children' takes a narrow scope against *itumo* 'always'; namely, there are always some children, whoever they are, in the park. The children observed might be different every day. Or those are mostly the same members, but there might be ins and outs. The sentence in (93) does not naturally presuppose some particular children who are always observed.

Nakanishi and Tomioka (2004:121-123) present more evidence to show that *–tati* plurals can be non-specific, including *donna* 'what kind', as in (94), relative clauses, as in (95) and sluicing, as in (96).

(94) a. A:Donna gakusei-tati-ga kita-no.
what.kind.of student-PL-NOM came-QUES
'What kind of student came?'
b. B:Majimena gakusei-tati-ga kita.
serious student-PL-NOM came
'Serious students came.'

(95) sokoni atumatta gakusei-tati
there gathered student-PL
'students who gathered there'

(96) Inoue-sensei-no ie-ni kodomo-tati-ga atumatta-to kiita kedo, watasi-wa
Inoue-Prof.-of house-at child-PL-NOM gathered-that heard but I-TOP
dono kodomo-tati-ka sira-nai
which child-PL-Q know-NEG
'(I) have heard that children gathered at Prof. Inoue's house, but I don't know which children.'

The *–tati*-marked nouns in (94) are not necessarily specific. Rather, in (94a) and (94c), the non-specific interpretations are far more salient.

Nakanishi and Tomioka (2004) point out (and Nomoto 2013 develops) that the specificity effects can be circumvented in other ways: modification and contrast. Consider (97) and (98) to see how modifiers alter associated judgements.

(97) Sono byooin-wa kangosi-tati-o sagasi-teiru.
that hospital-TOP nurse-PL-ACC look.for-PROG
a. Narrow: '*?That hospital is looking for nurses (to hire).'
b. Wide: 'There is a nurse/are nurses that hospital is looking for.'

(adopted from Nakanishi and Tomioka 2004:115)

(98) Sono byooin-wa [kodomo-no atukai-ni nareta] kangosi-tati-o sagasite-iru.
that hospital-TOP kid-GEN handling-DAT be.used nurse-PL-ACC loof.for-PROG
'That hospital is looking for nurses (to hire) who are used to dealing with kids.' (narrow scope)

(adopted from Nakanishi and Tomioka 2004:136)

In (97), the *–tati*-marked noun should take a wide scope, whereas, in (98), it allows a narrow scope reading. The example in (98) is acceptable even when *-tati* is attached to a noun. If *-tati* necessarily brings a specific (or definite) interpretation, the grammaticality of (98) is not explained.

In this chapter, when I investigate the individuation of *-tati*, I mainly investigate *-tati* plurals in non-specific interpretations (by adding a modifier or a scope-taking element to force a narrow scope/non-specific reading), and present *-tati* plurals in specific interpretations just for comparison, since specificity (or definiteness) makes it hard to examine individuation (pragmatic individuation; Zhang 2018, 2020).

For completion and comparison, I here show the specificity effect of *-tati*. First, *-tati*-marked nouns cannot be used as a predicate, a location where a specific or definite noun is prohibited (cf. **They are the students*). Consider (99) from Nomoto (2013:112):

(99) Karera-wa gakusei(*-tati) da.
they-TOP student-PL be
'They are students.'

The *–tati*-marked nouns cannot be used in the copular sentence, which requires a non-specific nominal.[22]

Second, a nominal phrase with *-tati* appears not to refer to kinds, as shown in (100), which shows that a "bare" plural *-kyooryuu-tati* 'dinosaurs' is not compatible with a kind-denoting predicate *extinct*.

(100) *Kyooryuu-tati-wa zetumetusi-ta.
dinosaur-PL-TOP become.extinct-PAST
(Intended) 'Dinosaurs became extinct.'

[22]The noun with *-tati* can be used anaphorically, as in, e.g., *They are the students* (who, e.g., I talked about yesterday). With this interpretation, the example in (99) is acceptable.

Third, examine (101) to see the relative scope that the *-tati*-marked nouns can take.

(101) Sono byooin-wa kangosi-tati-o sagasi-teiru.
that hospital-TOP nurse-PL-ACC look.for-PROG

a. Narrow: '*?That hospital is looking for nurses (to hire).'

b. Wide: 'There is a nurse/are nurses that hospital is looking for.'

(adopted from Nakanishi and Tomioka 2004:115)

As discussed in previous chapters, bare nouns in Japanese take variable scope against the intentional verb *look for* (as well as *want to*). When *–tati* is attached to the noun, however, it only takes the wide(st) scope, as in (101).

Another clue of the specificity of nouns with *–tati* comes from floating numeral quantifiers (FNQs) (Kitaoka 2014, Miyagawa 1989, 2017, Nakanishi 2007), which are restricted to an indefinite reading, as in (102).

(102) a. Gakusei-ga kinoo san-nin kouen-de odotta.
student-NOM yesterday 3-CL park-in danced
'(*The) Three students danced in the park yesterday.'

b. *Gakusei-tati-ga kinoo san-nin kouen-de odotta.
student-PL-NOM yesterday 3-CL park-in danced
'The three students danced in the park yesterday.'

As in (102a), when the numeral quantifier is separated from its associate noun *gakusei* 'student' (i.e., when it is in the state of an FNQ), it resists the specific interpretation. Attaching *–tati* to the noun causes ungrammaticality: FNQs require a non-specific interpretation, while *-tati* yields the specificity effect.[23,24]

[23]Note that the ungrammaticality in (102b) does not stem from the co-occurrence of a classifier and a plural marker (Borer 2005a, Greenberg 1972), because a classifier and a plural marker can co-occur DP-internally. See the next chapter for more details.

[24]The sentence in (102b) is marginally or somewhat acceptable for some speakers. Kitaoka (2014) claims that an apparent specific reading with FNQs is derived from a partitive specific reading. (102b) is acceptable when it means *Three of the (specific) students danced in the park yesterday.* As suggested by this translation, such a reading can be called partitive specificity (Enç 1991, Muromatsu 1998, 2003), but *three students* (among all the students in the context) is not specific in the manner used in this thesis. I exclude the partitive specificity readings from the specific effect in question.

Aside from this, since bare nouns also allow the definite reading, (102a) allows the partitive reading as well. Since the study by Inoue (1978), there has been considerable debate surrounding the structure and derivation of partitive floating numeral quantifiers. I follow Inoue (1978) in that the partitive FNQs are adverbials, rather than, as in (102a), derived through movement between the host noun and the FNQs. (See Chapter 5 for possible alternative analyses of FNQs: e.g., Nakanishi 2007). Namely, in the partitive reading in (102b), the FNQ does not start out inside the nominal domain, but is base-generated in the verbal domain as an adverbial. Adverbials of quantification, such as the partitive FNQs as well as *mostly*, may indirectly assign a range to a nominal syntax or semantics. However, the scope of this thesis does not extend to the D domain and beyond.

The properties of non-specific and specific *-tati* plurals are listed in (103) (see Sections 4.5.2.4 and 4.5.2.5 for details of the properties of non-specific *-tati* plurals):

(103) The properties of non-specific and specific *-tati* plurals

	Properties	Non-specific	Specific
a	Nominal Predicate	ok	*
b	Kinds	*	*
c	Scope	narrow	wide

4.5.2.3 A non-uniform analysis of *-tati*

A debate exists regarding the various interpretations of *–tati*, specifically about additive plurals and associative plurals. This subsection clarifies the theoretical assumptions on structures and derivations of three types of *-tati* introduced thus far: additive (specific or non-specific), associative, and affection.

It has been hotly debated whether the additive and associative interpretations are derived as variants of one single element or two distinct but similar meanings coincidentally sharing the same morphological form (i.e., polysemy).

Abstracting away differences in details, the first view, which I call the non-uniform view, argues that additive and associative readings with *–tati* are polysemous (e.g., Hirose 2004, Kurafuji 1999, 2004, Nomoto 2013, Ochi 2012, Ueda 2014, Ueda and Haraguchi 2008, among many others; also see Li 1999 for Mandarin, Kim and Melchin 2017, 2018 for Korean, Gillon 2015 for Innu, and Kramer 2016 for Amharic). Under the non-uniform view, the claim that associative plurals are located on D or adjoined to DPs is fairly common (e.g., Hirose 2004, Hosoi 2005, Nomoto 2013), whereas the locations of additive plurals vary among past studies (n, Ind, #). Hirose (2004) argues that additive plurals are on NPs (although it is not clear which projections in this thesis correspond to NPs in Hirose 2004; NPs, IndPs, or #Ps). Nomoto (2013) proposes a structure where additive plurals are merged with nPs (NPs in his term), but the label of the projection is not clarified.

Nakanishi and Tomioka (2004) propose a radically different view for diverse readings of *-tati* (the uniform view). *-Tati* with additive and associative readings are structurally identical, and the variations of the meanings are all semantic/contextual. Namely, the *default* interpretation of a nominal phrase with *-tati* is associative: e.g., *gakusei-tati* (student-PL) is expected to refer to a group that is represented by a student or students (but that includes non-student members). Under the uniform view, the additive reading is a variation of the associative reading. If the referent of a nominal phrase with *-tati* happens to be a uniform group (e.g., a group whose members are all students), it *looks* like an additive plural.

I adhere to the non-uniform view, claiming that certain structural characteristics of *-tati* cannot be accounted for with a single, unified explanation, and that various readings of *-tati* are realized with distinct underlying structures. In other words, the syntax of plurals in Japanese is heterogeneous.

Ueda and Haraguchi (2008) point out that *-tati* in fact can be doubled[25], and importantly, the doubled *-tati* shows a restriction of the meaning. Consider the example in (104) and its (im)possible interpretations:

(104) John-tati-tati
John-PL-PL

a. ok Add Ass — e.g., Johns and another John, and their friends
b. * Add Add — e.g., John and another John, and another group of Johns
c. ok Ass Ass — e.g., John and his friends, and their teachers
d. * Ass Add — e.g., John and his friends, and another John and his friends

It is noteworthy that not all of the potential compositional interpretations can be realized. In particular, additive plurals cannot follow another *-tati*, whether the first one is additive or associative. With these distributions, Ueda and Haraguchi (2008) claim that associative plurals are higher than additive plurals in structure. Another difference that the example in (104) shows is that additive plurals cannot be doubled, whereas associative plurals can.

Unfortunately, the restricted distributions alone do not suffice to support a consistent analysis. The ungrammaticality of (104b, d) can also be explained by a restriction of additive plurals, as in (105) in that it cannot pluralize a group of people.

(105) tyoosyuu-tati
audience-PL

a. '*groups of audience' (additive)
b. '?members of audience' (additive)

In (105a), *-tati* is intended (but fails) to pluralize *audience*, resulting in more than one group of audience: e.g., audience in a classroom and audience in an auditorium.[26] Thus, the ungrammaticality of (104b, d) suggests, but does not necessarily show, the structural hierarchy of the purported two *–tati*s.

[25] Doubling *-tati* is rare and not fully natural for most speakers. Nomoto (2013) points out that replacing the second one with another plural marker *-ra*, as in *-tati-ra*, ameliorates the acceptability (although to do this, it must be assumed that *-tati* and *-ra* reside in the same structural position).

[26] (105b) is acceptable where the *-tati* suffix pluralizes a member of an audience. In this scenario, however, what is intended to be pluralized is not a collective group of people but each individual in the audience.

The use of demonstratives provides us with further clues to investigate the types and locations of *–tati* suffixes (Nomoto 2013). Examine (106), noting that demonstratives in Japanese can refer to either a singular or a plural entity (but see below for discussions on the contrary)[27]:

(106) sono gakusei-tati
that student-PL

a. Structure: [that student]-PL *that < additive, that < associative

b. Structure: that [student-PL] that > additive, that > associative

Additive plurality cannot be applied to one specific entity, as in **Is* or **Johns*. Therefore, the example in (106) cannot be used for a plurality of *that student*, as in (106a). Additive plurals can only take scope below the demonstrative, as in (106b), meaning *that group of students*. Conversely, associative plurals can take scope either over (106a) or below (106b) the demonstrative. When the associative *-tati* takes scope over the demonstrative, the example in (106) describes that/those student(s) and his/her/their associate(s), as in (106a). When the associative *-tati* takes scope below the demonstrative, the example in (106) describes a group including a student/students and his/her/their associate(s), as in (106b).

The ambiguity test also demonstrates that the uniform view is not tenable. As discussed in Chapter 3, if an ambiguous expression fails the test, it suggests that the ambiguity stems from polysemy or that the ambiguous sentences are realized with distinct structures. With this in mind, consider (107).

(107) Kinoo gakusei-tati-ga ofisu-ni kita. Kyoo-mo _____ kita.
yesterday student-PL-NOM office-to came today-also _____ came

a. 'Yesterday, students came to my office. Students came today too.'

b. '*Yesterday, students came to my office. (A) student(s) and his/her/their associate(s) came today too.'

[27]The examples in Nomoto (2013:69) include *san-nin* (3-CL). Nomoto (2013) claims that adding numeral quantifiers obligatorily makes the referent a uniform group, as in (i). I removed it, since the non-uniform reading, in particular, (ic), is acceptable for many speakers, although it is true that the addition of *sono* makes it much easier to obtain that meaning.

(i) san-nin no gakusei-tati
3-CL of student-PL

a. 'ok 3 students'

b. '*3 people including a student or two'

c. '*3 students and their associates'

c. '*Yesterday, (a) student(s) and his/her/their associate(s) came to my office. Students came today too.'

d. 'Yesterday, (a) student(s) and his/her/their associate(s) came to my office. (A) student(s) and his/her/their associate(s) came today too.'

As shown in (107b, c), the ambiguity between the additive and associative plural readings does not survive over ellipsis. Namely, the ambiguity of two plural interpretations in (107) is derived from distinct underlying structures.

The observations so far based on Ueda and Haraguchi (2008) and Nomoto (2013), show that the additive and associative *-tati* plurals are homonymic (structurally ambiguous), and that the associative plurals are at the DP level. Although these observations do not show whether the additive plurals are individuating plurals or counting plurals (which I discuss in Section 4.5.2.5), there are further clues to argue that the associative plurals are on DPs.

First, the collective use of the associative plurals as in (108) shows that *-tati* is attached to DPs.

(108) a. huuhu-tati
couple-PL
'the/a couple'

b. Haruko to Zin-tati
Haruko and Zin-PL
'Haruko and Zin'

c. huuhu to Haruko-tati
couple and Haruko-PL
'the/a couple and Haruko'

d. kanozyo to Zin-tati
she and Zin-PL
'she and Zin'

In the collective use, the associative plural does not bring substantial meanings to the nominal phrases, as in the examples in (108). Also, *-tati* scopes over the conjoint elements, as in (108b, c, d), as in [*huuhu to Haruko*]-*tati* for (108c.) Assuming that proper names and pronouns are Ds/DPs (unless those are used as common nouns), the examples in (108) suggest that *-tati* is attached at the DP level.

Second, the fact that the associative *-tati* plurals are compatible with a mass term also shows that *tati* is attached to DPs for these uses. The phrase in (109) can be used to refer to a mass entity *wine* as well as other drinks (e.g., sparkling wine, fruit liquor).

(109) wain-tati
wine-PL
'my lovely wine and others'

The example in (109) involves specific and affection interpretations. Because of the affection interpretation, the wine should refer to a specific entity (although it can still be mass since the phrase can be used to refer to an unknown amount of wine (e.g., the wine that is being shipped from France). This specificity also suggests that *-tati* is attached to DPs.

A distinction should be made between specific additive plurals and non-specific additive plurals. As discussed in Chapter 3 (for wide scope (= specific) bare nouns) and Section 4.4.2.5, specificity is considered an indicator of DP projections (whether overtly or covertly). In Chapter 3, wide scope bare nouns are proposed to project DPs, since they are specific. Butler (2011, 2012) argues that plurals in Yucatec Maya show the syntactic properties of DP projections as well as a semantic property, i.e., specificity, which also suggests that the plurals are at the DP level. Applying the claim that specificity is an indicator of DP projections, I tentatively assume that specific additive plurals are at the DP level.

Nomoto (2013) provides an alternative view, according to which the additive *-tati* plurals are merged with NPs (the projection of the plurals itself is not presented), and the specificity (or 'referentiality' in Nomoto 2013) is licensed by a null D head that carries a definiteness feature. (See Hamedani 2011 for a similar observation and claim with plurals in Persian.)

Either analysis is on the right track, it appears hard to examine the individuation of a specific additive *-tati*, since specificity makes it hard to test using inclusive interpretations (that I employ to test the individuation of a plural). Note that the analysis of wide scope bare nouns in Chapter 3 does not work here. Wide scope bare nouns (DP bare nouns) were argued to involve individuation despite specificity. The existence of IndPs was claimed to be independent of specificity, namely, I claim that subkind readings indicate the bare noun involves individuation (also following Nomoto 2013). As shown in (110), the noun with *-tati* does not allow for either kind or subkind interpretations. (See the next section for details of *-tati* and (sub)kind interpretations.)

(110) Kyooryuu-tati-wa zetumetu-sita.
dinosaur-PL-TOP extinct-did
a. Specific additive: '(The individuals of) dinosaurs are extinct.'
b. Kind: '*Dinosaurs are extinct.'
c. Subkind: '*Some kinds of dinosaurs (e.g, tyrannosaurus and apatosaurus) are extinct.'

Therefore, I tentatively follow the claim that the specific additive *-tati* plurals are at the DP level.

In addition to the additive and associative plurals, the affection plurals, as in (83), repeated here as (111), are yet another variety of *-tati*, as introduced in Section 4.5.1.1.

(111) a. (?)neko-tati
cat-PL
'(my lovely) cats/(my lovely) cat(s) and their associate(s)'

b. ??kutu-tati
shoe-PL
'my lovely shoes/my lovely shoes and their associate(s)(accessories)'

c. ??wain-tati
wine-PL
'my lovely wine/my lovely wine and others'

In these examples, *-tati* is used to indicate the mental closeness or attachment of the speaker towards the entity that *-tati* is attached to. The nominals can be animals or inanimate entities. For instance, (111b) is likely to be used by a shoe-collector.

I claim that the affection plurals are on nPs, i.e., lexical plurals. Recall, as discussed in Section 4.4.2.4, that idiosyncrasies to certain lexical items are one of the signs of plurals at the nP level (lexical plurals; e.g., Acquaviva 2008). The affection plurals show such an idiosyncrasy: they can be used with inanimate nouns, and possibly animal nouns, but not human nouns. These distributions are not in line with the Animacy Hierarchy, repeated here as (112).

(112) Animacy Hierarchy (simplified):
human > non-human animate > inanimate

Corbett (2000) claims that plurals follow the Animacy Hierarchy. If a non-human animate noun in a language can be pluralized, a human noun should be able to be pluralized in the language. Inanimate nouns in the language may or may not be pluralized. The distributions of the affection plurals with *-tati* in Japanese do not follow this, allowing the last two (non-human animate and inanimate nouns) to be pluralized, though not human nouns. With this idiosyncrasy, I claim that the affection plurals are on nPs.

Thus, the various interpretations of *-tati* and the proposed projections are summarized in (113).

(113) Varieties of -*tati* and their projections

	Type	Specificity	Nouns	Structure
a.	Additive	Non-specific	common nouns	??
b.	Additive	Non-specific	proper names	??
c.	Additive	Specific	CNs/PNs	DP
d.	Associative	Spe./Non-Spe.	CNs/PNs	DP
e.	Affection	Specific	CNs/PNs	nP

With these, I claim that –*tati* is polysemous in nature, having various structurally different expressions. The present chapter is centred on additive plurals, specifically in relation to both common and proper nouns. In the next section (Section 4.5.2.5), I shall investigate whether the non-specific additive -*tati* plurals with common nouns are individuating plurals, to fill in the gap in (113a). (See Section 4.5.3 for plurals with proper names to fill in the gap in (113b).)

4.5.2.4 Bare plurals with -*tati*

This chapter presents a comparison of bare plural forms, i.e., common nouns and proper names with non-specific additive -*tati* plurals, with bare plurals in English. First, when a phrase with -*tati* is non-specific, it can be used as a nominal predicate. See the contrast described by the examples in (114).

(114) a. *Karera-wa gakusei-tati desu. (specific)
they-TOP student-PL COP
(Intended)'They are students.'

b. Karera-wa yuusyuuna gakusei-tati desu. (non-specific)
they-TOP excellent student-PL COP
'They are excellent students.' (Nomoto 2013:112, 119)

Without a modifier, the noun with -*tati* is more likely to be interpreted as specific. As in (114a), the specific noun cannot be used as a nominal predicate. On the other hand, with a modifier as in (114b), the nominal phrase with -*tati* is non-specific. In such cases, the phrase can be used as a nominal predicate, in a similar way to bare plurals in English.

Second, bare plurals in English obligatorily take narrow scope. They scope below negation, as in (115a), *want to*, as in (115b), or *look for*, as in (115c).

(115) a. I did not see spots on the floor. (narrow scope only)

b. Mary wants to see police officers (narrow scope only)

c. That clinic is looking for nurses. (narrow scope only)

Spots in (115a) does not refer to specific spots on the floor, but the sentence roughly means *I found no spots on the floor*. In (115b), Mary desires to see police officers, whoever they may be. Similarly, in sentence (115c), the clinic intends to employ eligible and qualified nurses, irrespective of their identity.

As shown in (116), when the noun with *-tati* in Japanese is non-specific, it takes narrow scope against *itumo* 'always'.

(116) Kono kouen-de-wa itumo kodomo-tati-ga asondeiru.
this park-in-TOP always kid-PL-NOM playing
a. 'In this park, there are always children playing.' (non-specific, narrow)
b. '??In this park, there are some children who are always playing.' (spe. wide)

(Nakanishi and Tomioka 2004:121)

Nakanishi and Tomioka (2004) (and also developed by Nomoto 2013) point out that nouns with *-tati* are more likely to take narrow scope when they are accompanied by modifiers, as in (117).[28]

(117) Sono sinbunsya-wa [Kokkyoo-naki-Isidan-ni sanka-sita isi-tati]-o
that newspaper-TOP [Borders-without-Doctors-in participate-did doctor-PL]-ACC
sagasi-teiru.
look.for-PROG
'The newspaper is looking for doctors who participated in Doctors without Borders.'
(non-specific, narrow scope)

(adopted from Nakanishi and Tomioka 2004:138)

In (117), the newspaper is looking for any doctor(s) who participate(s) in the organization (i.e., non-specific, narrow scope).

Third, Carlson (1977), Chierchia (1998a), among many others, claim that bare plurals in English refer to kinds. Such plurals can be paired with predicates that denote kinds, such as *extinct* or *rare*, as shown in (118).

(118) a. Dodos are extinct.
b. Foreigners are rare around here.

On the other hand, non-specific nouns with *-tati* are not compatible with kind-denoting predicates, even with modifiers, as in (119b).[29]

[28]Since Nakanishi and Tomioka (2004) argue that *-tati* is an associative plural marker, and an additive reading is derived contextually, the translation in (117) in (Nakanishi and Tomioka (2004)) includes 'doctors (and possibly others)'. I removed '(and possible others)' in (117), since I claim that additive and associative readings are realized with different structures, and I focus on additive plurals in this section.

[29]Note that *-tati* in (119b) does not refer to subkinds, either.

(119) a. [satuzin-ziken-o kaiketusuru] tantei-wa mare-da.
[murder-incident-ACC solve] private.detective-TOP rare-COP
'Private detectives who solve a murder case are rare.'

b. *[satuzin-ziken-o kaiketusuru] tantei-tati-wa mare-da.
[murder-incident-ACC solve] private.detective-PL-TOP rare-COP
(Intended) 'Private detectives who solve a murder case are rare.'

Thus, even when proper environments or contexts are provided to bring non-specific interpretations (e.g., modifiers, adverbs such as *itumo* 'always'), *–tati* plural does not pattern with bare plurals in English.

4.5.2.5 *-Tati* and individuation

Now, I move onto one of the main questions in this thesis; Is *–tati* an individuator? I argue that even in the absence of an overt classifier, and although a nominal phrase with *-tati* shows the property of count syntax, *-tati* itself does not individuate. Crucially, it only allows the exclusive plural interpretation, as in (120) and (121). (Note that *itumo* 'always' in (120) and *dono zidai ni-mo* 'in any ages' bring non-specific interpretations.)

(120) Mosi kouen-de kodomo-tati-ga itumo asondeiru nara, sono mati wa heiwa-da.
if park-at kid-PL-NOM always playing if that town is peace-COP
'If kids are always playing in a park, that town is a safe place.'

(121) ??Kono kouen dewa dono zidai ni-mo kodomo-tati-ga asondeinai.
this park in-TOP which age in-also child-PL-NOM play-PROG-NEG
'In this park, children are not playing in any period of time.'

In (120), for the sentence to be true, and to consider the town as a safe place, there should be more than one child in the park. Namely, *kodomo-tati* 'children' in the downward entailment environment does not allow an inclusive interpretation, which suggests that *–tati* marks exclusive plurality. As discussed earlier, following Mathieu (2014), I propose that *-tati* is a counting plural located at the #P level above IndPs in the structure.

Another piece of evidence that argues against a claim that *–tati* is an individuator, is from coercion. As shown in (122), *-tati* does not bring a kind/portion coercion when it is attached to a mass term.

(122) *wain-tati
wine-PL
(Intended) '(sub)kinds of wine, portions of wine'

The example in (122) does not allow interpretations as coerced nouns as its English counterpart does as in *wines*, which allows the portion and (sub)kind coercion. It is worth noting that the example in (122) does not serve as a plural of abundance, either. In contrast, the English counterpart *wines* can convey such a meaning in an appropriate context. These show that *-tati* does not individuate common nouns.

Thus, *-tati* in the additive interpretation does not show the properties of an individuator: it does not allow an inclusive plural interpretation, and it does not bring the (sub)kind or portion coercion effect, either.

Following Mathieu (2014), as discussed above, I claim that *-tati* is a counting plural that is located at the #P level above IndPs in the structure.

4.5.2.6 Summary of *-tati* plurals with common nouns

The properties of non-specific *-tati* plurals, along with specific *-tati*, those of bare plurals in English, are outlined in (123).

(123) The *-tati* plural with a common noun

	Type	Non-specific *-tati*	Specific *-tati*	Bare plurals in English
a	Nominal predicate	yes	no	yes
b	Kind	no	no	yes
c	Scope	narrow	wide	narrow
d	Individuation	no	no	yes

Non-specific *-tati* plurals do not individuate common nouns. I claimed that additive *-tati* plurals (with common nouns) are counting plurals. The proposed structure of the *–tati* plural is shown in (124b) (described in the head-initial order for ease of exposition).

(124) a. Bare plurals in English
students $[_{\text{DP}}$ D $[_{\text{IndP}}$ *student-s*$_{\text{Ind}}$ $[_{\text{nP}}$ ~~*student*~~ $]]]$

b. Non-specific additive *–tati* plurals in Japanese
gakusei-tati $[_{\text{DP}}$ D $[_{\#\text{P}}$ *gakusei.*$\emptyset_{\text{Ind}}$*.tati* $[_{\text{IndP}}$ ~~*gakusei*~~.$\emptyset_{\text{Ind}}$ $[_{\text{nP}}$ ~~*gakusei*~~ $]]]]$

In this section, I also showed (i) that specific *-tati* plurals are at the DP level, following the criteria in Butler (2011), Kim and Meng (2021), etc., (ii) that associative plurals are at the DP level, following Hirose (2004), Nomoto (2013), etc., and (iii) that affection plurals are lexical plurals at the nP level, following the criteria in Acquaviva (2008), Kim and Melchin (2018), etc. Next, I shall show non-specific additive *-tati* with proper names.

4.5.3 -*Tati* plural (2): Proper names

The use of the *–tati* plural is not limited to common nouns but can also be applied to proper names, as shown in (125). Although the most salient interpretation of such a phrase is associative, the additive plural interpretation is still possible and productive.

(125) Haruko-tati
Haruko-PL
a. 'Haruko and her associate(s)' (Associative)
b. 'Harukos, people who are all named Haruko' (Additive)

In this usage, as exemplified in (125b), the proper name is treated as a common noun, and is therefore compatible with additive plurality (while a specific entity (e.g., this specific computer on my desk with which I am writing the thesis in China in 2023) cannot be pluralized by a genuine plural, as in *{*my computer*}*s* or **Is*). In this section, I investigate the properties of the additive *–tati* plural with proper names. I focus on two instances of such plurals: (i) people who are all named X, as in (125b), and (ii) people who all show the characteristics of X, in other words, the plural of *a X*, as in (126), where kids are described with a major league baseball player from Japan, Shohei Otani.[30]

(126) Kouen-de Shohei-tati-ga yakyuu-o siteiru.
park-in Shohei-PL-NOM baseball-ACC playing
'Kids who play or love baseball like Shohei Otani are playing baseball in the park.'

In past theoretical literature, in particular theoretical literature, only some sporadic works have investigated the *–tati* plurals with proper names (e.g., Li 1999 for *–men* in Mandarin). I believe that the use of the *–tati* plural with proper names provides insights that have not been widely discussed in the literature.

To facilitate this discussion, I will introduce a movie series called *Real Hide and Seek*. Without going into irrelevant details, the plot involves individuals with the surname Sato (one of the most common family names in Japan) being hunted by *oni*s (demons of the king) during a specific time frame set by the king. For instance, the sentence in (127) describes a signature scene of the movie. (Note that, however, the sentences used in the following sections do not necessarily describe scenes in the movies.)

(127) Kyoo go-nin no Sato-(tati)-ga koros-are-ta.
today 5-CL of Sato-PL-NOM kill-PASS-PAST
'Today, five people whose names are all Sato were killed.'

[30]For unknown reasons, *Shohei* as a common noun evokes an image of kids rather than professional baseball players in Japan, who are more likely to be able to play in the United States than kids. The cause of this phenomenon remains unknown and could be explored in future research.

4.5.3.1 Distribution

Coercion of a proper name into a common noun is a productive phenomenon when it comes to types, though not so productive with respect to tokens. In other words, while it is possible to use any proper name as a common noun and make it countable if the context is appropriate, such proper-to-common coercion is not commonly observed in daily instances. In such proper-to-common coercion, proper names are more naturally used in a plural form/context, as in (128).

(128) a. Sato-tati
Sato-PL

b. Takusan no Sato
many of Sato
'many Satos'

c. Sato sorezore
Sato each
'each of (the) Satos'

It is not entirely clear whether the grammatical restriction on the plural with proper names is due to a syntactic constraint or simply because it is more challenging to interpret a proper name as a common noun in a singular context. For instance, *Sato* in (129) is hard, if not impossible or ungrammatical, to interpret as a singular common noun (e.g., *a person like Sato whom I know of*).

(129) Kouen-de guuzen Sato-ni atta.
part-in by.accident Sato-DAT met
'I came across {*?a Sato/ Satos} in a park.'

It appears that the presence of a plural marker or plural expressions serves to highlight the idiosyncrasy of the phrase, and facilitates an irregular interpretation, such as the common noun usage of proper names.

Note, however, that as in (128b, c) and (129), plural marking is not obligatory for proper names in plural contexts, in particular, when plurality is indicated by something else (e.g., plural demonstratives, quantifiers). Namely, proper names in a common noun usage are still General Number, i.e., number neutral, as in (130), with a proper context.

(130) Oni-wa kyoo-mo Sato-o tukamaeta.
demon-TOP today-also Sato-ACC caught
'The demons caught one or more Satos today, too.'

In (130), considering the story that Satos are captured and killed, a Sato cannot be captured every day, and there should be many Satos. In this context, the noun *Sato* can be unmarked for plural. The context is neutral as to how many Satos there are.

Similarly (or to a greater degree), the *–tati* plural with proper names is not naturally compatible with non-human animate nouns or with inanimate nouns. Some exceptional examples, which require peculiar contexts, are presented below.

(131) a. Kouen-ni Koko-tati-ga ita.
park-in Koko-PL-NOM existed
'There were cats that are all named Koko in the park.'
'There were cats like my cat Koko in the park.'

b. Context: The speaker used some Mac laptops so far, and called them Makkun1, Makkun2, etc. (*-kun* is a title suffix to address someone (something in this case) in a friendly and casual way.)

Tukue-no-ue-ni watasi-no Maakun-tati-ga aru.
desk-of-above-at I-of Maakun-PL-NOM exist

'There are my Macs on the desk.'

As mentioned above, I mainly use *Sato* and *Shohei* to discuss properties of *-tati* with proper names.

4.5.3.2 Semantic effects

In contrast to the *–tati* plural with common nouns, associative plural interpretations are not easy to achieve in *–tati* plurals with proper names, as in (132). Needless to say, the most salient interpretation of a proper name (for a specific person) with *–tati* is an associative plural reading, as extensively discussed in the literature. At issue here is, however, a proper name in a common noun usage (i.e., number neutral) with *–tati*.

(132) a. Sato-tati
Sato-PL
i. Additive 'persons who are all named Sato'
ii. *?Associative 'a group of people which can be represented by a person like Sato'

b. Shohei-tati
Shohei-PL
i. Additive 'baseball players like Shohei Otani'
ii. *?Associative 'a baseball player like Shohei Otani, and his/her associate(s)'

A context where associative plurals are more naturally achieved is that two *–tati*s are stacked up as in (133), but still the associative reading for the plural closer to the head noun is not easily achieved.

(133) a. Sato-tati-tati
Sato-PL-PL
'Persons who are all named Sato and their associates' (additive + associative)
'??A Sato (a person like Sato) and his associates, and their associates' (associative + associative)

b. Shohei-tati-tati
Shohei-PL-PL
'Baseball players like Shohei Otani, and their associates' (additive + associative)
'??A baseball player like Shohei Otani and his/her associates, and their associates' (associative + associative)

The reason for this is the same as for why proper names are not typically used as common nouns in singular contexts. Namely, the common noun usage of proper names itself weakly implies a plural entity (*persons all named X* or *a plurality of a X*).

In this chapter, I focus on the *–tati* plural with proper names in the additive and non-specific interpretations. *–Tati* plurals with proper names are different from those with common nouns in many aspects. It is more natural to use these in a non-specific context rather than with common nouns, as discussed below. I will demonstrate that the *-tati* plural with proper names is more similar to bare plurals in English (which I argue are individuating plurals) than the non-specific *-tati* plurals with common nouns (which I argue are counting plurals).

4.5.3.3 Bare plurals with *–tati* (2): Proper names

In this section, I compare the *–tati* plurals with proper names in Japanese to bare plurals in English and to the non-specific *-tati* plurals with common nouns. As mentioned earlier, bare plurals in English exhibit several characteristics, commonly observed with number neutral bare nominals in many languages, such as nominal predicates, obligatory narrow scope, and kind reference (e.g., Carlson 1977, Chierchia 1998a). These properties will be used for comparison with the *–tati* plural (in additive reading) with proper names, in order to argue for the individuation of the *–tati* plurals with proper names in Japanese.

First, bare plurals with *–tati* (with proper names or common nouns), as well as bare plurals in English, can be a nominal predicate, as in (134).

(134) a. *-tati* with proper names

Karera-wa Sato-tati desu.
they-TOP Sato-PL be

'They are Satos.'

b. *-tati* with common nouns

Karera-wa yuusyuuna gakusei-tati desu.
they-TOP excellent student-PL COP

'They are excellent students.'

With the context introduced (where people named Sato are hunted and killed), it is imaginable that at the conclusion of the hunt, demons transport Satos whom they hunted that day. As discussed in the previous section, the non-specific *-tati* with common nouns (whose specificity is brought about by adding a modifier), also allows the nominal phrase with *-tati* to be a nominal predicate. As shown in the English translations, bare plurals in English can be a nominal predicate.

Second, *–tati* plurals with proper names can take narrow scope. Consider (135) through (137), and compare them with their English translations.

(135) a. Oni-wa Sato-tati-o mituke-nakat-ta.
demon-TOP Sato-PL-ACC find-NEG-PAST
'Demons did not find Satos.'

b. Haruko-wa Shohei-tati-ni awa-nakat-ta.
Haruko-TOP Shohei-PL-DAT see-NEG-PAST
'Haruko did not see baseball players like Shohei Otani.'

(136) a. Oni-ga Sato-tati-o sagasiteiru.
demon-NOM Sato-pl-ACC looking.for
'Demons are looking for Satos.'

b. Tiimu-o tukuru tameni, Haruko-wa Shohei-tati-o sagasiteiru.
team-ACC make to Haruko-TOP Shohei-PL-ACC looking.for
'Haruko is looking for baseball players like Shohei Otani in order to make a team.'

(137) a. Oni-wa Sato-tati-o tukamae-tagat-teiru.
demon-TOP Sato-PL-ACC catch-want-PROG
'Demons want to catch Satos.'

b. Tiimu-o tukuru tameni, Haruko-wa Shohei-tati-ni aitagatteiru.
team-ACC make to Haruko-TOP Shohei-PL-ACC looking.for
'Haruko wants to see baseball players like Shohei Otani in order to make a team.'

In negation, as in (135), and sentences with *look for*, as in (136), and with *want to*, as in (137), the plurals all take narrow scope. For instance, in (135a), the speaker does not have to have some specific Satos in mind, but no one named Sato should be captured, if the sentence is true. In (136b), Haruko is looking for any talented baseball player(s) in a certain range of ages, and she does not have to have specific players in mind. In (137a), the demon(s) want(s) to hunt any Satos, whoever she is/he is/they are, but not try to capture a specific person (whose name is Sato).

Similarly, *-tati* with common nouns and bare plurals in English both take narrow scope. See the example below, repeated from the previous section, to see the scope of the *-tati*-marked phrase.

(138) Kono kouen-de-wa itumo kodomo-tati-ga asondeiru.
this park-in-TOP always kid-PL-NOM playing
a. 'In this park, there are always children playing.' (non-specific, narrow)
b. '??In this park, there are some children who are always playing.' (spe. wide)

(Nakanishi and Tomioka 2004:121)

(139) Sono sinbunsya-wa [Kokkyoo-naki-Isidan-ni sanka-sita isi-tati]-o
that newspaper-*top* [Borders-without-Doctors-in participate-did doctor-PL]-ACC
sagasi-teiru.
look.for-PROG
'The newspaper is looking for doctors who participated in Doctors without Borders.'
(non-specific, narrow scope)

As shown in (138) and (139), when they are non-specific, common nouns with *-tati* take narrow scope. Bare plurals in English also takes narrow scope, as shown in the translation in (139).

Third, kind reference shows contrasts between *-tati* with proper names and *-tati* with common nouns. *–Tati* plurals with proper names (as well as bare plurals in English) also more naturally refer to kinds than those with common nouns. Consider (140):

(140) a. Onigokko no zikan da-kara, Sato-tati-wa mareda.
Hide-and-Seek of time be-because Sato-PL-TOP rare
'Because it is the Hide-and-Seek time, Satos are rare (= not loitering about).'

b. Sakkaa-ga ninki dakara, sanzyuu-nen-go-niwa Shohei-tati-wa
soccer-NOM popularity because 30-year-after-in-TOP Shohei-PL-TOP
zetumetusuru.
extinct
'Because of the popularity of soccer, baseball kids like Shohei will be extinct in 30 years.'

In (140b), *Shohei-tati* refers to child baseball players, and is compatible with the kind-denoting predicate *zetumetusuru* 'extinct'. The kid kind itself will not be extinct, but baseball kids dreaming of becoming professional players will be extinct if the sentence is true. In these contexts, the specific interpretation of the *–tati* plurals is difficult to understand, because of the kind-denoting predicates. Bare plurals in English are also compatible with kind-denoting predicates, as in *Dodos are extinct* or *Female detectives are rare*.

On the other hand, *-tati* with common nouns do not refer to kinds, even when a modifier makes the non-specific interpretation easier, as in (141).

(141) *[satuzin-ziken-o kaiketusuru] tantei-tati-wa mare-da.
[murder-incident-ACC solve] private.detective-PL-TOP rare-COP
(Intended) 'Private detectives who solve a murder case are rare.'

4.5.3.4 *-Tati* and individuation (2): Proper names

Next, I examine the individuation of non-specific *–tati* with proper names. Consider (142) ((b) is uttered following (a)) and (143) ((b) is uttered in answer to (a)) to see whether *Sato-tati* 'Satos' is inclusive or exclusive.

(142) a. Kyoo oni-wa Sato-tati-o tukamaen-akat-ta.
today demon-TOP Sato-PL-ACC catch-NEG-PAST
'Today, demons did not catch Satos.'

b. *Hitori-dake da.
1.CL-only be
(Intended) 'Only one.'

(143) a. Oni-wa Sato-tati-o tukamaemasita ka?
demon-TOP Sato-PL-ACC caught QUES
'Did demons catch Satos today?

b. *Iie, hitori-dake desu.
no 1.CL-only be
(Intended) 'No, only one.'

In downward entailing environments, e.g., negation, as in (142), and question, as in (143), bare plurals with *Sato-tati* are inclusive, in contrast to bare plurals with a common noun (e.g., *gakusei-tati* (student+PL)).

4.5.3.5 Summary of *-tati* plurals with proper names

The properties of *tati*-marked plurals with proper names are outlined in (144), which show that *–tati* plurals with proper names pattern with bare plurals in English.

(144) The non-specific *-tati* plural: Proper names

	Property	*-tati* with proper names	*-tati* with common nouns	Bare Plurals in English
a	Nominal predicate	yes	yes	yes
b	Kind	yes	no	yes
c	Scope	narrow	narrow	narrow
d	Individuation	yes	no	yes

The proposed structure for bare plurals with non-specific additive *-tati* with proper names is presented in (145).

(145) *-tati* as individuating plurals and proper names as common nouns
Sato-tati (student-PL) $[_{DP}\ [_{IndP}\ \text{Sato.tati}_{Ind}\ [_{nP}\ \sout{\text{Sato}}\ ]]]$

4.5.4 Reduplication

In this section, I investigate syntactic and semantic properties of plurals via reduplication in Japanese. While plurals via reduplication are common and productive in Southeast Asian languages (Dalrymple and Mofu 2012, Sato 2009, Nomoto 2013), it is commonly claimed that plurals via reduplication in Japanese are fairly limited and thus not so productive. As such, reduplication has escaped attention in the theoretical literature, except for some sporadic theoretical works (e.g., Sudo 2017). A common analysis of plurals via reduplication in the relevant literature is that those are lexicalized (e.g., Shimoji 2022).

Still, however, I believe that plurals via reduplication provide us with clues to analyze nominal architecture (e.g., individuation) in Japanese. Therefore, in this section, I instead illustrate that their syntactic properties are strikingly similar to bare plurals in English. With this, I propose that plurals via reduplication are individuating plurals. I also show that plurals via reduplication are different from other plurals (*-tati*) and from lexically plural nouns.

4.5.4.1 Distribution

Sudo (2017:27) provides the list of reduplicated nouns in (146)[31], which he claims is nearly exhaustive.

(146) Reduplicated nouns in Japanese

a. hito-bito 'persons'
b. yama-yama 'mountains'
c. kuni-guni 'countries'
d. mura-mura 'villages'
e. hoshi-boshi 'stars'
f. kami-gami 'gods'
g. hi-bi 'days'
h. hana-bana 'flowers'

Some other examples are listed in (147) (e.g., Hayakawa 1985, Mangga 2018, Nishimura 2013, 2014, Shimoji 2022).

(147)
a. ie-ie 'houses'
b. simo-jimo 'common people'
c. ki-gi 'trees'
d. eda-eda 'branches'
e. ware-ware 'we'
f. mati-mati 'towns'
g. miti-miti 'streets'
h. asi-asi 'feet'
i. sima-jima 'islands'
j. tokoro-dokoro 'places'
k. konomi-gonomi 'likings'
l. kusa-gusa 'grasses'

Although acceptability varies among regional and social dialects (age groups), interrogative words often undergo reduplication, as in (148)(Kudo 2021).

[31]The second component of the reduplicated nouns undergoes sequential voicing (*rendaku*) in certain cases (Kubozono 2008). Note that /b/ corresponds to /h/ in the "voicing" system in Japanese.

(148) a. dare-dare 'who.PL'
b. itu-itu 'when.PL'
c. doko-doko 'where.PL'
d. nani-nani 'what.PL'

In contrast to the *–tati* marked plurals, reduplication is not limited to human nouns. Indeed, more inanimate nouns are eligible for reduplication than human nouns (*gods, persons, common people*) in the lists in (146) and (148).

There are a number of restrictions, or strong tendencies, to the formation of reduplicated nouns. For instance, the lists in (146) suggest that only native Japanese words undergo reduplication for plurals[32]. Tamamura (1985), cited in Shimoji (2022), points out that there seems to be a phonological restriction on the size of reduplicated nouns. Reduplication only takes place on one or two mora words (but see (146j, k)). While *yama-yama* 'mountains' is acceptable, *hayasi-hayasi* (or *-bayasi*) 'forests, plural of woods' is not possible since *hayasi* seems too long or heavy.

Thus, while plurals via reduplication are to some extent limited to certain lexical items (thereby, having been considered lexical phenomena), they are not limited in terms of the animacy of nouns (to which *-tati* is peculiar).

4.5.4.2 Semantic effects

Some peculiarities have been observed in reduplicated nouns. Reduplicated nouns often refer to plural (sub)kinds as well as plural individuals (Shimoji 2022). For instance, *kami-gami* 'gods' tends to refer to gods of various themes (e.g., a god of sea, a god of forest, etc.). This tendency is not as strong as previously reported (e.g., Kudo 2019), however, as in *yama-yama* 'mountains', which simply refers to multiple mountains, rather than multiple types of mountains (rocky mountain, woody mountain, etc.)

The referents of reduplicated nouns are often seen as a large number of entities, or an unknown number of entities. Nishimura (2013) observes that reduplicated nominals are not compatible with counting by two, as in (149).

(149) a. *hutatu no yama-yama
2.CL of mountain-REDUP
(intended) 'two mountains'

[32]The Japanese language has four layers in its lexicon (Ito and Mester 2015): native Japanese (Yamato Japanese), Sino-Japanese, entrenched loanwords, and recent loanwords. Many phonological and morphological operations are applicable to only subclasses of the Japanese lexicon. For instance, rendaku (see footnote 6) is largely limited to native Japanese words.

b. *hutari no hito-bito
2.CL of person-REDUP
(Intended) 'two persons'

Whereas it is true that *hito-bito* 'people' is not compatible with two or three, but is used to refer to relatively many people, some of the reduplicated nouns are naturally used with *two*. In particular, when it is modified post-nominally or by floating numeral quantifiers (FNQs), reduplicated nouns are normally modified by *two*. Consider (150).

(150) Kami-gami-ga hutari arawareta.
god-REDUP-NOM 2.CL appeared
'There appeared two gods.'

As in (150), reduplicated nouns allow FNQs, where the numeral can be *two*. Thus, the behaviour of *hito-bito* and some other nouns that resist modification by two, seems to reflect lexical properties, rather than a restriction imposed by reduplication.

Except for these semantic properties peculiar to them, reduplicated nouns lack other properties observed in *–tati* plurals. First, reduplicated nouns do not allow associative reading, as shown in (151b).

(151) a. gakusei-tati
student-PL
'students/(a) student(s) and their associate(s)'

b. kami-gami
god-REDUP
'gods / {*a god/gods} and {his/her/their} associates'

Secondly, even with inanimate nouns, reduplication does not induce an affection reading. Consider (152b):

(152) a. hana-tati
flower-PL
'(my lovely) flowers'

b. hana-bana
flower-REDUP
'flowers'

Moreover, reduplication does not show specificity effects (which *-tati* often shows). As in (150b), repeated here, the reduplicated noun is modified by FNQs, which force the associate noun to be non-specific.

(153) a. Hima-o moteamasita kami-sama-tati-ga mainiti hutari arawareta.
free.time-ACC had.too.much god-POL-PL-NOM every.day 2-CL appeared
'Every day there appeared two gods who were having too much free time.'

b. (Hima-o moteamasita) Kami-gami-ga mainiti hutari arawareta.
(free.time-ACC had.too.much) god-REDUP-NOM every.day 2.CL appeared
'Every day, there appeared two gods (who were having too much free time).'

As in (153a), *-tati* requires a modifier (*having too much free time*) for the nominal to be non-specific (see Section 4.5.2 for more details). Meanwhile, reduplicated nouns do not need a modifier to achieve a non-specific interpretation, as in (153b). Thus, plurals via reduplication do not show the specificity effect that *-tati* shows.

4.5.4.3 Reduplicated nouns as bare plurals

Next, I show that reduplicated nouns pattern more with bare plurals in English than *-tati* plurals (additive, non-specific). First, reduplicated plurals can refer to kinds. As in (154) and (155), those are compatible with kind-denoting predicates, as in *extinct* and *rare*.

(154) Kami-gami-wa zetumetu sita.
god-REDUP-TOP extinct
'Gods became extinct.'

(155) Sima-zima-wa Kono umi dewa mareda.
island-REDUP-TOP this sea in-TOP rare
'Islands are rare in this sea.'

Second, reduplicated nouns can take narrow scope against intentional verbs, as in (156) and (157), or negation, as in (158).[33]

(156) Haruko-wa mura-mura-o sagasiteiru.
Haruko-TOP village-REDUP-ACC looking-for
'Haruko is looking for villages.'

(157) Haruko-wa kami-gami-ni aita-gat-teiru.
Haruko-TOP god-REDUP-DAT meet-want-ing
'Hanako wants to meet gods.'

(158) Haruko-wa mou ni-zikan ie-ie-o mi-tei-nai.
Haruko-TOP already 2-hour house-REDUP-ACC see-PFV-NED
'Haruko hasn't seen houses for 2 hours.'

[33]In a similar way to bare nouns (as discussed in Chapter 2), bare plurals in (156) to (158) also allow a definite reading. In such cases, the bare plurals do not take narrow scope.

The speakers in (156) to (158) do not have specific objects (villages, gods, houses) in mind (wide scope reading), but any villages, any gods, or any houses are acceptable in these contexts (narrow scope reading).

Third, reduplicated nouns can be used as nominal predicates. Imagine a context where the speaker and his/her friend(s) are watching the night sky, and have found some shining objects. With this context, consider (159).

(159) Arera-wa yuufoo-zya-naku-te hosi-bosi desu.
those-TOP UFO-be-NEG-CONT star-REDUP be
'Those are stars, not UFOs.'

Fourth, reduplicated nouns can be used in an atelic context, but not in a telic context. Examine (160) to see in what context reduplicated nouns are compatible with the *in* or *for* phrases.

(160) a. Haruko-wa ni-zikan ki-gi-o kitta.
Haruko-TOP 2-hour tree-REDUP-ACC cut
'Haruko cut trees for two hours.'

b. *Haruko-wa ni-zikan-de ki-gi-o kitta.
Haruko-TOP 2-hour-in ki-REDUP-ACC cut
'Haruko cut the trees in two hours.'

When the reduplicated noun is non-specific (160a), it is only compatible with the atelic context, allowing the *for* phrase. In a telic context (brought by the *-in* phrase), the reduplicated noun is forced to have a definite/specific interpretation, as in (160b). These also pattern with bare plurals and definite plural nouns in English, as shown in the translations in (160a) and (160b), respectively.

4.5.4.4 Reduplication and individuation

I now turn to the individuation of plurals via reduplication. Recall that, as discussed in Section 4.4, inclusive plural interpretations are used as an indicator of individuating plurals. As shown in (161) and (162), plurals via reduplication in Japanese are inclusive under negation (Sudo 2017).

(161) Haruko-wa mou ni-zikan-mo ie-ie-o mi-tei-nai.
Haruko-TOP already 2-hour-as.much.as house-REDUP-ACC see-PFV-NEG
*Ik-ken-dake mita.
1-CL-only saw
(Intended) 'Haruko hasn't seen houses for as much as two 2 hours. She just saw one house.'

(162) Taro-wa kisetu-no hana-bana-o motteko-nakat-ta. *Iti-rin-dake
Taro-TOP season-GEN flower-REDUP-ACC bring-NEG-PAST 1-CL-only
mottekita.
brought
'Taro didn't bring seasonal flowers. (He) brought only one.'

(Sudo 2017:27, the second phrase was added based on the discussion therein)

In (161), the bare plural via reduplication, *ie-ie* 'houses' in the first sentence does not exclude atomic individuals. This is demonstrated by the fact that the first sentence cannot be followed by the second sentence, which specifically refers to atomic individuals. The bare plural via reduplication in (162), *hana-bana* 'flowers' in the first sentence does not exclude atomic individuals, either. These examples show that bare plurals via reduplication are inclusive.

Similarly, reduplicated nouns allow inclusive plural interpretations in questions, as in (163).

(163) A: Sima-zima-ga mi-rare-masi-ta ka.
A: island-REDUP-NOG see-can-POL-PAST QUES
'Were you able to see islands?'

B: *Iie, hitotu-dake miemasita.
B: no 1.CL-only visible

'No, only one (of them) was visible.'

Thus, inclusive plural interpretations illustrate that plurals via reduplication involve individuation. With this, I claim that reduplication for plurals is a syntactic process, where a noun is individuated, in a similar way to *-s* in English as well as *-tati* with proper names in Japanese.

Moreover, reduplicated nouns are comparable with collective nouns. Consider (164) to see whether a collective noun *gunsyuu* 'crowds' is inclusive or exclusive.

(164) Gunsyuu-o mi-nakat-ta. Hitori sika i-nakat-ta.
crowds-ACC see-NEG-PAST 1.CL only be-NEG-PAST
'I did not see crowds. There was only one person.'

Collective nouns can exclude atomic individuals in the group. In negation, *gunsyuu* 'crowds' is still exclusive. If reduplicated nouns are lexicalized nouns denoting a plural entity, it should pattern with collective nouns (e.g., audience), contrary to the fact as in (164).

4.5.4.5 Summary

The properties of reduplicated nouns are summarized in (165), which shows clear patterning with bare plurals in English.

(165) Reduplicated nouns in Japanese

		Plurals via Reduplication	*-tati* with common nouns	Bare Plurals in English
a.	Nominal predicate	yes	yes	yes
b.	Kind	yes	no	yes
c.	Scope	narrow	yes	narrow
d.	Telicity	atelic	N/A	atelic
e.	Plurality	inclusive	exclusive	inclusive

4.5.5 Null plurals with plural quantifiers/demonstratives

4.5.5.1 Phenomena

For completion of plurals in Japanese, in this section, I discuss another instance of plurality in Japanese, i.e., null plurals with plural quantifiers/demonstratives. As discussed in the previous chapter, syntactic countability is also attested with count-sensitive quantifiers/demonstratives, as in (166). For ease of exposition, I tentatively describe it as a null plural marker $\emptyset_{\text{Ind}}$.

(166) a. korera no gakusei-$\emptyset_{\text{Ind}}$
these of student
'these students'

b. ikutuka no hon-$\emptyset_{\text{Ind}}$
some of book
'some books'

c. musuu no zou-$\emptyset_{\text{Ind}}$
a.lot of elephant
'a lot of elephants'

By comparing them with *–tati* plurals, I aim to demonstrate that null plurals with plural quantifiers/demonstratives are not simply a covert counterpart of the *–tati* plural, but exhibit distinct properties that align with the plural marker in English.

The interpretations possible with *-tati*, an overt plural marker, and those with a covert plural marker, do not fully overlap. First, *-tati* allows an associative interpretation, but a null plural marker does not, as shown in (167) and (168).

(167) gakusei-tati
student-PL

a. Additive: 'students'

b. Associative: '(a) student(s) and his/her/their associate(s)'

(168) korera no gakusei-$\emptyset_{\text{Ind}}$
these of student

a. Additive: 'these students'

b. Associative: '*These students and their associates'

In (167), *-tati* induces the associative reading, which includes someone who is not explicitly denoted by the head noun (i.e., non-student persons). Such interpretation is not achieved with the null plural with plural demonstratives, as in (168b).

Similarly, null plurals with plural demonstratives do not imply the speaker's affection or attachment when it is used with inanimate nouns. Consider (169) to see the differences between *–tati* and null plurals with plural demonstratives.

(169) a. kutu-tati
shoe-PL
'my lovely shoes'

b. korera no kutu-$\emptyset_{\text{Ind}}$
these of shoe
'these (pairs of) shoes'

Second, null plurals with plural quantifiers do not show specificity effects. As discussed in Section 4.5.2, *-tati* brings a specific interpretation if the noun is not used with a modifier or other scope-taking elements. Because of the specificity effect, nouns with *tati* plurals cannot be used in possession constructions in Japanese, which Kishimoto (2000) argues display the (non-)specificity effects, as in (170).

(170) Taroo-ni kodomo-tati-ga aru.
Taro-DAT child-PL-NOM have
(Intended) 'Taro has kids.'

As shown in (171), possession constructions show that only weak quantifiers can be used with the nominative phrases of possessive verbs.

(171) a. *Taroo-ni {sono/ hotondo-no/ subete/ kare-no} kyoodai-$\emptyset_{\text{Ind}}$-ga aru.
Taro-DAT that/ most-of/ all-of/ his brother-NOM have
'Taro has that/most/all/his brother(s).'

b. Taroo-ni {takusan-no/ hutari-no/ nan-nin-ka-no} kyoodai-$\emptyset_{\text{Ind}}$-ga aru.
Taro-DAT many-of/ 2-CL-of/ what-CL-QUES-of brother-NOM have
'Taro has many/two/some brothers.'

The null marked plural indicated by count-sensitive quantifiers is compatible with the possession construction, as in (172), which suggests that this type of plural is a weak quantifier.

(172) Haruko-ni tasuu-no kyoodai-$\emptyset_{\text{Ind}}$-ga aru.
Haruko-DAT many-of brother-NOM have
'Hanako has many brothers.'

Third, null plurals with plural demonstratives can also be used as the plural of abundance (Acquaviva 2008), as in (173).

(173) a. kono mizu
this water
'this water'

b. korera no mizu–$\emptyset_{\text{Ind}}$
these of water
'these waters/this large mass of water' (e.g., water covering a town after a typhoon hit it)

In (173), where the null plural marker, indicated by the plural demonstrative, is attached to a mass term *mizu* 'water'. As indicated by its English translation, it describes a large mass of water, indicating that it is still semantically a mass term.

4.5.5.2 The null marked plural and Individuation

In this subsection, I provide the derivation for a null plural marker. As discussed in Section 4.4, modified plurals, e.g., *three dogs* or *korera-no hon* 'these books,' are quantity expressions. Therefore, inclusive/exclusive interpretations are not indicative of individuation. Instead, based on the analyses of numerals in Hungarian, I posit structures of the null marked plural expressions, where I show how nouns are covertly individuated. In Section 4.4, I introduced two types of structures for a noun phrase with a numeral. In Hungarian and Azeri, numerals are not compatible with nouns marked for plural. Instead, nouns are bare when they are modified by numerals. Zareikar (2018) and Borer (2005a) propose structures for Azeri (174) and Hungarian (175), respectively.

(174) Modified plurals (Azeri)
iki oğlan '(lit.) two boy' [$_{\text{DP}}$ D [$_{\#\text{P}}$ *iki.*# [$_{\text{IndP}}$ *oğlan.*$\emptyset_{\text{Ind}}$ [$_{\text{nP}}$ ~~*oğlan*~~]]]]

(175) Modified plurals (Hungarian)
öt hajó '(lit.) five ship' [$_{DP}$ D [$_{\#P}$ *öt*.# [$_{IndP}$ ~~*öt*~~.IND [$_{nP}$ *hajó*]]]]

In Azeri (174), a null Ind head individuates the noun, whereas a numeral specifies the number feature. An analysis with a null plural marker is in line with this. Meanwhile, in Hungarian (175), a numeral individuates the noun, and also specifies the number feature.

By applying the structure in (175) to count-sensitive quantifiers/demonstratives in Japanese, I assume the structure in (176) for *korera-no hon* 'these books' where the linker *no* is inserted postsyntactically (Watanabe 2010). (For ease of exposition, the structure is shown in the head-initial order.)

(176) *korera-no hon* 'these books'
[$_{DP}$ *korera* [$_{\#P}$ ~~*korera*~~.# [$_{IndP}$ ~~*korera*~~.IND [$_{nP}$ *hon*]]]]

In Chapter 5, I also argue for the structure in (176) to account for the structure and derivation of pre-nominal numeral quantifiers.

4.6 Alternative approach: Wiltschko (2008)

In this section, I summarize an alternative approach (which, however, I did not employ) to capture diverse types of plurals, mainly based on Wiltschko (2008). Several works provide analyses of plurals in relation to meanings (e.g., the mass-count distinction, number properties, inclusive/exclusive plural interpretations), as in the previous sections. On the other hand, Wiltschko (2008) analyzes plurals in relation to their morphosyntactic status. Although plural markers are commonly considered inflectional morphemes, Wiltschko (2008) identifies two types of plurals, categorizing them into inflectional and modifying (non-inflectional). Inflectional plurals are assigned on the # head, whereas modifying plurals are identified as either root modifiers, nP modifiers, or DP modifiers. By comparing plurals in English and Halkomelem Salish (Canada, US)[34], Wiltschko (2008) argues that English (individuating) plurals are inflectional, whereas Halkomelem plurals are modifiers on the root.

In this section, I summarize her criteria for (non-)inflectional plurals, and further investigate interactions between the classification of plurals in the last section and the one in Wiltschko (2008). I suggest that the status of matching the criteria of non-inflectional

[34] According to Wiltschko (2008), there are three ways to mark plurality in Halkomelem: reduplication, *-l-* infixation, and vowel change. Wiltschko considers these three as phonologically conditioned allomorphs, and hence provides the same treatment for structural positions. See Hamedani (2011) for Persian and Kramer (2015, 2017) for Amharic, both of which have both inflectional and non-inflectional plural morphemes.

plurals in Wiltschko (2008) does not necessarily rule out the possibility that the plural involves a functional head, or that a pluralized noun does not participate in syntactic Agree.

4.6.1 Inflectional plurals and non-inflectional plurals

Wiltschko (2008) claims that plurals can be categorized based on distributional criteria, rather than identity in meaning. That (a) plural marker(s) in one language is/are similar or identical in meaning to those in English, does not necessarily lead to categorizing the plural markers in those two languages in the same category. To investigate whether plurals in English and Halkomelem are categorized by the same types of morpheme, particularly, whether plurals in Halkomelem are inflectional as those in English, she posits four questions: (i) Is plural marking obligatory?; (ii) Does plural marking trigger agreement?; (iii) Can plural marking appear inside compounds?; (iv) Can plural marking appear inside derivational morphology. By responding no to all four of these questions, Wiltschko (2008) concludes that the plurals in Halkomelem are non-inflectional.

First, inflectional plurals, as English plurals, are obligatory, whereas Halkomelem plurals are not. In English, the noun should normally carry a plural marking when the referent of the nominal is a plural entity. Compare (177) and (178):

(177) a. the three boys
b. *the three boy

(178) te lhíxw swíweles/ swóweles [Halkomelem]
DET three boy boy.PL
'the three boys' (Wiltschko 2008:642)

In English, since the numeral *three* forces a plural interpretation, the noun *boy* must be marked with a plural marker, as in (177a), otherwise it is rendered ungrammatical, as in (177b). In Halkomelem, as in (178), the plural interpretation does not require the noun to be marked for plural. Either the unmarked form or the plural form allows a plural interpretation.

Secondly, an obligatory agreement between a pluralized noun and other elements in the nominal spine is another clue to establish the inflectional status of the plural. In English, nouns agree with demonstratives in number, as in (179), whereas determiners and nouns in Halkomelem display all four possible patterns, as in (180).

(179) a. These *boy/boys can sing.
b. This boy/*boys can sing.

(180) a. t'ílém ye/te s-í:wí:qe
sing DET.PL/DET man.PL
'The men are singing.'

b. t'ílím ye swíyeqe
sing DET.PL man
'The men are singing.'

c. t'ílím te swíyeqe
sing DET man
'The man is singing.' (Wiltschko 2008:643)

Thirdly, as conventionally discussed, the possibility of marking plurals inside the compounds provides a clue to identifying inflectional morphology. If plural morphology is allowed inside the compounds, it is considered a non-inflectional morpheme, while if it is not possible to make a plural marker inside compounds, it is an inflectional morpheme. In English, as in (181), plural morphology is prohibited inside compounds, regardless of the number of entities (*teeth, children*) involved in the action/event.

(181) a. tooth-brush, *teeth-brush

b. child-care, *children-care

In Halkomelem, as in (182), compound components, rather than whole compounds can be pluralized.[35]

(182) a. qo 'water' welé$\bar{*}$xes 'frog' [Halkomelem]

b. tem-qoqo:
time-water.PL
'high water time'

c. ten-welé$\bar{*}$xes
time-frog.PL
'time of frogs' (= 'March')

Therefore, compounds also show that the English plural is inflectional, whereas that in Halkomelem is non-inflectional.

[35]It is fascinating that the plural in (182a) appears to be a plural of abundance, attaching it to a mass term *water*, without resulting in mass-to-count coercion. Wiltschko (2008:669) introduces examples of pluralized mass terms, all of which refer to "a lot of" the entity (i.e., abundance plural). She treats abundance plurals and other modifying plurals on a par structurally, despite their contrast in meaning. Meanwhile, plural marking on a verb leads to pluractional meanings, e.g., repetition (ibid.:679). Although giving three interpretations of one morpheme in the same position has various and valuable implications, I leave their syntax and semantics for future research.

Similar to compounds, interactions with derivational morphology are also a clue to identifying inflectional morphemes. If a plural can be used inside derivational morphology, it is non-inflectional. For instance, in English, as in (183), plural markers are prohibited inside derivational morphology.

(183) a. mother-ese / *mother-s-ese
b. brother-hood / *brother-s-hood

Although the motherese and brotherhood normally involve more than one mother or brother, the plural marking is prohibited inside the derivational morphology.

In contrast, in Halkomelem as in (184), plural morphology for the head noun is inside the derivational morphology (nominalizing prefix *s-* in (184)).

(184) a. p'eq' 'white' [Halkomelem]
b. s-p'eq'
NMLZ-white
'white spot on skin'
c. s-p'eq'p'eq' (*sp'eq'sp'eq')
NMLZ-white.PL
'white spots on skin' (Galloway 1993:379, cited in Wiltschko 2008:645)

Thus, behaviours of plural morphology in English and Halkomelem provide criteria to identify (non-)inflectional plurals, as in (185).

(185) criteria for (non-)inflectional plural morphology (based on Wiltschko 2008:645)

	Inflectional (e.g., English)	Non-inflectional (e.g., Halkomelem)
obligatory plural marking	yes	no
obligatory agreement	yes	no
plural inside compounds	no	yes
plural inside derivational morphology	no	yes

4.6.2 Plurals on the # head and adjoined plurals

After clarifying that plurals in English and Halkomelem show different categorical statuses, Wiltschko (2008) provides a theoretical analysis of the properties of each type of plural. The English plurals themselves are # heads (which encompass both IndPs and #Ps in the assumed structure in this thesis), whereas those in Halkomelem are modifiers of the Root

node. Wiltschko (2008:671) reports the differences between those two types of plurals as in (186). I take these as the criteria to determine the headness of plurals.[36]

(186) Criteria for functional heads and modifiers for plurals (based on Wiltschko 2008)

		Functional Head	Modifier
		e.g., English	e.g., Halkomelem
a.	obligatory agreement	yes	no
b.	absence of plural marking	singular	General Number
c.	plural can be selected for	yes	no
d.	pluralia tantum	yes	no

The first three are related to values on the # head and the syntactic operation of Agree. Wiltschko (2008) assumes Agree mechanisms for the number properties following Chomsky (2000, 2001a). The # head in English carries a number feature, either [+PL] (a feature for plurality) or [-PL] (a feature for singularity).[37] On the D head is an unvalued number feature, which can be valued by either of the valued number features. If D is valued by [+PL], the valued D will be realized as *these*. If D is valued by [-PL], the valued D will be realized as *this*. Thus, since unvalued D should be valued (otherwise the derivation clashes), English demonstratives obligatorily agree with nouns in number (*this boy*, *these boys*), as in (186a). Since the # head has either [+PL] or [-PL], the absence of [+PL] should lead to a property of [-PL], i.e., singular, as in (186b). Due to this Agreement mechanism, D in English can specifically select for plural or singular objects, as in (186c) and (187) (Wiltschko 2008:664).

(187) a. each house, every house

b. many houses, most houses, some houses, all houses

In Halkomelem, on the other hand, as shown in the previous section, agreement in number on the surface between D and N is optional, as in (186a), and plural interpretation is achievable whether a nominal is marked for the plural or not (i.e., General Number), as in (186b). According to Wiltschko (2008), plural objects are compatible with any determiners, whether singular or plural, as in (186c). Therefore, plurals in Halkomelem do not involve

[36] I leave out some properties that she presented since those are not applicable to Japanese or to plurals discussed in this chapter. For instance, although the possibility of bare plural arguments is used as an indicator of headness, it is not applicable to Japanese, where bare nouns are widely used as arguments. Complementality between classifiers and plural markers is also claimed to show the headness of plurals. Since I discuss various types of plural (individuating, counting, lexical) and classifiers, I exclude it from the criteria in (186).

[37] In fact, Wiltschko (2008) posits [PL] and [SG] features. In this chapter, however, I use [+PL] and [-PL] instead for ease of exposition, in order to make it easier to distinguish the plural feature on a head from an optional plural feature [PL] that Wiltschko (2008) assumes for Halkomelem.

the obligatory Agree operation or selection of # by D (as observed in English). Neither the plural form of a determiner nor the pluralized noun in (180a), repeated here, is a realization of the syntactic Agree operation.

(188) t'ílém ye/te s-í:wí:qe
sing DET.PL/DET man.PL
'The men are singing.'

Wiltschko (2008) assumes a monovalent [PL] feature for Halkomelem, unlike the [+/-PL] contrast in English. The [PL] feature can be optionally and selectively attached to various locations, as briefly discussed in the next section.

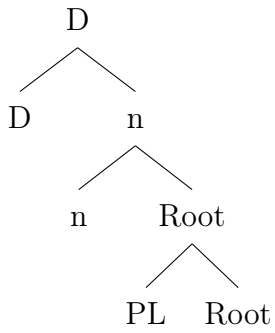
The last criteria is pluralia tantum, as in (186d). Since a head plural (inflectional plural) is a grammatical morpheme, it does not necessarily match the meaning of the referent of the noun to which the plural is attached. For instance, the term *scissors* is syntactically a plural noun (and causes a plural agreement as in *these scissors*); however, its referent is singular (one cutting tool). Similar examples in English include *glasses, pants, means, trousers*, etc. On the other hand, Wiltschko (2008) observes that Halkomelem does not possess pluralia tantum. This is straightforward if it is assumed that the [PL] feature necessarily yields a plural interpretation. Therefore, plurals in Halkomelem do not show properties of functional heads according to Wiltschko's (2008) criteria so far and are considered modifier plurals.

4.6.3 Sites of plurals

So far, Wiltschko (2008) illustrates that plurals in Halkomelem are not inflectional and do not head a phrase, either, but are modifiers, adjoining various locations: RootPs, nPs, or DPs. Here, I show the properties of three modifiers, i.e., RootP modifiers (Halkomelem; Wiltschko 2008), nP modifiers (Korean; Kim and Melchin 2017, 2018), and DP modifiers (Yucatec Maya; Butler 2011, Madnarin; Kim and Meng 2021).

Wiltschko (2008) argues that plurals in Halkomelem are modifiers on Roots. Namely, as in (189), plurals adjoin to Roots (since it is adjunction, the label of the merged unit is still Root). Roots lack any property of syntactic categorization, however. Following Marantz (1997) from DM perspectives, she claims that they can act as syntactic categories.

(189) Halkomelem plurals: Root modifier (adjusted from Wiltschko 2008:674)



The structure in (189) is well explained by the empirical facts observed so far. First, the possibility of plural markers appearing inside compounds as in (182b), and inside derivational morphology as in (184c), is compatible with the view that plurals in the language are Root modifiers.

Further, as predicted by the properties of the Root, i.e., acategorial node, plural marking can be shown on nouns, as well as on other categories, including verbs, as in (190) and adjectives, as in (191).

(190) a. xáqlhel-em
sigh-IV.
'sighing'

b. xaáqxqlhál-em
sigh.PL-IV
'sighing over and over' (Wiltschko 2008:679)

(191) a. *x̄weém 'fast'

b. *x̄weém-*x̄wém
fast.PL
'real fast, very fast' (Wiltschko 2008:680)

Testing the putative plural marker *–tul* in Korean with the criteria in Wiltschko (2008), Kim and Melchin (2018) demonstrate that *–tul* is a nP modifier. After first showing properties of *–tul* as non-inflectional plurals and as modifiers, Kim and Melchin (2018) employ idiosyncrasies as a clue of nP modifiers, based on the observation that *–tul* shows irregular distributions. They observe irregular distributions of *–tul*, in comparison to Animacy Hierarchy, as in (192), in which Corbett (2000) points out that the distribution of plural marking follows cross-linguistically:

(192) Animacy Hierarchy (simplified):
human > non-human animate > inanimate

Nouns in all the above-listed classes are also allowed if a plural marking is possible at a point in the hierarchy. For instance, if a language allows non-human animate nouns to be pluralized, human nouns are highly likely to be pluralized as well in the language, whereas inanimate nouns (below-listed than the non-human animate) may or may not be pluralized. Korean *–tul* is peculiar, i.e., it is attached to human and inanimate nouns, but much less often to non-human animate nouns, as in (193).

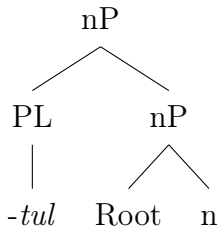
(193) a. salam-tul sey myeng
person-PL three CL
'three people'

b. chayk-tul sey kwun
book-PL three CL
'three books'

c. ??kilin-tul sey mari
giraffe-PL three CL
'three giraffes' (Kim and Melchin 2018:14)

Therefore, *–tul* shows some idiosyncrasy in its distribution. Kim and Melchin (2018) present the structure in (194), arguing that the nP level is the locus of idiosyncrasies or irregular plurals in this case.

(194) Korean *–tul* plural: nP modifier (Kim and Melchin 2018)



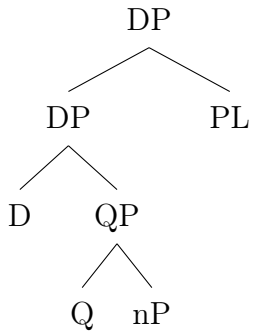
Lastly, based on the observations of its distributions and semantic properties, Butler (2011, 2012) illustrates that the plural in Yucatec Maya adjoins to DPs. The plural in the language is attached outside a coordinated structure, and can scope over both components of the coordination. Examine (195) to see what the plural pluralizes:

(195) le x-ch'úupal yéetel le ko'olel-o'ob-o'
DEF FEM-girl and DEF woman-PL-D2
'the girls(s) and the woman/women' (Butler 2011:68)

A plural marker should adjoin to DP for it to scope over both nouns marked with the definite marker. Moreover, since DP-adjoined plurals entail the projection of DPs, the presence of the plural should indicate argumental nominal. This is borne out by allowing

bare plurals in the argument positions. Moreover, DP adjunction is supported by semantic properties. Butler (2012) demonstrates that the plural marker triggers the definiteness and specificity effect, subsequently resulting in an obligatory wide scope reading. The structure of the DP-adjoined plural is shown in (196).

(196) Yucatec Maya plurals: DP modifier (based on Butler 2011)



Thus, plural marking is not always on the Ind or # head; however, it targets various landing sites, each of which shows syntactic and semantic properties to indicate the attachment location.

As seen thus far, Wiltschko (2008) shows that plurals can be either inflectional (as with those in English) or non-inflectional (as with those in Halkomelem, Korean, Yucatec Maya), and that inflectional plurals are on the # head (IndPs in this thesis), while non-inflectional plurals adjoin as modifiers at the Root, n, or D levels.

In the next three sections, I show that while classifying various kinds of plurals (e.g., English-type and Halkomelem type) is valuable, it does not necessarily lead one to argue for distinct categories (e.g., inflectional and non-inflectional).

4.6.4 Gender in German

As discussed above, Wiltschko (2008) distinguishes inflectional (head) plurals from non-inflectional (modifying) plurals. Non-inflectional (modifying) plurals do not participate in (obligatory) syntactic Agree operations. In the next section, I present that plurals in Japanese show mixed properties of head plurals and modifying plurals. Whether considering plurals to be non-inflectional or not is important because the assumed structure and derivation based on Borer (2005a) and those based on Wiltschko (2008) appear to be incompatible on the surface. Despite the lack of compelling arguments, I tentatively support the former in this thesis. Here, I comment on the possibility of accommodating the distinct properties of plurals in English-type languages and those in Halkomelem-type languages in the system of Borer (2005a).

Wiltschko (2008) argues that the (optional) feature [PL] can be attached to various elements: e.g., Roots, nP, or demonstratives. [PL] does not require, or is not required by, a syntactic Agree operation, and its associate can be either in a singular or plural form. For instance, determiners and nouns show all the possible four patterns in Halkomelem as in (180), repeated here as (197).

(197) a. t'ílém ye/te s-í:wí:qe
sing DET.PL/DET man.PL
'The men are singing.'

b. t'ílém ye swíyeqe
sing DET.PL man
'The men are singing.'

c. t'ílém te swíyeqe
sing DET man
'The man is singing.'

Although the plural expressions in (197) do not involve Agree, there is a case where a modifier is involved in Agree (which is discussed in Wiltschko 2008:661). In German, determiners and nouns obligatorily agree in gender, as in (198a, b), and gender mismatch renders ungrammaticality, as shown in (198c):

(198) a. der Doktor [German]
DEM.MASC doctor
'the doctor'

b. die Doktor-in
DET.FEM doctor-FEM
'female doctor'

c. *die Doktor
DET.FEM doctor
(intended) 'the female doctor'

However, besides feminizing the word with a derivational suffix *–in* as in (198b), gender mismatch can be salvaged by adding *Frau* 'woman', as in (199).

(199) die Frau Doktor [German]
DET.FEM woman.FEM doctor
'the lady doctor'

Wiltschko (2008:661) claims that "modifying features on D modify the interpretation and thus can determine the interpretation of the noun, but only if the noun is not specified for

the feature." Although this mechanism is straightforward for optional features like [PL], it is unclear why and how the gender in the determiner is valued in (199). The modifier *Frau* appears to be somehow involved in the agreement between the determiner and the head noun. If *Frau* is a head noun, *Doktor* is lost in the argument structure. Alternatively, as in (200), I tentatively assume without further scrutiny that the noun is marked for feminine with a null morpheme (the covert equivalent of *–in*) specified (or just indicated) by the modifier.

(200) die Frau Doktor.$\emptyset_{\text{F}}$ [German]

If this is on the right track, and if this applies to plurality, the paradigm in (197) can be analyzed as follows. In Halkomelem, the "singular" determiner *te* is compatible with either a singular or plural noun, and the plural determiner *ye* is used with a noun marked for plural either with a plural marker (201c) or covertly (201d).

(201) a. DET.SG + Noun.SG
b. DET.SG + Noun.PL
c. DET.PL + Noun.PL
d. DET.PL + Noun.$\emptyset_{\text{PL}}$

With this, at least the plurality can be seen as Agree. The paradigm in (201) remains insufficient to render the Agree operation "obligatory" since the singular determiner is used with a plural noun. Later in this chapter, I refine the paradigm in (201), considering plurals in Japanese. The tentative conclusion here is that modifying plurals can *indirectly* participate in the syntactic Agree operation through a covert marker on the associate noun.

4.6.5 Abundance plurals in English and in Halkomelem

In English, mass-y nouns can be marked "plurality," as in (71), repeated here as (202).

(202) The river discharges its waters into the lake. (= lots of water) (Acquaviva 2008:1)

As discussed in Section 4.4.2.4, mass nouns with plurals commonly refer to a large mass of the mass entity (e.g., lots of water) (Acquaviva 2008).

Similarly, in Halkomelem, mass-y nouns can be marked "plurality" as in (203). As shown in the English translations, mass-y nouns with plurals refer to a large mass of the mass entities.

(203) a. tsel kw'éts-l-exw te/ye th'exth'eéet
1.SG.S see-TRANS-3O DET/DET.PL gravel.PL
'I saw a lot of gravel.'

b. tsel kw'éts-l-exw te/ye shweláthetel
1.SG.S see-TRANS-3O DET/DET.PL fog.PL
'I've seen a lot of fog.' (Wiltschko 2008:669)

In this section, I claim that abundance plurals in English fulfill the criteria for inflectional plurals in Wiltschko (2008), although this feature is not bivalent [+/-PL], but is monovalent [PL]. Here, I apply the criteria for (non-)inflectional plurals (obligatory plural marking, obligatory agreement, plural inside compounds, plural inside derivational morphology) in Wiltschko (2008), and show that abundance plurals in English are classified as inflectional plurals.

First, abundance plurals in English should be considered obligatory. Although plural marking on mass-y nouns is not obligatory, it is required to achieve an abundance meaning. Second, when plurals are marked on nouns, even though they are mass-y nouns, they require agreement, as in (204)(Emphasis added).[38]

(204) a. The water**s** of the Mediteranean **are** always warm.
b. See **these** water**s** **they**'ll pull you up (from *These Waters* by Ben Howard)

As shown in (204), abundance plurals in English require plural agreement on the verb (*are*) and demonstratives (*these*), and should be referred back to by a plural pronoun (*they*). Third, abundance plurals are unlikely to be inserted inside compounds, as in (205). No matter how much water is used in a waterbed or in a waterslide, the plural marker cannot be inserted inside the compounds.

(205) a. water-bed / *water-s-bed
b. water-slide / *water-s-slide

Fourth, abundance plurals are unlikely to be inserted inside derivational morphology, as in (206).

(206) a. waterless / *water-s-less
b. watery / *water-s-y

The properties of abundance plurals in English are summarized in (207), which shows that abundance plurals pattern with genuine plurals, and thereby show that abundance plurals are inflectional plurals.

[38] I owe the example in (204a) and relevant discussions to Elizabeth Ritter.

(207) criteria for (non-)inflectional plural morphology (based on Wiltschko 2008:645)

		Individuating plurals	Abundance plurals	Halkomelem
a.	obligatory plural marking	yes	yes	no
b.	obligatory agreement	yes	yes	no
c.	plural inside compounds	no	no	yes
d.	plural inside derivational morphology	no	no	yes
	Types of plurals	Infl.	Infl.	Non-Infl.

Next, I apply to abundance plurals in English the criteria for the head/modifier distinction in (Wiltschko (2008)) (obligatory agreement, property in the absence of plural marking, whether plural can be selected for, pluralia tantum). The criteria show mixed results: in some points, abundance plurals pattern with genuine plurals in English, while in other points, abundance plurals pattern with plurals in Halkomelem.

First, as discussed above, abundance plurals in English require plural agreement with verbs and demonstratives. Second, the nominal phrase refers to a mass term (i.e., unmarked) in the absence of abundance plurals (although the nominal phrase still refers to a mass term in the presence of abundance plurals). The unmarkedness of the nominal in the absence of abundance plurals in English is in line with the description of Halkomelem: "their absence is not associated with a specific meaning but instead is truly unmarked" (Wiltschko 2008:688). Third, abundance plurals appear to be able to be selected for, as in (208).

(208) Many waters cannot quench love... (*The Bible, Song of Solomon*8:7)

Fourth, although English allows the form-meaning mismatch as in pluralia tantum, it is not observed with abundance plurals.[39]

Thus, the properties of abundance plurals in English in terms of the head/modifier distinction in Wiltschko (2008) are summarized in (209).

[39]Some might argue that abundance plurals are instances of form-meaning mismatch, since they involve "plural" marking but do not achieve plurality in the same sense as, e.g., *books, students*, etc. This claim makes sense, but it requires us to consider that Halkomelem also allows the form-meaning mismatch.

(209) Criteria for functional heads and modifiers for plurals (based on Wiltschko 2008)

		Individuating plurals	Abundance plurals	Halkomelem
a.	obligatory agreement	yes	yes	no
b.	absence of plural marking	singular	mass	General Number
c.	plural can be selected for	yes	yes	no
d.	pluralia tantum	yes	no	no
	Category	Functional	??	Modifier

As shown in (209), the status of abundance plurals is not conclusively determined. However, it is crucial that abundance plurals show different patterning in the first two criteria. Abundance plurals in English require agreement as in individuating plurals, whereas their absence leads to unmarkedness as in Halkomelem. It should be assumed that a monovalent feature [PL] participates in the Agree operation, in a similar way to individuating plurals.

Recall that abundance plurals are inflectional plurals as discussed above. This also suggests that whether the number feature is bivalent [+/-PL] or monovalent [PL] does not seem crucial for Agree.

4.6.6 Plurals in Japanese and Wiltschko (2008)

In this section, I apply to *-tati* plurals the criteria of (non)inflectional plurals and the head/modifier distinction in Wiltschko (2008). I show that *-tati* with proper names fulfills the criteria for non-inflectional plurals and modifier plurals, although, as shown in Section 4.5.3, they are individuating plurals (i.e., inflectional and head plurals).

The criteria to determine whether plurals are head plurals or modifier plurals are repeated in (210).

(210) criteria for (non-)inflectional morphology (based on Wiltschko 2008:645)

		Inflectional	Non-inflectional
		(e.g., English)	(e.g., Halkomelem)
a.	obligatory plural marking	yes	no
b.	obligatory agreement	yes	no
c.	plural inside compounds	no	yes
d.	plural inside derivational morphology	no	yes

I investigate plurals in Japanese with (210). First, regarding (210a) and (210b), plurals in Japanese are not obligatory (except for human pronouns). Plural marking is not required to achieve a plural interpretation. Bare nouns are General Number in Japanese, whether the nouns are common nouns or proper-names-turned common nouns. For instance, *gakusei* 'a student or students' allows either singular or plural reading. A plural referent does not necessarily cause plural marking. Similarly, plural-marked nouns do not necessarily cause agreement, whether nouns are common nouns, as in (211), or proper-names-turned common nouns, as in (212).

(211) a. kono gakusei-tati
this student-PL
'these students'

b. korerano gakusei-tati
these student-PL
'these students'

c. korerano gakusei
these student
'these students'

(212) a. kono Shohei-tati
this Shohei-PL
'these Shoheis'

b. korerano Shohei-tati
these Shohei-PL
'these Shoheis'

c. korerano Shohei
these Shohei
'these Shoheis'

As in *gakusei* 'student(s)', the absence of plural marking leads to the number neutral interpretation rather than singular, as in (210c). This is also true of proper names, as repeated in (213), where a bare form *Sato* is used to refer to either singular or plural entities.

(213) Oni-wa kyoo-mo Sato-o tukamaeta.
demon-TOP today-also Sato-ACC caught
'The demons caught one or more Satos today, too.'

Regarding the criteria in (210c, d), plural morphology does not appear inside a compound or a derivational morphology, as in (214).

(214) a. gakusei(*-tati) undou
student-PL movement
'student movement'

b. otoko(*-tati)-rasisa
man-PL-ness
'manliness'

Regarding (210f), it is not obligatory that count-sensitive modifiers select for plural forms, since plural marking is optional. In contrast to English, the singular does not appear to be selected for, either. This is presumably because there is simply no [-PL] or [SG] feature in Japanese. As in (215), *sorezore* 'each' cannot take a singular noun. (215) also shows that General Number does not participate in syntactic number agreement.

(215) a. *sorezore no kanozyo
each of she

b. kanozyo-tati-sorezore
she-PL-each
(Intended) 'each of them.F'

c. *sorezore no zibun
each of self

d. zibun-tati-sorezore
self-PL-each
(intended) 'each of oneselves'

Regarding (210g), Japanese does not have pluralia tantum.

Thus, *–tati* plurals clearly show patterning in modifying plurals, whether they are used with a common noun or a proper name. The properties of plurals in Japanese are outlined in (216).

(216) The properties of-*tati* plurals in Japanese

		Head	Modifier	Japanese
a.	obligatory plural marking	yes	no	no
b.	obligatory agreement	yes	no	no
c.	absence of plural marking	singular	neutral	neutral
d.	plural inside compounds	no	yes	no
e.	plural inside derivational morphology	no	yes	no
f.	plural can be selected for	yes	no	no
g.	pluralia tantum	yes	no	no

Thus, -*tati* plurals largely pattern with the properties of modifier plurals. Recall, however, that I showed in Section 4.5 that -*tati* with common nouns are counting plurals, whereas -*tati* with proper names are individuating plurals. The fact that different types of plurals both show the same properties as modifier plurals, is problematic for the head/modifier distinction in Wiltschko (2008). In particular, the status of -*tati* with proper names as individuating plurals should imply that it is an inflectional plural heading IndPs, contrary to the criteria in (216) (which shows -*tati* is a modifier plural). In addition, (216c) is crucial. Modifier plurals carry a feature [PL] (rather than a bivalent feature [+/-PL]), and their absence yields unmarked (i.e., number neutral) interpretations. This claim seems to imply that modifier plurals are exclusive plurals, contrary to the fact observed in Section 4.5 that -*tati* with proper names is inclusive.

Thus, while the distinction between English-type plurals and Halkomelem-type plurals is well justified by Wiltschko (2008), it does not necessarily mean that the distinction is reflected in syntax, in particular, the Agree operation.

While I leave for future research on how to formalize the differences between modifier plurals and head plurals in Wiltschko (2008), I instead proposed, as in Section 4.5, that -*tati* projects IndPs or #Ps, or adjoins at the nP or DP level.

4.7 Summary of Chapter 4

In this chapter, I argued for a grammaticized mass-count distinction in Japanese by showing manifestations of count syntax in the grammar of the language in question. I also investigated the syntactic and semantic properties of plurals in Japanese, and proposed that the grammaticized mass-count distinction is manifested by -*tati* plurals (when used with proper names) and plurals via reduplication, which show striking similarities to plural markers in English. The structures of plurals in Japanese are schematized as below.

(217) Plurals in Japanese

a. Bare plurals 1 $[_{DP}\ [_{IndP}\ [_{nP}$ Proper-Name $]tati_{IND}]D]$ (e.g., *Haruko-tati*)

b. Bare plurals 2 $[_{DP}\ [_{IndP}\ [_{nP}$ N$]$ REDUP$_{IND}]D]$ (e.g., *yama-yama*)

c. Modified plurals 1 $[_{DP}\ [_{\#P}\ [_{IndP}\ [_{nP}$ N $]_{IND}]\#]D]$
(e.g., *gakusei sorezore* '(the) students each')

d. Modified plurals 2 $[_{DP}$ D $[_{\#P}$ ~~D~~.# $[_{IndP}$ ~~D~~ $[_{nP}$ N $]_{IND}]\#]D]$
(e.g., *korera no hon* 'these books')

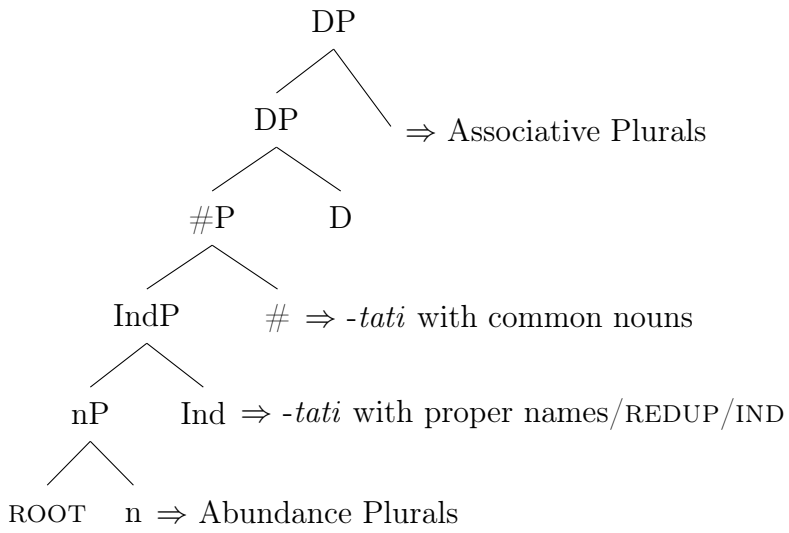
e. Counting plurals $[_{DP}\ [_{\#P}\ [_{IndP}\ [_{nP}$ N $]\emptyset_{Ind}]tati]D]$
(e.g., *gakusei-tati* 'students')

f. Lexical plurals $[_{DP}$ *korera no* $[_{nP}$ [n $\emptyset_{pl}$] [ROOT]]]]
(e.g., *korera no mizu* 'waters'; abundance plurals)

The *-tati* plural with a proper name and reduplication pattern with bare plurals in English (217a, b). Count-sensitive modifiers specify the number properties, as in (217c, d). Such a null plural marker is attested in the plural of abundance (217f). The *-tati* plural with a common noun is a counting plural, excluding one from its interpretation.

I claimed that the plurals in Japanese are mapped across syntactic structures as below. The analysis provided in this chapter is in line with the recent development of a heterogeneous analysis of plurals (e.g., Mathieu 2014).

(218) Plurals in Japanese



I left for future research important basic questions regarding a co-occurrence generalizations of classifiers and plural marking (e.g., Greenberg 1972, Sanches and Slobin 1973). I believe that, by sorting out individuating and non-individuating plurals, the analysis of

distributions of classifiers and plurals shall be refined. In the next chapter, I propose that classifiers also encompass both individuating and non-individuating varieties.

5 Classifiers

5.1 Problems and Proposals

In Chapters 2 to 4, I proposed that the Japanese language possesses residual ways of manifesting the grammaticized mass-count distinction in the absence of classifiers, and that bare nouns (General Number), count-sensitive quantifiers/demonstratives, and plurals involve individuation (thereby manifesting the grammaticized mass-count distinction).

This chapter discusses classifiers in Japanese, in particular, individuation and classifiers and properties of "numeral quantifiers" (sequences that consist of a numeral and a classifier, as in *san-nin* (3-$\text{CL}_{\text{people}}$) or *go-hon* (5-$\text{CL}_{\text{bottle}}$)) in Japanese.[1] In Japanese, classifiers are normally required when mass-y nouns are measured, as in (1), where a classifier *-hon* is inserted to support a numeral and a noun.

[1] To be precise, numeral quantifiers can involve container phrases in Japanese, as in (i), where container phrases (glass, cup, etc.) are added before a sequence of a numeral *4* and a classifier *-hon*. Container phrases are often used with mensural classifiers and are used to indicate what unit is used to count or measure objects. See Sections 5.2 and 5.6 for more details.

(i) {gurasu, koppu, dekyanta, supuun} yon-hai-no wain
{glass, cup, decanter, spoon} 4-CL-LIN wine
'four {glasses, cups, decanters, spoons} of wine'

(1) Haruko-wa Sato kyoozyu-ni 4-**hon**-no wain-o okutta.
Haruko-TOP Sato Professor-DAT 4-CL-LIN wine-ACC presented
'Haruko presented Professor Sato with four bottles of wine.'

In (1), a numeral 4 does not modify a noun (wine) directly. The numeral and the noun are mediated by a classifier *-hon*, which is used for long tubular objects, e.g., bottles.

The linker *-no* is also inserted in (1). In Japanese, pre-nominal modifiers (except adjectives and relative clauses) are commonly supported by the linker, as in *Tokyo-kara-**no** meeru* (Tokyo-from-LIN e-mail). Leaving detailed discussions for later sections, I tentatively assume that *-no* is inserted at PF post-syntactically (Watanabe 2006, 2010).

The use of classifiers as in (1) is similar to measure words (e.g., *bottle*, *glass*) in English, which are required when mass-y nouns are measured as in *four bottles of wine* or *four glasses of wine*.

In Japanese, however, classifiers are also normally required when count-y nouns are counted, as in (2), where a classifier *-nin* is inserted to support a numeral and a count-y noun *gakusei* 'student'.

(2) Haruko-wa Sato kyoozyu-ni san-**nin**-no gakusei-o syookaisita.
Haruko-TOP Sato professor-DAT 3-CL-LIN student-ACC introduced
'Haruko introduced 3 students to Professor Sato.'

This use of classifiers contrasts with the English counterpart *three students*, where a numeral directly modifies a noun. In Japanese, with some exceptional cases (as discussed in the last chapter (Section 4.3); e.g., large number numerals), classifiers are almost obligatory when a numeral modifies a noun, as in (1) and (2), whether the noun is count-y or mass-y.

I call classifiers used for count-y nouns as in (2) "sortal classifiers", and classifiers used to measure (or count) as in (1) "mensural classifiers" in this chapter.

Classifiers have received much attention in previous literature from various perspectives, including descriptive and theoretical linguistics, typology, philosophy, pedagogy, and cognitive science, and their syntactic and semantic properties have been extensively discussed. However, while it is widely assumed in theoretical literature that classifiers are involved in individuation, number, counting, and quantification (e.g., Borer 2005a, Chierchia 1998b), it has yet to be revealed *how* classifiers are involved in these functions syntactically.

This is not the sole question to address and answer in this chapter. In Chapters 3 to 4, I also showed that bare nouns and plurals in Japanese are heterogeneous in terms of individuation. DP bare nouns involve individuation, whereas nP bare nouns do not. Plurals are either individuating plurals or non-individuating plurals (including counting plurals, nP plurals, and DP plurals).

As such, in this chapter, in addition to investigating how classifiers are involved in individuation and counting/measuring, I also explore *what* type(s) of classifiers individuate nouns. Identifying individuating and non-individuating classifiers is not new. Cheng and Sybesma (1999) claim that in Mandarin and Cantonese, sortal classifiers ("count classifiers" in their term) (as in (1)) manifest the (grammaticized) mass-count distinction, while mensural classifiers ("mass classifiers/massifiers" in their term) (as in (2)) do not. Li (2013) proposes that either sortal or mensural classifiers can be either individuating or non-individuating classifiers, and that their differences are reflected in different structures.

However, classifiers and numeral quantifiers (sequences that are formed by a numeral and a classifier) in Japanese are more diverse than in Mandarin in terms of their configurations. Besides the two types of classifiers (i.e., sortal and mensural), numeral quantifiers are structurally diverse. Numeral quantifiers appear at various locations in a sentence without drastically changing the meaning of the sentence. Examine (3), which shows possible locations in a sentence where numeral quantifiers appear.[2]

(3) a. Haruko-ga **san-nin**-no gakusei-o Sato kyoozyu-ni syookaisita.
Haruko-NOM 3-CL-LIN student-ACC Sato professor-DAT introduced

b. Haruko-ga gakusei-**san-nin**-o Sato kyoozyu-ni syookaisita.
Haruko-NOM student-3-CL-ACC Sato professor-DAT introduced

c. Haruko-ga gakusei-o **san-nin** Sato kyoozyu-ni syookaisita.
Haruko-NOM student-ACC 3-CL Sato professor-DAT introduced

d. Haruko-ga gakusei-o Sato kyoozyu-ni **san-nin** syookaisita.
Haruko-NOM student-ACC Sato professor-DAT 3-CL introduced

e. **San-nin** Haruko-ga gakusei-o Sato kyoozyu-ni syookaisita.
3-CL Haruko-NOM student-ACC Sato professor-DAT introduced
'Haruko introduced (the) 3 students to Professor Sato.'

Numeral quantifiers can be either pre-nominal, post-nominal, or separated from the noun. As shown in (3a, b), numeral quantifiers may precede the associate noun (supported by a linker *-no*) or follow it (preceding a case marker) within the DP. As shown in (3c, d, e), numeral quantifiers can modify their associate noun remotely. I refer to numeral quantifiers that are separated from their associate nouns as "floating numeral quantifiers" or "FNQs", and sentences containing floating quantifiers as "FNQ constructions".[3] While

[2] See Section 5.2 for more details on differences in meanings among sentences in (3).

[3] As discussed in Section 5.2, floating numeral quantifiers (FNQs) are one of the popular topics relevant to classifiers in Japanese in theoretical literature (e.g., Miyagawa 1989 and subsequent works, Takami 1998, Fitzpatrick 2006, Nakanishi 2007, to name a few). In particular, the derivation of FNQs is divided into two schools: a movement view and a adverb view. Leaving details for Section 5.2, I tentatively assume that FNQs are derived via a movement of the associate noun out of a DP, leaving numeral quantifiers

syntactic and semantic properties of numeral quantifiers in various locations, including FNQs, attract attention in the past literature, it is not a common method to view these from the viewpoint of individuation.

In order to untangle these puzzles regarding individuation of classifiers and diverse structures of numeral quantifiers (and relevant constructions), I address the questions as below and, by answering them, provide descriptive and structural analyses of classifiers and their relations to the grammaticized mass-count distinction.

(4) a. Are classifiers required by nouns for individuation or required by numerals?
b. What classifiers individuate?
c. Are pre-nominal, post-nominal, and floating numeral quantifiers related structurally?

Function of classifiers

The first question concerns the function of classifiers and the mass-count distinction. This question comes from the observation in (5), which shows that classifiers are commonly used when counting/measuring nouns in Japanese.

(5) a. Sortal classifier

San-*(nin) no gakusei-ga kinoo kono hon-o katta.
3-CL LIN student-NOM yesterday this book-ACC bought

'Three students bought this book yesterday.'

b. Mensural classifier

Haruko-wa go-*(hai) no wain-o nonda.
Haruko-TOP 5-CL LIN wine-ACC drank

'Haruko drank five glasses of wine.'

Two analyses are presented to capture the obligatory use of classifiers in case of counting/measuring in Japanese. Sudo (2014) claims that classifiers are required by numerals so that they can modify nouns. Under this analysis, nouns are individuated by another element, and classifiers themselves do not serve for individuation (although sentences containing classifiers, like count-sensitive quantifiers, may involve individuation). Watanabe (2006) and subsequent works, and Ochi (2012) claim that classifiers are required by nouns so that they can participate in count syntax. Under this analysis, classifiers individuate

behind. In Section 5.4, I also discuss varieties of FNQs that are not derived via movement. However, I use the term "floating" for all the instances where numeral quantifiers are associated with nouns remotely on the surface (regardless of their derivations and structures).

nouns. Thus, although the individuation of classifiers is often assumed without language specific scrutiny, it is still unanswered whether (and/or how) classifiers are involved in individuation.

The obligatory use of classifiers is compatible with either a classifier-for-numeral analysis (e.g., Sudo 2014) or a classifier-for-individuation analysis (e.g., Ochi 2012, Watanabe 2006). Under the classifier-for-numeral analysis, classifiers are required by numerals so that they can modify nouns. The fact that a numeral and a classifier form a "unit", i.e., a numeral quantifier, suggests that classifiers are closer to numerals than to nouns. This in turn supports the classifier-for-numeral analysis. This analysis leaves open a question as to what individuates nouns so that they can be modified by numerals (which are supported by classifiers).

Under the classifier-for-individuation analysis, classifiers are required by nouns for individuation so that nouns can participate in count syntax (e.g., modification by numerals). This analysis is in line with the proposed structure in the chapters so far of my thesis and past studies that I follow (e.g., Borer 2005a).

I partially follow both of these analyses and propose that classifiers are required for individuation as well as required by numerals. I show mass-to-count coercion effects as in (6), where the classifier makes a count (pillars) from a mass term (water); i.e., the classifier individuates *water*.

(6) Totuzen yon-hon-no mizu-ga hukidasita.
suddenly 4-CL-LIN water-NOM spouted
'Four pillars of water suddenly spouted out.'

I argue that classifiers are also required by numerals by showing that numeral quantifiers, as in *go-nin* (5-CL), undergo various phonological, morphological, and syntactic operations as a unit. To accommodate these two claims that look conflicting with each other at first glance, I claim, as an answer to the third question in (4), that classifiers, because of their clitic nature, move to merge with numerals.

Individuating and non-individuating classifiers

Second, as my answer to the second question in (4), I also propose that classifiers include individuating and non-individuating ones. As indicated in (5), classifiers are commonly classified into two types: **sortal** classifiers and **mensural** classifiers (Tang 1990). Sortal classifiers are mainly used with nouns whose English counterparts are usually count. Mensural classifiers include those denoting containers (cups, bottles, etc.) and standard measures (e.g., kg, km) (see Li 2013 for more detailed classifications of classifiers). Mensural classifiers are used to measure count-y or mass-y objects. As such, the type of classifiers

(sortal or mensural) is often assumed to manifest or reflect the grammaticized mass-count distinction (e.g., Cheng and Sybesma 1999 for Mandarin, Gebhardt 2009 for Persian).

The examples in (7) cast doubt on this, however.

(7) a. Haruko-wa san-bon no tabako-o sutta.
Haruko-TOP 3-CL LIN cigarette-ACC smoked
'Haruko smoked three cigarettes.'

b. Haruko-wa san-bon han no tabako-o sutta.
Haruko-TOP 3-CL half LIN cigarette-ACC smoked
'Haruko smoked three and a half cigarettes.'

Sortal classifiers allow both mass and count readings. In (7a), Haruko may or may not smoke each cigarette fully. Meanwhile, in (7b), Haruko is more likely to smoke three entire cigarettes and a half of a cigarette. In the second reading, one cigarette is used as a sort of measure phrase to measure the amount of cigarettes consumed.

A clearer mass context can be found with an *in-total* interpretation. The example in (7b) (and also (7a) in a much lesser degree) can be used to describe a situation where Haruko smokes seven butts, each of which roughly equals half a cigarette (i.e., in total, 3.5 cigarettes). Thus, sortal classifiers do not always individuate.

Mensural classifiers do not always instantiate mass syntax, either. Mensural classifiers commonly allow two readings: a **container** reading and a **measure** reading (e.g., Watanabe 2006). For instance, *san-bai no wain* 'three bottles of wine' refers to either three bottles containing wine (count reading) or the amount of wine (i.e., three bottlefuls) (mass reading).

Thus, importantly, the sortal/mensural distinction does not manifest or reflect the grammaticized mass-count distinction. I instead propose that the distinction between count and mass *readings* of a classifier manifests the grammaticized mass-count distinction, whether the classifier is sortal or mensural. (Also see Li 2013, Zhang 2018, 2020, and Mathieu and Zareikar 2015 for a similar claim for other languages.) In doing so, I classify classifiers and their readings as in (8).

(8) Classification of classifiers

	Type	Reading	Ind
a.	Sortal	count	Yes
b.	Sortal	mass	No
c.	Mensural	container (count)	Yes
d.	Mensural	measure (mass)	No
e.	Sortal/Mensural	attributive	No

As in (8), in addition to the count and mass readings of sortal and mensural classifiers, I add **attributive** readings (Jiang 2008, 2012). Attributive readings are not necessarily relevant to counting or measuring, but express the quality of the associate noun. For instance, the numeral quantifier *go-nin* in *go-nin-no guruupu* (5-CL$_{\text{person}}$-LIN group) merely explains the property of the noun regarding how many people belong to the group, but does not count the number of groups. Identifying attributive readings, I show, makes the classification more explanatory when comparing various observations. I classify classifiers using syntactic (FNQs, ellipsis) and semantic properties (incompletive readings).

The structures of classifier constructions

The third question in (4) concerns the structure(s) of DPs. Analyses of the structures of numeral quantifier constructions are inevitably complex since numeral quantifiers appear at various locations within the nominal domain as well as in a sentence, as shown in (3). Simplified examples are shown in (9):

(9) a. Pre-nominal numeral quantifiers

Go-nin-no gakusei-ga odotta.
5-CL-LIN student-NOM danced

b. Post-nominal numeral quantifiers

Gakusei-go-nin-ga odotta.
student-5-CL-NOM danced

c. Floating numeral quantifiers

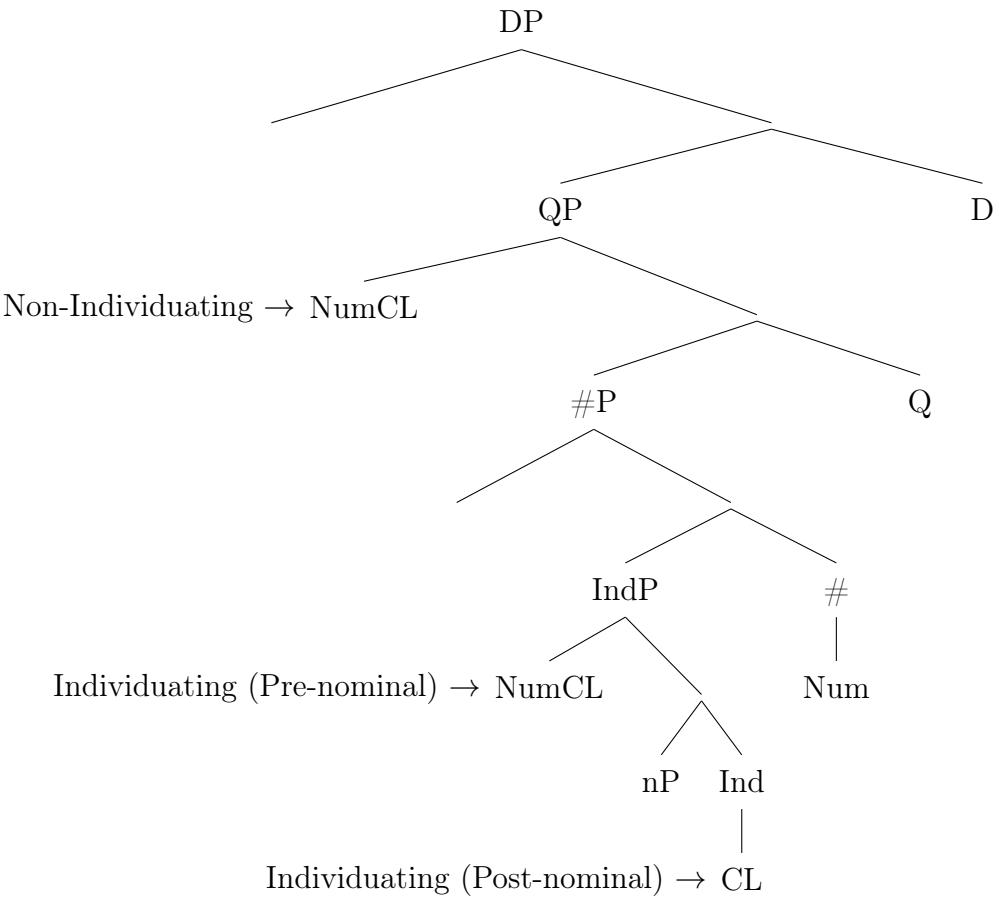
Gakusei-ga go-nin odotta.
student-NOM 5-CL danced

(For a-c) '(The) 5 students danced.'

In particular, it is hotly debated whether pre-, post-nominal, and floating numeral quantifiers are related structurally (e.g., one or two of them are derived from the other via movement).

With these observations, I map the count and mass readings of classifiers of each type to two distinct structures as in (10). I investigate predictions made from these two distinct structures, in (10), and show how those are fulfilled: (i) nominal ellipsis and the linker *-no*, and (ii) the possibility of case-marking to bare numeral quantifiers.

(10)



This chapter is organized as follows. Section 5.2 provides a brief overview of classifiers in Japanese. Section 5.3 argues that classifiers serve as individuators, thereby manifesting the grammaticized mass-count distinction. Section 5.4 proposes classifications of classifiers with respect to individuation. I argue about what kinds of classifiers individuate when. Crucially, I propose that both sortal and mensural classifiers allow either a count or mass reading. Three phenomena that differentiate individuating classifiers from non-individuating ones are introduced, including locations of numeral quantifiers, nominal ellipsis, and incompletive interpretation. In Section 5.5, I show that classifiers are also required by numerals. Section 5.6 examines the structures of classifier constructions, applying the observations gained by this point, and also applying past studies (e.g., Ochi 2012) on pre- and post-nominal numeral quantifiers. I argue for two distinct structures for pre- and post-nominal numeral quantifiers, and show how classifiers and numerals are mapped into the nominal functional structures. Section 5.6 concludes the chapter.

5.2 Classifiers

5.2.1 Definition

When I use the term *classifier* in this thesis, I only consider numeral classifiers, which are used when numerals modify nouns: e.g., *-nin* as in (11a), *-hiki* as in (11b), and *-mai* as in (11c), etc.

(11) a. san-nin-no gakusei
3-CL-LIN student
'three student'

b. ni-hiki-no neko
2-CL-LIN cat
'two cats'

c. go-maino kami
5-CL-LIN paper
'five sheets of paper'

Classifiers also include other types of elements with classificatory functions: verbal classifiers, possessive classifiers, demonstrative classifiers, locative classifiers, event classifiers, etc. (Aikhenvald 2000, Croft 1994, Dixon 1986, Kobuchi-Philip 2021, Mizuguchi 2004b), as well as Noun Classes (Dixon 1986), and grammatical gender (Corbett 1991). I leave out these types of classifiers from the discussion in this thesis.

Still, however, defining numeral classifiers is not an easy task. The term *numeral classifier* can be translated into Japanese in two ways: *ruibetusi* (literally, *classify + category*) or *josuusi* (literally, *assist + numeral/counting + category*). These terms tell us that classifiers serve two functions.[4] Moreover, numeral classifiers in Mandarin show some properties that are not expected for *numeral* classifiers (although these properties are not uncommon among numeral classifiers in other languages). In Mandarin, numeral classifiers can also be used with demonstratives or adjectives (Li 2013) in lieu of numerals, can be reduplicated, in which case the sequence commonly describes distributivity, or can stand alone with a noun without numerals or demonstratives. (See Jenks 2015, Jiang 2012 for an extensive overview on the syntactic and semantic properties of classifiers in Mandarin and comparative studies of classifier languages.) Nevertheless, Li (2013:15) presents a straightforward definition of classifiers (italics by Li):

[4]To be precise, these two terms in Japanese correspond to classifiers as a cover term encompassing various subtypes of classifiers and *numeral* classifiers that are most often taken up in literature among various types of classifiers, respectively.

"[F]rom the syntactic perspective, the term *numeral classifier* can be understood as the mediating element occurring contiguous to the numeral or determiner when modifying nouns. Semantically, it has the function of counting or measuring entities, namely, providing counting or measuring units."

In this sense, numeral classifiers in Japanese are neater and fit the definition above better than Mandarin. With some exceptions (as discussed in Chapter 4), classifiers in Japanese obligatorily accompany numerals, as in (12), numerals obligatorily accompany, as in classifiers (13), and classifiers cannot be reduplicated, as in (14), or used with demonstratives, as in (15).

(12) *Nin no gakusei-ga odotta.
CL-LIN student-NOM danced
(Intended) 'A student/Students danced.'

(13) *San-no gakusei-ga odotta.
3-LIN student-NOM danced
(Intended) 'Three students danced.'

(14) *Nin-nin-no gakusei-ga odotta.
CL-CL-LIN student-NOM danced
(Intended) 'A student/Students/Each student danced.'

(15) *Kono-nin-no gakusei-ga odotta.
this-CL-LIN student-NOM danced
(Intended) 'This/These student(s) danced.'

As such, as a working definition in this thesis, I define classifiers as follows, by minimally revising the one by Li (2013):

(16) Definition of classifiers
From the syntactic perspective, the term *numeral classifier* can be understood as the mediating element occurring contiguous to numeral when modifying nouns. Semantically, it has the function of counting or measuring entities, namely, providing counting or measuring units.

Descriptively, numeral classifiers are used to classify and count/measure objects. Theoretically, classifiers play a role in number or individuation in classifier languages (Borer 2005a; and as we see in detail throughout this thesis).

5.2.2 Classifiers in Japanese

Before going into interactions of classifiers and individuation, I provide a brief overview of classifiers in Japanese. I restrict descriptions here to what is relevant to the discussion in the rest of this chapter. See Downing (1996) and Mizuguchi (2004b) for more detailed and comprehensive descriptions of classifiers in Japanese.

5.2.2.1 Classification of classifiers

In this chapter, I mainly discuss sortal classifiers, as in (17a), and mensural classifiers, as in (17b), among various subtypes of classifiers identified (e.g., Li 2013 for classifiers in Mandarin).

(17) a. Sortal classifier

San-*(nin) no gakusei-ga kinoo kono hon-o katta.
3-CL LIN student-NOM yesterday this book-ACC bought

'Three students bought this book yesterday.'

b. Mensural classifier

Haruko-wa go-*(hai) no wain-o nonda.
Haruko-TOP 5-CL LIN wine-ACC drank

'Haruko drank five glasses of wine.'

Classifiers are also used to measure with standard measures, as in (18), or (sub)kinds (Tatsumi 2017a), as in (19). Unless necessary, I leave out these classifiers and leave them for future research.

(18) Standard measures

a. san-kiro-no niku (3-kilogram-LIN meat)

b. san-kiro-no paipurain (3-kilometer-LIN pipeline)

c. san-rittaa-no wain (3-liter-LIN wine)

d. san-heibei-no supeesu (3-square.meter–LIN space)

(19) Kind classifiers

a. san-syurui-no wain (3-kind-LIN wine)

b. san-syu-no wain (3-kind-LIN wine)

5.2.2.2 Inventory of classifiers

Iida (1999), cited in Tojo (2014), estimates that there are 360 classifiers in Japanese (including sortal and mensural classifiers), which can be further divided into two categories: about 40 are standard measures (e.g., *kiro* 'kilometer, kilogram'), and the remaining 320 items denote other types of classifiers (including both sortal and mensural classifiers).

In daily use, the number of classifiers used seems to be much smaller. Downing (1996) finds 154 sortal numerical classifiers in earlier linguistic research on classifiers, but in a corpus study taken from oral and written texts, she only finds 36 classifiers. In addition, Downing (1996) distributed a questionnaire to 15 Japanese speakers who were asked their opinions on applying the 154 sortal classifiers she discovered. Only 27 classifiers out of 154 were used by all the participants. With these, Downing (1996) lists 26 classifiers as "core inventory" and another 47 as "extended inventory."

Additionally, Komatsu (2018) notes that Japanese classifier systems, particularly those used in everyday language, are becoming more simplified. Some classifiers that were once widely used are no longer in use, and have been replaced by more generic ones. For example, *tansu* 'chest, drawer' is (or used to be) counted by a specific classifier *-sao*. Nowadays, as Komatsu (2018) points out, it is more likely to be counted by *-dai*, which is also used to count other large furniture (e.g., tables, TVs) and vehicles. (The general classifier *-tu* is also used as often as *-dai*.)

On the contrary, it does not seem unusual to introduce new classifiers. Historically, numerous classifiers have been formed from nouns, and this pattern is still present today. However, the majority of recently developed classifiers are mensural (e.g., Tojo 2014). For instance, as seen in (20), a number of loanwords are being utilized as mensural classifiers (e.g., Mizuguchi 2004a, Tojo 2014).

(20) a. san-setto-no maakaa
3-CL_{set}-LIN highlighter
'three sets of highlighters'

b. san-kappu no siroppu
3-CL_{cup}-LIN of syrup
'three cups of syrup'

In (20), the loanwords *setto* 'set' and *kappu* 'cup' are used as mensural classifiers to count or measure the entities.

Tojo (2014) introduces "nominal classifiers", classifiers in transition from a noun to a (sortal) classifier. Consider (21) to see what *classifier* is used to count.[5]

[5]As discussed below, sequences of a numeral and a classifier appear at various locations within a DP,

(21) a. Siritu-daigaku-ga yon-dangaku zassi-ni syoukais-are-ta.
private-university-NOM 4-university magazine-in introduce-PASS-PAST
'Four private universities were introduced in the magazine.'

b. Gakubu no kyoozyu san-kyoozyu-ga kouen-sita.
faculty if professor 3-professor-NOM lecture-did
'Three professors from the Faculty delivered a talk.'

c. Guruupu-riigu no geemu-o san-siai mita.
group-league of game-ACC 3-game watched
'I watched three games in the group leagues.'

Since these newly introduced classifiers show different properties from (usually more restricted than) other commonly used classifiers, I exclude the nominal classifiers from the discussion in this chapter.

5.2.2.3 Classifying function of classifiers

When classifiers are used to count or measure, they select or focus on a salient part of the referent in its pragmatic context or lexical/conceptual frame (e.g., everything pertinent to the lexical item). For example, the classifier in a phrase *ni-mai no kami* 'two sheets of paper' highlights the noun's shape attribute, which is flat and thin. *Go-hon no wain* 'five bottles of wine' describes one potential state of wine kept in tubular objects, e.g., bottles.

Sortal and mensural classifiers select different ranges of nouns.Sortal classifiers are normally used with count-y nouns, whose counterparts in number languages are count nouns. Besides general classifiers (*-tu*, *-ko*; these are not as general as *-ge* in Mandarin, though), each (countable) noun has a particular sortal classifier or two. Appropriate classifiers are selected for inanimate entities concerning their shape or function. For instance, the general classifier *-ko* is not so general since it is used for relatively smaller tangible objects. Neither is another general classifier *-tu*, which is used only with the numbers 1 to 9.[6] The most popular methods of counting animals (including insects) are by-*hiki* or *-tou*. Birds are counted by *-wa* (or *hiki*). Namely, classifiers semantically agree with the ontological properties of nouns depending on their size. It is for this reason that classifiers are thought to be comparable with grammatical gender or Noun Classes.[7]

as well as in a sentence in Japanese. Although I put them pre-nominally until Section 5.5, they follow the associate nouns or case markers in (21), since nominal classifiers seem to show some preferences in terms of location.

[6] As opposed to many other languages (e.g., Arabic, Yucatec Mayan, etc.), where only specific numerals are compatible with plurals or classifiers, this restriction is morphological and historically developed rather than reflecting distributions of number qualities. The rules for selecting a classifier are beyond the scope of this thesis. For such issues, see Komatsu (2018), Laykoff (1986), Matsumoto (1993), among many others.

[7] This claim does not exclude the possibility that individuation is not encoded in gender or Noun Classes.

However, in contrast to these grammatical classification systems, the choice of classifiers shows some flexibility, and classifiers often cause coercion effects. For instance, as noted above, animals can be counted either by-*hiki* (for small ones) or -*tou* (for larger ones). It is up to the context and the speakers which classifier to choose:

(22) a. tiwawa go-hiki to raburadooru yon-tou
chihuahua 5-CL and Labrador 4-CL

b. raburadooru go-hiki to zou yon-tou
Labrador 5-CL and elephant 4-CL

c. Gozira-wa zou-go-hiki-o humitubusita.
Godzilla-TOP elephant-5-CL-ACC trampled.over
'Godzilla trampled over 5 elephants.'

d. Gozira-ip.piki-nara watasi-wa go-hun-de taoseru.
Godzilla-1.CL-if I-TOP 5-minute-in defeat
'It will take less than five minutes for me to kill just one Godzilla.'

In (22a), the Labrador Retriever is perceived as a relatively large dog, thereby counted by -*tou*. It can be perceived as a small animal depending on the context, as in (22b), where it is compared with elephants, which, as in (22c), in turn are considered small when those are compared with Godzilla. Even Godzilla can be perceived as a small animal (or as weak an animal as small animals) in a certain mental situation, as in (22d).

Also, it is possible that the same noun can be counted or measured in different ways by different classifiers. Consider (23) to see what the classifiers quantify.

(23) a. Go-nin no gauksei-ga hasitta.
five-CL of student-NOM ran
'Five students ran'

b. Go-kumi no gauksei-ga hasitta.
five-CL of student-NOM ran
'Five groups of students ran'

There should only be five students in (23a); however, in (23b) there may be more than five since *go-kumi* 'five group' only specifies the number of student groups, not the precise total number of students.

Moreover, the wrong choice of classifier is considered unnatural or unacceptable, rather than considered ungrammatical. Consider (24):

Ott (2011) and Wiltschko (2006) argue that diminutives in German individuate nouns. Also, as shown in Chapter 4, the singulative, which is done by gender shift, in Arabic is an individuator (Mathieu 2012).

(24) a. ?Go-hiki-no gakusei
5-CL-LIN student
'five students'

b. ??/#Go-nin no inu
5-CL LIN dog
(Intended) 'five dogs'

Note that the wrong classifiers as in (24) are not completely ungrammatical (although almost all native speakers initially judged them *ungrammatical*). The choice of classifiers has sort of pragmatic functions, and we do not always (in fact, usually not) find one-to-one (or one to a fixed number) correspondences between nouns and classifiers. Namely, the seemingly wrong choices of classifiers as in (24) can be improved in certain environments, and in fact, nouns have wider choices of classifiers (however 'wrong' or 'incorrect' prescriptively or conventionally). For instance, (24a) can be used to describe cute and comical students like small animals. (24b) may be used to refer to dog-turned persons or person-turned dogs. Thus, in contrast to gender or noun classes, the selection of classifiers is somewhat conventionalized rather than grammatically encoded.

Crucially, such flexibility does not seem to entirely stem from lexical properties. Rather, flexibility is in syntax. Namely, feature specifications or interpretations can be overwritten (or coerced) in syntax. In this chapter, I show that sortal classifiers coerce mass-y terms into count nouns. Importantly, such coercion takes place only in one direction, i.e., mass-to-count. Provided that nominals are mass (neutral) at the beginning of the derivation, it is straightforward that coercion always takes place from mass/uncountable to count. (To generate mass nominals from countable nouns, syntax has only to leave nouns unindividuated.)

Mensural classifiers, on the other hand, do not favour specific nouns. Mensural classifiers are compatible with any noun as long as the classifier can measure or count the entity that a noun designates. Consider (25), noting that *-hai* is used for a glass or cup, and its contents, and *-hon* is used for a bottle or tubular object.

(25) a. booru go-hai no wine
bowl 5-CL LIN wine
'5 bowls of wine'

b. botoru go-hon no aisu
bottle 5-CL LIN ice.cream
'5 bottles of ice cream'

A bowl can measure wine if you put it in bowls, even though it is typically consumed using a bottle, a decanter, or a glass. Similarly, you can measure ice cream by *-hon*, which is

commonly used to count bottles, if you put it in a wine bottle. Mensural classifiers can also classify count-y objects, as noted in (26).

(26) booru san-bai no ringo
bowl 3-CL LIN apple
'3 bowls of apples'

When sortal and mensural classifiers are used with mass-y and count-y items, an effect emerges that highlights another (surface) difference between them. Mensural classifiers are inherently compatible with count-y objects, similar to that in (27).

(27) Haruko-wa go-hako no hon-o katta.
Haruko-TOP 5-CL LIN book-ACC bought
'Haruko bought 5 boxes of books.'

In (27), Haruko could purchase five books, each contained in a box, or purchase 1,000 volumes, which the bookshop would package into five boxes. Count-y objects can be employed more effectively with a container when a mensural classifier is used. Consider:

(28) booru san-bai no ringo
bowl 3-CL LIN apple
'3 bowls of apples'

(28) shows that *ringo* 'apple' (in a count reading) can be measured with a bowl, although bowls do not count its number. On the other hand, when sortal classifiers are used with mass-y objects, it brings coercion effects, as in (29), where a syntactically countable nominal is derived from mass-y objects by sortal classifiers.

(29) itutu no mizu
5-CL LIN water
'five waters (e.g., five glasses, five bottles, five kinds, etc.)'

In (29), the general classifier *-tu* induces coercion (portion, (sub)kind) from mass to count.

5.2.2.4 Numerals

As mentioned above, classifiers are almost always used with numerals, and numerals are almost always used with classifiers. There are two numeral systems in Japanese, including Sino Japanese numerals and Yamato (native) Japanese numerals, as in (30):

(30) Numerals in Japanese

	Types	Sino	Yamato
a.	1	iti	hi-
b.	2	ni	hu-
c.	3	san	mi-
d.	4	si	yon
e.	5	go	itu-
f.	6	roku	mu-
g.	7	siti	nana
h.	8	hati	ya-
i.	9	kyuu/ku	kokono
j.	10	zyuu	too

The range of Yamato numerals is 1 to 10. As a hyphen indicates, Yamato numbers, except 4, 7, and 10, are bound morphemes and always need classifiers. Only the general classifier *-tu* and *-ka* 'day' are used with the Yamato numerals 5, 6, 8, and 9 in everyday discourse. Meanwhile, *too* '10' can stand alone and cannot be used with classifiers.

Two systems are frequently mixed into one paradigm. Examine the examples in (31) to compare them with the numerals in (30).

(31) Persons

a.	1	hito.ri
b.	2	huta.ri
c.	3	san-nin
d.	4	yo-nin
e.	5	go-nin
f.	6	roku-nin
g.	7	nana-nin (siti-nin)
h.	8	hati-nin
i.	9	kyuu-nin (ku-nin)
j.	10	zyuu-nin

In (31), numbers and classifiers are morphologically fused in numbers 1 and 2. The digits underlined (1, 2, 4, 7) are Yamato numerals (where *yon* 'four' is truncated to *-yo*, which is observed in various expressions; e.g., *yo-ji* 'four o'clock'). Other numerals are Sino numerals.

Similarly, there are Japanese native classifiers and Sino classifiers. In (31), 1 and 2 are used with a Yamato classifier *-ri*. Although some tendency is observed that Yamato numerals are used with Yamato classifiers, there are no strong restrictions on combinations of the origins of numerals and classifiers. (31a, b) are the cases of Yamato numerals and a Yamato classifier. (31d, g) are the cases of Yamato numerals and a Sino classifier. Others in (31) are the cases of Sino numerals and a Sino classifier.

Numerals and classifiers often undergo morphological or phonological operations. As in (31a, b), *-ri*, a Yamato classifier to count people, is fused with numerals 1 and 2. As shown in (32), *-hiki*, a classifier for relatively small animals, alters its initial consonant via assimilation or gemination, which also causes numerals to alter, as in (32a, f, h).

(32) *-hiki* for (small) animals

a.	1	i**p-pi**ki
b.	2	ni-hiki
c.	3	san-**b**iki
d.	4	yon-hiki
e.	5	go-hiki
f.	6	ro**p-p**iki / roku-hiki
g.	7	nana-hiki
h.	8	ha**p-p**iki
i.	9	kyuu-hiki
j.	10	ju**p-p**iki

5.2.2.5 Container Phrase

It is well-known that one of the key distinctions between sortal and mensural classifiers is their compatibility with a container phrase. Mensural classifiers are frequently used with a container phrase, as in (33), to indicate the container with which the object is counted or measured.

(33) a. Haruko-wa **gurasu**-san-bai-no wain-o nonda.
Haruko-TOP glass-3-CL-LIN wine-ACC drank
'Haruko drank three glasses of wine.'

b. Haruko-wa botoru-san-bon no wain-o nonda.
Haruko-TOP bottle-3-CL LIN wine-ACC drank
'Haruko drank three bottles of wine.'

In (33), the containers, *gurasu* 'glass' and *botoru* 'bottle', respectively, specify the unit of counting or measuring. The example in (34) suggests that the container can be a temporary one.

(34) Tookyoo doomu sen-bai no gomi
Tokyo Dome 1,000-CL LIN trash
'1,000 Tokyo-Dome-fulls of trash (= trash, whose amount is enough for Tokyo Dome Stadium to be filled 1,000 times)'

Tokyo Dome Stadium is frequently used to describe a quantity (or area). A ballpark is unlikely to be used to store rubbish, much less likely to be filled with trash, but it can be used as a benchmark to define a sizable amount in a somewhat imaginable way. Interestingly, objects can be used as a container with a classifier that is not commonly used with the noun:

(35) a. hako itu-tu/go-{ko/*hai}
box 5-CL/5-CL
'five boxes'

b. mizu hako go-hai
water box 5-CL
'five box(-es/-ful) of water'

As in (35a), *hako* 'box' is not usually counted by *-hai* by itself, but when it is used as a container to scoop or measure water, it may appear in mensural expressions as a container with *-hai*, as in (35b).[8]

5.2.2.6 Distribution of numeral quantifiers

Since, as noted thus far, numerals and classifiers are mutually indispensable in Japanese. Therefore, we should analyze the distribution of a unit of a numeral and a classifier, which

[8]In fact, there are some sporadic examples where modifiers are used with sortal classifiers, as in (i).

(i) (?)**A4-ban**-ni-satu no hon
A4-size-2-CL NO book
'two A4-size books'

Although only container phrases denoting a size or a type can be used with sortal classifiers, the possibility of inserting a container phrase may give some insight to discuss the structure of classifier constructions and the grammaticized mass-count distinction. Especially, that only modifiers denoting a size or a type can be used in this context reminds us of the pre-classifier adjectives in Mandarin, which Cheng and Sybesma (1999) argue is one of the diagnostics to distinguish mensural classifiers from sortal classifiers (but also see Li 2013, Zhang 2011). I leave for future research the possibility of inserting modifier phrases into numeral classifiers with sortal classifiers, as in (i).

I calla "numeral quantifier'. As discussed above, numeral quantifiers may also contain a container phrase.

The structural locations of Japanese classifiers are a well-known and extensively researched feature. (36) demonstrates places where numeral quantifiers may appear without significantly altering the meaning of the sentence.

(36) a. Haruko-wa san-nin no gakusei-o hometa. PRE-N
Haruko-TOP 3-CL LIN student-ACC praised
'Haruko praised three students.'

b. Haruko-wa gakusei-san-nin-o hometa. POST-N
Haruko-TOP student-3-CL-ACC praised
'Haruko praised three students.'

c. Haruko-wa gakusei-o san-nin hometa. POST-CASE
Haruko-TOP student-ACC 3-CL praised
'Haruko praised three students.'

d. Haruko-wa gakusei-o yasasiku san-nin hometa. FNQ
Haruko-TOP student-ACC kindly 3-CL praised
'Haruko praised three students kindly.'

e. San-nin Haruko-wa gakusei-o hometa. PRE-N (without *no*)
3-CL Haruko-TOP student-ACC praised
'Haruko praised three students.'

Numeral quantifiers in Japanese can be used pre-nominally (with a linker -*no*) as in (36a), post-nominally as in (36b), following a case marker as in (36c), away from its associate noun (i.e., FNQs) as in (36d), or at the top or around as in (36e).

The derivation of the configuration in (36d) has been extensively discussed in the literature. The structural relations of (36a) and (36c) have drawn much interest. Some claim that those have a syntactic connection. In particular, (36d) is derived from (36a) or (36c) through a series of syntactic movements (Kawashima 1994, 1998, Kitahara 1993, Kitaoka 2014, Miyagawa 1989, 2017, Watanabe 2006, 2008).

Others argue that those are semantically related. Under such a view, DP-internal numeral quantifiers and FNQs are generated independently. For instance, it is argued that FNQs are adverbial, and base-generated in vP/VP (e.g., Nakanishi 2007). Since a movement view captures the semantic relation between a noun and a classifier (which an adverbial view does not straightforwardly explain), I follow a movement view for the derivation of the FNQs.[9]

[9]However, it is noteworthy that many of the adverbial views are compatible with the discussions and proposals in this chapter. In this chapter, I discuss that the relation between classifiers and nouns is local

The linker -*no* is also inserted in (36a). In Japanese, pre-nominal modifiers (except adjectives and relative clauses) are commonly supported by the linker, as in (37).

(37) a. Tomodati-kara-**no** tegami
friend-from-LIN letter
'a letter/letters from a frined'

b. {takusan/kore-ra}-**no** mondai
{many/this-PL}-LIN problem
'many/these problems'

c. tugi-**no** syuumatu
next-LIN weekend
'next weekend'

Modifiers can be stacked as in (38), where each modifier should be linked with -*no*.

(38) kore-ra-**no** takusan-**no** tomodati-kara-**no** tegami
this-PL-LIN many-LIN friend-from-LIN letter
'These many letters from a friend'

As Watanabe (2006) points out, it is hard to designate a specific location in a structure that holds the linker -*no*. Therefore, I follow Watanabe (2006) in that -*no* is inserted at PF post-syntactically.[10] This claim in turn suggests that pre-nominal numeral quantifiers are not modifiers, but establish relations with the head (i.e., pre-nominal numeral quantifiers are at the specifier of a relevant phrase). Recall that in Borer's (2005a) system, f-morphs at the specifier of IndPs are also available for individuation. Namely, pre-nominal numeral quantifiers and post-nominal numeral quantifiers are alike in that both can involve individuation (although I propose in Section 5.4 that not all classifiers individuate nouns).

Which configuration (pre-nominal, post-nominal, FNQs, etc.) is least unmarked structurally, semantically, or pragmatically does not appear to see a consensus in the literature. In this chapter, I use the pre-nominal configuration as a default unless otherwise necessary. In Section 5.4, I show different properties of numeral quantifiers in various locations, as listed in (36), in relation to individuation.

(so that the semantic relation is established), and that certain DP structures enable a dependency between FNQs and the associate nouns. For instance, Doetjes (1997) claims that floating quantifiers in French and Dutch form an adverbial phrase with a covert anaphor. The covert anaphor (adjacent to the adverbial floating quantifier) and the associate noun maintain a binding relation. In Section 5.6, I argue that FNQs in Japanese contain a covert pronoun.

[10]For further discussions on the linker -*no* in Japanese, see Ochi (2012), Saito et al. (2008), and Ueda (2014), as well as Watanabe (2006) and subsequent works.

5.2.2.7 Semantic properties

Numeral quantifiers in the three locations show different semantic properties: specificity. Post-nominal numeral quantifiers require a specific reading (e.g., Kitahara 1993, Ochi 2012). Consider (39).

(39) Heikinsuru to, kono byooin-de-wa maishuu,...
average do, this hospital-at-TOP every.week
'On average, every week in this hospital,...'

a. san-nin-no akanboo-ga umare-teiru. [Pre-nominal]
3-CL-LIN baby-NOM be.born

b. *akanboo-san-nin-ga umare-teiru. [Post-nominal]
baby-3-CL–NOM be.born

c. akaboo-ga san-nin umare-teiru. [FNQ]
baby-NOM 3-CL be.born
'... three babies are born.' (Ochi 2012:92)

The context in (39b) requires non-specific referents, provided that the same baby/babies cannot be born every week. As in (39b), a post-nominal numeral quantifier cannot be used in this context, which suggests that post-nominal numeral quantifiers cause the specificity effect.

On the other hand, FNQs require a non-specific referent (Kitahara 1993, Watanabe 2008). Consider (40).

(40) a. John-wa ni-dai-no piano-o kai-tagatta. [Pre-nominal]
John-TOP 2-CL-LIN piano-ACC buy-wanted

b. John-wa piano ni-dai-o kai-tagatta. [Post-nominal]
John-TOP piano 2-CL-ACC buy-wanted

c. John-wa piano-o ni-dai kai-tagatta. [FNQ]
John-TOP piano-ACC 2-CL buy-wanted
'John wanted to buy two pianos.' (Watanabe 2008:520)

Pre-nominal and post-nominal numeral quantifiers as in (40a, b) are ambiguous whether John has two specific pianos in mind (specific reading), or any two pianos, presumably, the number of pianos that John wants to buy is at issue (non-specific reading). However, FNQs as in (40c) only allows the non-specific reading, and the example cannot be used when John has two specific pianos in mind.[11] In Section 5.6, I attribute the (non-)specificity

[11] For other semantic properties of numeral quantifiers and FNQs (distributivity, exhaustivity, partitivity, etc.), see, e.g., Fitzpatrick (2006), Inoue (1978), Nakanishi (2007), and Takami (1998).

on features on D, and provide a possible structure and derivation of numeral quantifiers and FNQs.

5.3 Classifiers and Individuation

In the previous chapter, I proposed that even in Japanese, a typical classifier language, plural markers individuate nouns in certain cases in the absence of classifiers (*-tati* with proper names, plurals via reduplication), and that the putative plural marker *-tati* used with common nouns is a counting plural. In this section, I argue that classifiers individuate nouns in Japanese, following traditional views on classifiers (Allan 1977, Chierchia 1998a, 1998b, Greenberg 1972, Nemoto 2005). To support this claim, I add further observations from the coercion effects of classifiers.

5.3.1 Theoretical claims

Chierchia (1998a) argues that nouns in classifier languages are all mass (or inherently plural), and classifiers are required for nouns to be counted. Borer (2005a) extends this claim to all languages in the world. Nouns are all mass (or neutral) in all languages, and need to be individuated (or *divided* in her term) to be counted (see Muromatsu 1998, 2003 for a similar claim for classifiers in Japanese). It is plural marking that individuates a noun in number languages.

On the other hand, classifiers have been argued to create singulars, a function that I assume is one of the kinds of individuation. Nomoto (2013) claims that classifiers "restrict the noun denotation to singularities."(p.79; also see Yi 2011 and subsequent works for a similar claim in Korean, another classifier language). Cheng and Sybesma (1999) state that classifiers have "a singularizing function: the count-classifier identifies singular units; it picks out one instance of what is denoted by N."(p.518).

In Mandarin, the singulativizing function of classifiers is observed with a classifier used without a numeral, which yields a singular reading, as in (41).

(41) (zhe) ben shu
(this) cl book
'this/a book'

A similar interpretation of classifiers used without a numeral is observed cross-linguistically (e.g., Cantonese (Iljic 1994, Cheng and Sybesma 1999), Malay (Nomoto 2013)).

Deriving a singular from unindividuated nominals reminds us of the singulative in Arabic, as discussed in Chapter 4. Arabic has a series of collective nouns, which employ

a bare form (without any plural morphology) to denote a plural entity, as in (42a). The singulative creates a singular from collective nouns, as in (42b). Crucially, singulativised collective nouns can be pluralized further, as in (42c).

(42) Collective nouns in Arabic

a. Collective noun: *burtogaal* 'oranges'

b. Singulativised collective noun: *burtogaal.a(h)* 'an orange'

c. Plurals of singulativised collective nouns in Arabic: *burtogaal.a-at* 'oranges'

As the singulativization process has already individuated the noun, the plural form used in (42c) must serve a different function. Significantly, as Mathieu (2014) observes, pluralizing singulativized collectives results in an exclusive plural interpretation, as shown in (43).

(43) Exclusive plurals in Arabic

hal ʕindik burtogaal.a-at?
QUES have-you oranges.FEM-PL (FEM = singulativizer in this case)

(Intended): 'Do you have oranges?' (Mathieu 2014:170)

To provide a thorough response to the question posed in (43), the listener should answer no, if she/he has only one orange. Namely, *burtogaal* 'oranges' in (43) should be interpreted as more than one orange. The fact that the plural of singulatives is exclusive indicates that it is a counting plural rather than an individuating plural. The claim that the plural in (43) does not individuate nouns is in line with the claim that the singulative is an individuator.

Therefore, I consider classifiers, whose functions include creating singulars, to be a variety of individuators. However, since unfortunately classifiers cannot be used without numerals in Japanese (in contrast to Mandarin as in (41), I also seek out further empirical evidence to support the claim that classifiers are individuators.

5.3.2 Coercion

In this section, to add empirical evidence to argue for the individuation of classifiers in Japanese, I show the mass-to-count coercion effects of classifiers and how these serve for individuation.

Since I follow Borer's (2005a) derivation (thereby theoretically any nouns can be either count or mass), I use the term *coercion* fairly descriptively: an operation/phenomenon (i) where conceptually uncountable nouns (or entities that the nouns denote) are used in count syntax (e.g., *give me two beers* (Universal Packager; portion coercion); *Two waters*

converge at this point (Universal Sorter; subkind coercion); Bunt 1985), or (ii) where conceptually countable nouns that are normally used in count syntax are used in mass syntax (e.g., *There is dog all over the wall* (Universal Grinder; Pelletier 1975)).

Normally, only mensural classifiers are used with mass-y objects, supplying a container or a unit of counting/measuring, and sortal classifiers are used with count-y objects, providing a classification of an entity denoted by the noun. However, some sortal classifiers are also able to coerce mass-y objects into grammatically count ones.

A general classifier *-tu* functions as the Universal Sorter (Bunt 1985). Consider (44)[12], where *-kuruma* 'car' is used with a subkind reading.

(44) Zyoosei-ga yoku kau kuruma-ga {yot-tu/??yon-dai} aru.
woman-NOM often buy car-NOM four-CL/four-CL be
'There are four (types of) cars often bought by women.' (Nomoto 2013:27)

When a noun is used with a subkind reading, as in (44), a general classifier *-tu* is preferred over a classifier that is normally used for the noun (e.g., *-dai* for cars as in (44)).

Crucially, *-tu* can also achieve (sub)kind coercion with mass-y objects. Consider (45), where *-tu* counts the types (or labels) of wine.

(45) kono resutoran-wa wain-ga {yot-tu/(?)yon-hon} sika nai.
This restaurant-TOP wine-NOM 4-CL/4-CL only be.not
'There are only four wines in this restaurant.'

When *wine* refers to its subkinds, the general classifier *-tu* is slightly more natural than a mensural classifier *-hon*, which is commonly used for bottles.

Similarly, *-tu* is also used for the Universal Packager (Bunt 1985). Consider (46), where *-tu* counts the portions of wine.

(46) *At a restaurant*

Wain(-o) {yot-tu/(?)yon-hai} kudasai.
wine(-ACC) 4-CL/4-CL please.give.me

'Four wines, please.'

When *-wine* is used for a certain container of serving (e.g., at a restaurant or bar), a general classifier *-tu* is preferred over a mensural classifier *-hai*, which is commonly used for cups, glasses, decanters, etc. Thus, a general classifier *-tu* can be used for mass-to-count coercion, especially, (sub)kind coercion, as in (45), and portion coercion, as in (46).

[12]In this section (Section 5.3.2), I use post-nominal numeral quantifiers, instead of pre-nominal ones (which I commonly use in this chapter). See Section 5.6 for distinct properties and derivations of pre- and post-nominal numeral quantifiers.

Moreover, there are other sortal classifiers that create the count from mass-y objects. A sortal classifier -*hon* is normally used for tubular objects, including pens, umbrellas, etc., as in (47).

(47) {pen, kasa, boo, ninzin, asi}-yon-hon
{pen, umbrella, stick, carrot, foot}-4-CL
'four {pens/umbrellas/sticks/carrots/feet}'

However, -*hon* is also used for water that forms a tubular object (e.g., water-pillar), as in (48)

(48) Totuzen mizu-4-CL-ga hukidasita.
suddenly water-4-CL-NOM spouted
'4 pillars of water suddenly spouted out.'

When -*hon* is used with a mass-y term, the classifier describes it as if it were a countable object (e.g., pillar). In (48), the water spouts out and forms pillars. When the speaker perceives or wants to describe the pillars of water as solid/concrete objects, the sortal classifier -*hon* can be used to count the pillars of water in the same way as it is used for, e.g., pillars in a building, pens, umbrellas, etc..[13]

This is not a sole case of mass-to-count coercion led by a sortal classifier. A sortal classifier -*mai* is normally used to count thin and flat objects (e.g., shirt, card, wall, window), as in (49).

(49) {kami, syatu, kabe, mado}-yon-mai
{paper, shirt, wall, window}-4-CL
'four {sheets of paper, shirts, walls, windows}'

-*Mai* shows a coercing function similar to -*hon* if the context allows it. Examine (50), assuming a waterfall can be perceived as a sheet of water when it is viewed from the side.

(50) (Viewing Niagara Falls from their basin)

Kyodaina mizu-ni-mai-ga sobietatteiru.
gigantic water-2-CL-NOM rising

'Two gigantic sheets of water rise.'

[13] As repeatedly shown in this chapter, -*hon* is also used as a mensural classifier, referring to bottles or other tubular containers. Importantly, -*hon* in (48) is not a mensural classifier, but is used in the same way as (47), i.e., as a sortal classifier.

A waterfall is presumably solid enough to be perceived as a wall or sheet (in particular, wide ones like Niagara Falls). Hence, it can be counted by *-mai* as in (50), in which water is individuated as a sheet-shaped object, with no help from a container. Interestingly, the word *bakuhu*, one of the Japanese translations of waterfall, which literally means *waterfall-cloth*, also seems to support this construal. In the same way as *-hon* in (47b), *-mai* is used to count the number of individuated potions of water.

The sortal classifiers in (48b) and (50b) create a unit of counting (e.g., pillars of water, sheets of water) from a conceptually uncountable noun *water*. Namely, sortal classifiers individuate nouns, making the count from the uncountable.

This claim partially answers the first question posed at the beginning of this chapter: Are classifiers required by nouns (i.e., for individuation)? The claim here does not imply, however, that all the classifiers individuate. Recall that it is assumed in past literature that subtypes of classifiers are identified and the mass-count distinction is argued to be manifested at the level of classifiers (e.g., Cheng and Sybesma 1999 for Mandarin). Also, the claim that classifiers individuate nouns does not necessarily exclude the other possibility, i.e., classifiers are required by numerals. Therefore, in the next two sections (Sections 5.3 and 5.4), I go into these two points, and propose (i) a classification of classifiers in terms of individuation, and (ii) that classifiers are also required for numerals (as well as for individuation).

5.4 Classifying classifiers

The claim in the previous section that classifiers individuate nouns, answers my main research question, *Does Japanese exhibit the grammaticized mass-count distinction?*, but it needs some refinement. The discussion so far does not cover all the varieties of classifiers and the possible configurations of numeral quantifiers. Therefore, departing from the cases of coercion as in (48) and (50), I further argue, in this section, for the distinction between individuating and non-individuating classifiers.[14]

While classifiers are frequently claimed to create a count nominal from an unindividuated mass (Aikhenvald 2000, Allan 1977, Borer 2005a, Chierchia 1998a, 1998b, Greenberg 1972, among many others), the distinction between individuating and non-individuating classifiers has not received much attention in the theoretical literature.

Cheng and Sybesma (1999) appear to be one (and the first one) of the most oft-cited

[14]Another refinement needed is regarding numerals. The fact that classifiers are required by nouns for individuation, does not exclude the possibility that classifiers are required by numerals. In Section 5.4, I argue that numerals require classifiers.

works that explicitly argues for the interrelation between the grammaticized mass-count distinction and the sortal/mensural distinction of classifiers (their *count classifiers* and *mass classifiers/massifiers*). Cheng and Sybesma (1999, 2012) argue that sortal classifiers manifest the grammaticized mass-count distinction while mensural classifiers do not, by showing their distinct semantic functions. As in (51), sortal classifiers "name the unit" of counting that is built-in in the lexical information of the noun.

(51) Sortal classifiers

san zhi bi [Mandarin]
3-CL pen

'three pens'

On the other hand, as in (52), mensural classifiers "create a unit" of counting, with which the mass-y object is measured.

(52) Mensural classifiers

san wan tang [Mandarin]
3-CL soup

'three bowls of soup'

In (52), a classifier *-wan* specifies what kind of container is involved. To strengthen their claim, Cheng and Sybesma (1999) also show distinct syntactic properties of sortal and mensural classifiers. Nevertheless, Cheng and Sybesma (1999) do not distinguish between two readings of mensural classifiers (a container reading and a measure reading).[15]

Similarly, mensural classifiers are often excluded from the discussions on individuation since they do not appear to be counting, at least not in a straightforward way, the way sortal classifiers do (Downing 1996, Nomoto 2013, Sudo 2014, 2016). For instance, although she provides comprehensive descriptions and analyses of Japanese sortal classifiers, Downing (1996) largely leaves out mensural classifiers. So do Nomoto (2013) and Sudo (2014, 2016). On the other hand, while they take up various types of classifiers, Ochi (2012) and Watanabe (2006, 2008, 2010) do not provide a structural analysis of various readings of classifiers. These views leave open a question as to the individuation and derivations of classifiers.

Therefore, in this section, I introduce cases where sortal classifiers are used in a mass context (i.e., they do not always manifest the mass-count distinction), following Li

[15]Note also that later in this section I show that sortal classifiers can be used to measure (rather than counting), and that mensural classifiers can be used to count (rather than measuring).

(2013) (Section 5.3.1). Also, I claim that container readings (but not measure readings) of mensural classifiers manifest the mass-count distinction. Namely, the distinction between count and mass readings is the key factor in the mass-count distinction, regardless of the types of classifiers (Section 5.3.2).

In Section 5.3.3, in addition to count and mass readings, I identify attributive readings, which denote the quality of the associate noun (see Jiang 2008, 2012 for a similar variety in Mandarin, and Park 2022 in Korean). For instance, in *yo-nin no guruupu* 'a group of four,' the numeral quantifier describes the quality (composition in this case) of a group, rather than counting or measurement.

In Section 5.3.4, I examine these three readings (count, mass, attributive) with structural and semantic properties, including the location in a nominal domain as well as in a sentence (i.e., FQs), nominal ellipsis, and incompletive reading (Zhang 2018, 2020). With these, I present the diagnostics to classify them, as in (53), and by doing so, I show that not all classifiers individuate nouns.[16]

(53) Classification of classifiers

	Type	Reading	Ind	Pre-N	Post-N	FNQ	Ellipsis	Incomp.
a.	Sort.	count	Yes	ok	ok	ok	ok w/o *no*	ok
b.	Mens.	count	Yes	ok	ok	ok	ok w/o *no*	ok
c.	Sort.	mass	No	ok	*?	*	ok w/o *no*	*
d.	Mens.	mass	No	ok	*?	*	ok w/o *no*	*
e.	Sor./Men.	attri.	No	ok	ok?	*	ok with *no*	ok

5.4.1 Unindividuating sortal classifiers

Now I illustrate that it is the distinction between count/mass readings of either type of classifier rather than the sortal/mensural distinction that reflects the mass-count distinction. I instead show that both sortal and mensural classifiers allow either a count or mass reading.

Cheng and Sybesma (1999) propose that the sortal/mensural distinction manifests the mass-count distinction in Mandarin. To support this claim, Cheng and Sybesma claim that sortal classifiers are functional while mensural classifiers are lexical (i.e., nouns). To demonstrate structural differences between sortal and mensural classifiers, Cheng and Sybesma introduce adjectives modifying classifiers and *de* 'of/LIN', both of which differentiate sortal classifiers from mensural classifiers. (See Li 2013 for counterarguments for

[16]In Section 5.5, I propose the structure(s) of classifier constructions in Japanese, and show how the properties observed so far and in this section can be reflected in the structures.

these observations.)[17] However, the example in (54), challenges this view for Japanese.

(54) a. Haruko-wa san-bon no tabako-o sutta.
Haruko-TOP 3-CL LIN cigarette-ACC smoked
'Haruko smoked three cigarettes.'

b. Haruko-wa san-bon han no tabako-o sutta.
Haruko-TOP 3-CL half LIN cigarette-ACC smoked
'Haruko smoked three and a half cigarettes.'

In (54a), Haruko may or may not smoke each cigarette fully. Meanwhile, in (54b), Haruko should smoke three entire cigarettes and a half. In the latter case, one cigarette is used as a sort of measure phrase to measure the amount of cigarettes consumed. The clearer mass context involves the *in-total* interpretation. The example in (54b) (and also (54a) in a much lesser degree) can be used to describe a situation where Haruko smokes seven butts, each of which roughly equals half a cigarette (i.e., in total, 3.5 cigarettes). In mass readings, the classifier does not create individuals in a similar way to the mensural classifiers in a measure reading (e.g., *san-bon no wain* 'three bottlefuls of wine') that do not individuate. Thus, sortal classifiers do not always individuate.

Crucially, this is not a case of the count-to-mass coercion of the Universal Grinder type. (Pelletier 1975, Cheng et al. 2008). In general, the Universal Grinder is not in effect in Japanese, as in (55).[18]

(55) Kabe-ni inu-ga hirogatteiru.
wall-on dog-NOM spreading

a. Count: '(Paintings/Photos of) dogs are all over the wall. / One big painting or photo of a dog covers the wall.'

b. Mass: '*Dog is all over the wall.'

[17] Whether Cheng and Sybesma (1999) or Li (2013) is correct, these criteria do not work in Japanese: adjectives cannot be used to modify classifiers, and a linker *no* is widely used with pre-nominal classifiers in Japanese regardless of the types of classifiers.

[18] Interestingly, the Universal Grinder does not work with object mass nouns in English or bare count nouns in Mandarin (Cheng et al. 2008). Moreover, it is notable that even flexible nouns (especially, the animal-meat type) may not allow this reading in Japanese. In (i), a mass noun *niku* 'meat' allows the mass reading. However, with a flexible noun *sakana* 'fish', which can be used to refer to fish meat (where used as a mass noun), only a count reading is natural. Although, certainly, this is an interesting topic worth going into, I leave it for another occasion.

(i) Tukueni-ni {niku/sakana}-ga hirogatta.
table-on meat/fish-NOM spread
'{Meat/Fish} spread over the desk.'

Also, the mass reading is derived from picking up part of the conceptual frame of the noun, rather than created by the classifier. Recall from Chapter 2 that count-y nouns in Japanese can be compared by volume as well as by cardinality:

(56) Kono nagaisu-ni ano nagaisu yori hito-ga iru. Dakara, ano
this long.chair-on that long.chair than person-NOM there.be so that
nagaisu-ni suwar-oo.
long.chair-on sit-let's
'There is/are more PERSON on this bench than on that bench. So, let's sit down on that bench.'
Context: The speaker and her/his colleagues are at an outdoor concert, where a number of long benches are installed for spectators. They are looking for a bench, where there is still space left enough for all of them to sit.

The sentence in (56) is true when there are 20 people on this bench, while 15 on that bench (compared by the number of people on each bench). Fascinatingly, it is also true when there are 10 sumo wrestlers on this bench, while 15 small children on that bench (compared by the total amount of space (perhaps even including spaces in-between) that each of the bodies occupies). In (56), persons are referred to as objects that take up certain space/area while their function (as humans) is bleached. Nevertheless, the persons themselves do not undergo physical transformation. Certain shapes of the entities (persons) are not required for this reading, either. With this, I argued in Chapter 2 that count-y nouns are possibly all ambiguous in Japanese as to whether those are conceptually countable or uncountable. In (54), the classifier picks up the uncountable part (a space-holder) of the entity *cigarette* to measure the total amount of it. This is clearly different from the mass reading derived by the Universal Grinder, where the entity undergoes a certain physical transformation (e.g., individuals to meat-stuff). Rather, the mass reading in (54) is derived from a normal semantic agreement between the classifier and the entity denoted by the noun. Thus, sortal classifiers do not always individuate.

5.4.2 Individuating mensural classifiers

In this subsection, I show that mensural classifiers, which are commonly used with mass-y nouns, involve individuation when they have count readings. A count reading of mensural classifiers is not a new idea; a container reading is often assumed to involve individuation (Li 2013, Watanabe 2006, 2008).

As in (57), mensural classifiers in Japanese allow two readings, including a container reading and a measure reading. These two readings are available with or without a con-

tainer phrase (e.g., *botoru* 'bottle'), as in (57b).

(57) a. Haruko-wa san-bon no wain-o nonda.
Haruko-TOP 3-CL LIN wine-ACC drank
i. Container: 'Haruko drank three bottles of wine.'
ii. Measure: 'Haruko drank three bottlefuls of wine.'

b. Haruko-wa botoru-san-bon no wain-o nonda.
Haruko-TOP bottle-3-CL LIN wine-ACC drank
i. Container: 'Haruko drank three bottles of wine.'
ii. Measure: '?Haruko drank three bottlefuls of wine.'

In (57), *san-bon no wain* 'three bottles of wine' is used for either three glasses containing wine (container reading) or a certain portion of wine whose amount equals to three bottlefuls of wine (measure reading) (see Li 2013, Löbel 1989, Rothstein 2010, and Selkirk 1977 for a similar observation and/or claim in other languages). I argue that two readings of the mensural classifiers correlate with individuation. The former reading involves counting the number of bottles, thereby, individuation is involved. The latter does not entail the existence of bottles, thereby, individuation is not necessarily involved. (For a similar claim on classifiers or measure words in other languages, see Li 2013, Zhang 2018, 2020 for Mandarin; Mathieu and Zareikar 2015 for Azeri and Ojibwe (Algonquian).)

The container reading (count reading) is more salient when the verb/event focuses more on containers rather than (the amount of) the content. Consider (58) and (59), where the verb *-hakonnda* 'carried' focuses on the (number of) containers (bottles/buckets).

(58) Haruko-wa (botoru) san-bon no wain-o hakonnda.
Haruko-TOP bottle 3-CL LIN wine-ACC carried
a. Container: 'Haruko carried three bottles of wine.'
b. Measure: '*?Haruko carried three bottle-full of wine.'

(59) Haruko-wa (baketsu) san-bai no mizu-o hakonnda.
Haruko-TOP bucket 3-CL LIN water-ACC carried
a. Container: 'Haruko carried three buckets of water.'
b. Measure: '(?)Haruko carried three bucketfuls of water.'

Since the verb *-hakonnda* 'carried' focuses on the containers (bottles/buckets) rather than the content (wine/water), the container readings are more natural than the measures readings.[19]

[19]The acceptability of measure readings seems to depend on to what degree a container is likely to be

In what follows, I illustrate the differences between container and measure readings of mensural classifiers. First, these two readings differ in terms of monotonicity: a container reading does not require monotonic objects, whereas a measure reading does.

A container reading is used to measure the object by counting the containers. As a result, a container reading can be used to count different types of containers. In (59) in a container reading, for instance, three buckets may all be 4L ones. Or one 3L bottle, one 4L bottle, and one 5L bottle.

On the other hand, the measure reading in (59) employs one certain bucket as a measure to measure the amount of water. The container may or may not actually exist. For instance, in (58), there might be three actual wine-bottles. Also, the sentence can be used to describe a certain amount of wine, perhaps, 2,250ml (750ml x 3), since it is fairly clear based on common knowledge what amount *three wine-bottles* refer.

These two readings also differ in terms of maximality. Three bottles in (58) in a container reading should contain wine, but are not necessarily full, since counting the containers (that contain the object denoted by the noun) is the function in the container reading. On the other hand, in the measure reading in (57), there should be three times as much wine as wine enough to fill one bottle.

The differences between measure and container readings are also found in anaphoric references. Mensural classifiers in these two readings are referred back to by different pronouns (cf. Li 2013 for Mandarin):

(60) a. Container reading

Haruko-wa botoru san-bon no wain-o hakonda. **Sorera**-wa omokatta.
Haruko-TOP bottle 3-CL LIN wine-ACC carried those-TOP heavy.PAST

'Haruko carried three bottles of wine. Those (= three bottles) were heavy.'

b. Measure reading

Haruko-wa taru-kara botoru san-bon no wain-o dekyanta-ni
Haruko-TOP barrel-from bottle 3-CL LIN wine-ACC decanter-to
utusita. {**Sore**/ *sorera}-wa kusat-tei-ta.
transferred that/ those-TOP rot-PROG-PAST

'Haruko poured three bottlefuls of wine from a barrel and into a decanter. {That/ *Those} (= three bottlefuls of wine) was rotten.'

used to measure the amount of its content. For instance, since bottles are unlikely to be used to describe the amount of wine carried, the measure reading is much less natural than the container reading, in (58). On the other hand, since buckets are naturally used to describe the amount of water carried, the measure reading is much more natural in (59) than in (58). In particular, the use of the container phrase appears to improve the measure reading in (59) (but not in (58)).

The classifier in a container reading (60a) can be referred back to by a plural pronoun, since the number of bottles is at issue (*sore* 'that/those' can also be used since it is compatible with either a singular or plural referent). The use of *sorera* 'those' indicates that the noun is individuated and specified for number. Meanwhile, those in a measure reading (60b) cannot be referred back to by a plural pronoun, since the numeral quantifier refers to the mass term of wine, amounted to three bottles.

The last piece of difference between container and measure readings is observed with coordination. As shown in (60), these two readings have different syntactic properties, with which I argue that these two are structurally or featurally different. With this, it is predicted that these two readings cannot be conjoint. Consider (61) to see (im)possible interpretations.

(61) go-hai-no wain-to biiru
5-CL-LIN wine-and beer

a. Container + Container: '5 glasses of wine and 5 glasses of beer'

b. Container + Measure: '*5 glasses of wine and 5 glassfuls of beer'

c. Measure + Container: '*5 glassfuls of wine and 5 glasses of beer'

d. Measure + Measure: '5 glassfuls of wine and 5 glassfuls of beer'

Container and measure readings cannot be conjoint. This result suggests, as predicted, that these two readings are structurally distinct.

Moreover, if both sortal classifiers with a count reading and mensural classifiers with a count (container) reading involve individuation, it is predicted that these two can be coordinated. Conversely, sortal classifiers with a mass reading and mensural classifiers with a mass (measure) reading should be coordinated. Consider (62) and (63) to confirm that these are borne out.

(62) go-hon-no tabako-to wain
5-CL-LIN cigarette-and wine

a. Count + Count: '5 cigarettes and 5 bottles of wine'

b. Count + Mass: '*5 cigarettes and 5 bottlefuls of wine'

(63) Go-hon-han-no tabako-to wain-o iti-jikan-de ajiwatta.
5-CL-half-LIN cigarette-and wine-ACC 1-hour-in tasted

a. Count + Mass: '*(I) tasted 5 and a half cigarettes and 5.5 bottlefuls of wine in 1 hour.'

b. Mass + Mass: '(I) tasted 5.5 cigarettes and 5.5 bottlefuls of wine in 1 hour.'

Thus, sortal and mensural classifiers each allow either a count or mass reading. Regardless of the type of classifier, a count reading involves individuation, while a mass reading does not. As a result, four types of readings can be identified: sortal classifiers in a count reading, sortal classifiers in a mass reading, mensural classifiers in a count (container) reading, and mensural classifiers in a mass (measure) reading.

5.4.3 Attributive reading

classifiers lead yet another reading: attributive reading. This reading is different from counting or measuring in that an attributive reading adds (or restricts) properties of the nominal phrase modified (Jiang 2008, 2012). *Kaidan* 'stair(s)' and a classifier *-dan* show this reading clearly:

(64) Sanzyuu-dan no kaidan-o nobotta.
30-CL LIN stair-ACC climbed

a. Counting: '(I) climbed 30 steps.'

b. Attributive: '(I) climbed stairs, which consist of 30 steps.'

In the counting reading (64a), what is counted is the number of steps on which a series of actions is taken. The stairs might (or maybe) have more than 30 steps. Or the stairs might have only five steps, and the speaker went up the stairs six times. In the attributive reading (64b), on the other hand, the numeral classifier modifies the stairs by providing the details, and hence the stairs should not have more or less than 30 steps to make the sentence true.

Jiang (2012) claims that numeral quantifiers in Mandarin are often ambiguous between count/measure and attributive readings (a "quality reading" in her term). This is also true for Japanese. For instance, *san-dai no kuruma* (3-CL LIN car) can be used to count cars (count reading) or describe a group of cars that contain three cars (attributive reading), although the count reading is much more salient than the attributive reading in this example. When the nominal is specific, the attributive reading becomes more salient:

(65) san-zyuu-nin no are-ra-no gakusei
3-10-CL LIN that-PL-LIN student
'that group of students, which consist of 30 students' (attributive)

In (65), since the demonstrative makes *gakusei* 'student' specific and plural, the numeral quantifier *san-zyuu-nin* '30 (people)' cannot count individuals. Instead, it describes a quality/property of a group, i.e., the number of people contained in the group. In this reading, the sortal classifier *-nin* does not individuate *student*. Needless to say, it does not

create an uncountable entity (coercion), since the number of individuals in the group is provided as an attribution of the group.

Double numeral quantifier constructions also show the possibility of the attributive reading:

(66) san-kumi no go-zyuu-nin no gakusei
3-CL_{group} LIN 5-10-CL_{person} LIN student

a. '3 groups of 50 students' (count students, count groups)

b. '50 students in 3 groups' (count students, quality of groups)

In (66a), the classifier *-kumi* (used for groups) creates individual groups. Groups of 50 students are counted and there are three groups (i.e., in total, 150 students). In this reading, the classifier *-kumi* serves as an individuator. In (66b), on the other hand, *san-kumi* 'three groups' describes the quality of a group of 50 students (i.e., being divided into 3 smaller groups). In this reading, *-kumi* does not serve as an individuator.

As a result, we have five types of numeral quantifiers, as in (67). Both sortal and mensural classifiers allow either a count or mass reading, which reflects the grammaticized mass-count distinction. Either type of classifier allows an attributive reading, which does not manifest the grammaticized mass-count distinction.

(67) Classification of classifiers

	Type	Reading	Ind
a.	Sortal	count	Yes
b.	Sortal	mass	No
c.	Mensural	container (count)	Yes
d.	Mensural	measure (mass)	No
e.	Sort./ Mens.	attributive	No

5.4.4 Properties of individuating classifiers

In this section, to refine this classification, I investigate the properties of each type in (67), and provide the diagnostics to determine the type of a classifier, including locations in the sentence, floating numeral quantifiers (FNQs), nominal ellipsis, and an incompletive reading.

5.4.4.1 Locations and FNQs

Numeral quantifiers may appear in various locations in a sentence without drastically changing the meaning of the sentence, as in (68).[20]

(68) a. Haruko-wa san-nin no gakusei-o hometa. PRE-N
Haruko-TOP 3-CL LIN student-ACC praised
'Haruko praised three students.'

b. Haruko-wa gakusei-san-nin-o hometa. POST-N
Haruko-TOP student-3-CL-ACC praised
'Haruko praised three students.'

c. Haruko-wa gakusei-o yasasiku san-nin hometa. FNQ
Haruko-TOP student-ACC kindly 3-CL praised
'Haruko praised three students kindly.'

Numeral quantifiers can precede the associate noun with the linker *no*, as in (68a), intervene between the associate noun and the case marker, as in (68b), or be away from the associate noun, as in (68c).[21,22]

Classifiers show different behaviours depending on the location in the sentence. First, as in (69), when sortal classifiers are used post-nominally or as FNQs, only the count reading is available.[23]

(69) Sortal classifiers

[20]Structural properties of numeral quantifiers immediately following the case marker attached to the associate nominal, e.g., *gakusei-o san-nin* (student-ACC 3-CL), have not seen a consensus in the relevant literature. While such sequences are often used as cases of FNQs (e.g., Nakanishi 2007, 2008), it is also claimed that numeral quantifiers in such sequences are still within the DP. In this chapter, I insert an adverbial or other plausible element (e.g., *yasasiku* in (68c) to make it clear that numeral quantifiers are separated from the associate DP (i.e., as an instance of FNQs).

[21]Numeral quantifiers can also precede the host noun without the linker *-no*. However, this case is derived from scrambling of FNQs over the host noun, as in (i)(Kitaoka 2014).

(i) San-nin gakusei-o yasasiku _____ hometa.
3-CL student-ACC kindly _____ praised
(lit.) 'Three, (I) praised students kindly.'

[22]The post-nominal position commonly yields a specific reading (Huang and Ochi 2014). I return this property in Section 5.5.

[23]The restriction as in (69c) and (72) that FNQs do not allow a mass reading, appears to be lifted when the number is at issue, rather than the event (or the amount of objects involved in the event), as in (i).

(i) Heikinsuru-to nihonzin-no kituensya-wa tabako-o mainiti 19.8-hon suu.
take.the.average-if Japanese-of smoker-TOP cigarette-ACC every.day 19.8-CL smoke
'On average, Japanese smokers smoke 19.8 cigarettes every day.'

a. pre-nominal

Haruko-wa san-bon-han-no tabako-o sutta.
Haruko-TOP 3-CL-half-LIN cigarette-ACC smoked

i. Count: 'Haruko smoked three cigarettes and half a cigarette.'

ii. Mass: 'Haruko smoked cigarettes, amounted to three and a half cigarettes.'

b. post-nominal

Haruko-wa tabako san-bon-han-o sutta.
Haruko-TOP cigarette 3-CL-half-ACC smoked

i. Count: 'Haruko smoked three cigarettes and half a cigarette.'

ii. Mass: '*? Haruko smoked cigarettes, amounted to three and a half cigarettes.'

c. FNQs

Haruko-wa tabako-o niwa-de san-bon-han sutta.
Haruko-TOP cigarette-ACC backyard-in 3-CL-half smoked

i. Count: 'Haruko smoked three cigarettes and half a cigarette in the backyard.'

ii. Mass: '*Haruko smoked cigarettes, amounted to three and a half cigarettes, in the backyard.'

Mensural classifiers pattern with sortal classifiers in terms of available readings. Both count and mass readings are available in the pre-nominal position, whereas only the count reading is available in the post-nominal position and the FNQ positions. Consider (70) to (72)[24]:

(70) Mensural classifiers

a. pre-nominal (Count)

Haruko-wa (botoru) san-bon-no wain-o nonda.
Haruko-TOP bottle 3-CL LIN wine-ACC drank

'Haruko drank three bottles of wine.'

[24]As in the case with sortal classifiers, the restriction is lifted when the number is at issue, rather than the event (or the amount of objects involved in the event), as in (i).

(i) Kyonen nihonzin-wa biiru-o hitoriatari 52.5-hon nonda.
last.year Japanese-TOP beer-ACC per.capita 52.5-CL drank
'Last year, Japanese people drank 52.5 bottles of beer per capita.'

b. pre-nominal (Mass)

Haruko-wa (botoru) san-bon-no wain-o taru-kara dekyanta-ni
Haruko-TOP bottle 3-CL-LIN wine-ACC barrel-from decanter-to
utusita.
transferred

'Haruko transferred three bottlefuls of wine from a barrel to a decanter.'

(71) a. post-nominal (Count)

Haruko-wa wain-(botoru-)san-bon-o nonda.
Haruko-TOP wine-bottle-3-CL-ACC drank

'Haruko drank three bottles of wine.'

b. post-nominal (Mass)

*Haruko-wa wain-(botoru)-san-bon-o taru-kara dekyanta-ni utusita.
Haruko-TOP wine-bottle-3-CL-ACC barrel-from decanter-to transferred

(Intended) 'Haruko transferred three bottlefuls of wine from a barrel to a decanter.'

(72) a. FNQ (Count)

Haruko-wa wain-o yukkuri (botoru) san-bon nonda.
Haruko-TOP wine-ACC slowly bottle 3-CL drank

'Haruko slowly drank three bottles of wine.'

b. FNQ (Mass)

*Haruko-wa wain-o taru-kara (botoru) san-bon dekyanta-ni utusita.
Haruko-TOP wine-ACC barrel-from bottle 3-CL decanter-to transferred

(Intended) 'Haruko transferred three bottlefuls of wine from a barrel to a decanter.'

Whereas the pre-nominal position is least restricted, a measure (mass) reading is not achieved in the post-nominal or the FNQ positions. Even though we share some common knowledge that the volume of a standard wine bottle is 750ml, the sentences in (71b) and (72b) cannot refer to (in total) 2,250ml (three 750ml-bottlefuls) of wine consumed/transferred.

Lastly, the attributive reading is available in the pre-nominal position, as shown in (73a), but not fully natural in the post-nominal position, as in (73b). The attributive reading is not available as FNQs.

(73) Attributive reading

a. pre-nominal

Go-zyuu-nin no arera-no gakusei-ga odotta.
5-10-CL LIN those student-NOM danced

'Those 50 students danced.'

b. post-nominal

(?)[Arera-no gakusei]-go-zyuu-nin-ga odotta.
those student-5-10-CL-NOM danced

(Intended) 'Those 50 students danced.'

c. FNQ

*Arera-no gakusei-ga iyaiya go-zyuu-nin odotta.
those student-NOM reluctantly 5-10-CL danced

(Intended) 'Those 50 students reluctantly danced.'

The interactions between locations and types of classifiers (and their readings) are summarized in (74).

(74) Classification of classifiers based on the locations

	Type	Reading	Ind	Pre-N	Post-N	FNQ
a.	Sort.	count	Yes	ok	ok	ok
b.	Mens.	count	Yes	ok	ok	ok
c.	Sort.	mass	No	ok	*?	*
d.	Mens.	mass	No	ok	*?	*
e.	Sor./Men.	attri.	No	ok	ok?	*

The possible locations may be sufficient to distinguish individuating and non-individuating classifiers. If a classifier can be used post-nominally or as an FNQ, it is an individuating classifier. However, these diagnostics do not suffice to decisively distinguish the mass reading from the attributive reading.

5.4.4.2 Ellipsis

I show another syntactic or distributional property of each type of classifier (and their readings). In so doing, I provide the answers to the task left unsolved in the previous section: how to distinguish the mass reading from the attributive reading.

Count and mass readings show distinct behaviours in terms of nominal ellipsis. As in (75), sortal and mensural classifiers in a count reading allow nominal ellipsis.

(75) a. Sortal (count)

Haruko-wa kongetu san-satu no hon-o yonda-ga, Zin-wa go-satu
Haruko-TOP this.month 3-CL LIN book-ACC read-but Zin-TOP 5-CL
(*no) ~~hon-o~~ yonda.
LIN book-ACC read

'Haruko read three books this month, but Zin read five (books).'

b. Mensural (container, count)

Haruko-wa (botoru) yon-hon no wain-o hakonda-ga, Zin-wa go-hon
Haruko-TOP bottle 4-CL LIN wine-ACC carried-but Zin-TOP 5-CL
(*no) ~~wain-o~~ hakonda.
LIN wine-ACC carried

'Haruko carried 4 bottles of wine, but Zin carried 5 bottles (of wine).'

As in (76), those in a mass reading also allow nominal ellipsis, although it is less natural than those in a count reading.

(76) a. Sortal (mass)

Haruko-wa ni-hon-han no tabako-o sutta-ga, Zin-wa yon-hon-han
Haruko-TOP 2-CL-half LIN cigarette-ACC smoked-but Zin-TOP 4-CL-half
(*no) ~~tabako-o~~ sutta.
LIN cigarette-ACC smoked

'Haruko smoked 2 cigarettes and a half, but Zin smoked 4 (cigarettes) and a half.'

b. Mensural (mass)

?Haruko-wa taru-kara dekyanta-ni botoru ni-hon no wain-o
Haruko-TOP barrel-from decanter-to bottle 2-CL LIN wine-ACC
utusita-ga, Zin-wa botoru yon-hon (*no) ~~wain-o~~ utusita.
transferred-but Zin-TOP bottle 4-CL LIN wine-ACC transferred

'Haruko poured 2 bottles of wine from a barrel and into a decanter, but Zin poured 4 bottles (of wine from the barrel into a decanter).'

c. Mensural (mass)

?Haruko-wa sukunakutomo tansu mit.tu no huku-o mot-teiru-ga,
Haruko-TOP at.least chest 3.CL LIN clothes-ACC have-PROG-but
Zin-wa tansu yot.tu (*no) ~~huku-o~~ mot-teiru.
Zin-TOP chest 4.CL -LIN clothes-ACC have-PROG

'Haruko has at least three chestfuls of clothes, but Zin has four (chestfuls of clothes).'

As indicated in (75) and (76), the linker *no* should be dropped in the second clause. This makes a crucial point to distinguish sortal and mensural readings from an attributive reading. As in (77), when a nominal in an attributive reading undergoes nominal ellipsis, *no* and the case marker should be stranded.

(77) Haruko-wa san-kumi-no go-zyuu-nin-no gakusei-ni nihongo-o osietaga,
Haruko-TOP 3-CL_{group}-LIN 5-10-CL-LIN student-to Japanese-ACC taught-but,
Zin-wa yon-kumi *(no) ~~go-zyuu-nin-no~~ ~~gakusei~~*(-ni) ~~nihongo-o~~ osieta.
Zin-TOP 4-CL_{group} one 5-10-CL-LIN student-DAT Japanese-ACC taught
(Intended) 'Haruko taught 50 students in 3 groups, but Zin taught (the) one (= 50 students) in 4 groups.'

As indicated in (77), *no* is a *one*-proform in this case, and the phrase undergoes one-replacement rather than nominal ellipsis. As a result, the applicability of ellipsis and one-replacement can be used to determine whether the classifier is of the sortal/mensural types or of the attributive type. The interactions between types of classifiers (and their readings) and nominal ellipsis are summarized in (78).

(78) Classification of classifiers based on nominal ellipsis

	Type	Reading	Ind	Ellipsis
a.	Sort.	count	Yes	ok w/o *no*
b.	Mens.	count	Yes	ok w/o *no*
c.	Sort.	mass	No	ok w/o *no*
d.	Mens.	mass	No	ok w/o *no*
e.	Sort./Mens.	attributive	No	ok with *no*

5.4.4.3 Incompletive reading

To classify classifiers (and their readings) with respect to semantic properties, I introduce yet another reading: an incompletive reading. I review Zhang (2018, 2020) to see the possibility of an incompletive reading of numeral quantifiers with consumption verbs in Mandarin. I apply the observations and analysis to Japanese, and argue that the incompletive reading can also be used to distinguish a count reading from a mass reading, regardless of the type of classifiers. Zhang (2020) observes that in Mandarin, referentiality (i.e., referring to pre-existing entities in the discourse (p.440); roughly, it corresponds to definite or specific indefinite in this thesis) is a crucial factor for the possibility of incompletive readings.

A mass expression in the direct object position of a consumption verb does not allow an incompletive reading, as shown in (79).

(79) *Wo he-le san-sheng shui, mei he-wan. [Mandarin]
I drink-PFV three-liter water, not drink-finish
(Intended) 'I drank three liters of water, but I didn't finish.' (Zhang 2020:437)

The direct object in (79) is quantified by numeral quantifiers with a standard measure (liter), and hence, it is mass and non-referential. In this context (mass, non-referential), the noun does not allow an incompletive reading, as demonstrated by the fact that the first sentence cannot be followed by *I didn't finish*, which leads to an incompletive reading.

As in (80), when a direct object becomes referential by inserting the demonstrative, it allows an incompletive reading, and is compatible with *I didn't finish*.

(80) Wo he-le **na** san-sheng shui, mei he-wan.
I drink-PFV that three-liter water, not drink-finish
(Intended) 'I drank those three liters of water, but I didn't finish.' (Zhang 2020:437)

Meanwhile, sortal classifiers and mensural classifiers in a container reading (i.e., count classifiers) allow an incompletive reading even when those are non-referential.

(81) a. Sortal (count)

Wo chi le san-ge pingguo, mei chi-wan. [Mandarin]
I eat PFV 3-CL apple not eat-finish

'I ate (some part of) 3 apples, but didn't finish.'

b. Mensural (count)

Wo he le san-wan shui, mei he-wan.
I drink PFV 3-CL water not drink-finish

'I drank (some part of) 3 bowls of water, but didn't finish.' (Zhang 2020:447)

With these, I present a generalization (based on Zhang 2020) that if an expression has an incompletive reading in a non-referential context when it is used with a consumption verb, it involves individuation.[25]

I apply this diagnostics to Japanese to see how to classify classifiers in terms of individuation. First, as in (82), sortal classifiers show distinct results depending on the

[25]In fact, Zhang (2018) claims that Japanese consumption verbs do not allow incompletive readings. However, I found that incompletive readings can be achieved in an appropriate context. For instance, as in (i), the adverb *tamesini* 'giving it a try' makes it easier to achieve incompletive readings.

(i) Tamesini san-ko no ringo-o tabeta-ga, zenbu tabe-nakat-ta.
try 3-CL LIN apple-ACC ate-but all eat-NEG-PAST
'I tried to eat 3 apples, but did not eat all.'

reading. Namely, the count reading allows an incompletive reading, as in (82a), while the mass reading does not, as in (82b),

(82) Sortal classifiers

a. Count reading

Haruko-wa go-ko-no ringo-o tabeta-ga, onaka-ga ippai-de
Haruko-TOP 5-CL-LIN apple-ACC ate-but stomach-NOM full-by
tabe-owara-nakat-ta.
eat-finish-NEG-PAST

'Haruko ate (some part of) 5 apples, but she was full, so she didn't finish them.'

b. Mass reading

*?Haruko-wa go-hon-han-no tabako-o sutta-ga, zikan-ga
Haruko-TOP 5-CL-half-LIN cigarette-ACC smoked-but time-NOM
nakat-ta-node sui-owara-nakat-ta.
not.exist-PAST-because smoke-finish-NEG-PAST

'Haruko smoked cigarettes, which amount to 5 and a half cigarettes, but she didn't finish them because she didn't have enough time.'

Next, mensural classifiers pattern with sortal classifiers with respect to incompletive readings. The count reading (container reading) allows an incompletive reading, as in (83a), while the mass reading (measure reading) does not, as in (83b).

(83) Mensural classifiers

a. Container reading (count)

Haruko-wa go-hon-no wain-o nonda-ga, suguni yot-ta-node
Haruko-TOP 5-CL-LIN wine-ACC drank-but soon get.drunk-PAST-because
nomi-owara-nakat-ta.
drink-finish-NEG-PAST

'Haruko drank five bottles of wine, but didn't finish them because she got drunk very soon.'

b. Measure reading (mass)

*?Haruko-wa taru-kara botoru ni-hon no wain-o nonda-ga, suguni
Haruko-TOP barrel-from bottle 2-CL LIN wine-ACC drank-but soon
yot-ta-node nomi-owara-nakat-ta.
get.drunk-PAST-because drink-finish-NEG-PAST

'Haruko drank two bottlefuls of wine from a barrel, but didn't finish it, since she got drunk very soon.'

Lastly, numeral quantifiers in an attributive reading allow an incompletive reading. Consider (84), where the numeral quantifier *go-ko* is used with an attributive reading to describe the property of a skewer of dumplings (i.e., how many dumplings the skewer holds).

(84) Haruko-wa syokuzi no atode go-ko-no kusidango-o tabeta-ga,
Haruko-TOP meal of after 5-CL-LIN skewer.dumpling-ACC ate-but
tabe-owara-nakat-ta.
eat-finish-NEG-PAST
'Haruko ate a skewer of 5 dumplings after the meal, but didn't finish them.'

5.4.4.4 Summary of the classification of classifiers

As we have seen the results thus far, the locations in the sentence, FNQs, nominal ellipsis, and incompletive readings are useful to classify classifiers in terms of individuation. The classifications and properties are summarized in (85).

(85) Classification of classifiers

	Type	Reading	Ind	Pre-N	Post-N	FNQ	Ellipsis	Incomp.
a.	Sort.	count	Yes	ok	ok	ok	ok w/o *no*	ok
b.	Mens.	count	Yes	ok	ok	ok	ok w/o *no*	ok
c.	Sort.	mass	No	ok	*?	*	ok w/o *no*	*
d.	Mens.	mass	No	ok	*?	*	ok w/o *no*	*
e.	Sor./Men.	attri.	No	ok	ok?	*	ok with *no*	ok

The possible locations and availability of incompletive readings suffice to distinguish individuating classifiers from non-individuating classifiers. Among non-individuating classifiers, those in attributive readings are distinguished from mass readings by nominal ellipsis and incompletive readings. (See Park 2022, Paul et al. 2021 for other possible clues to investigate the properties and classification of classifiers.)

5.5 Classifiers are also for numerals

Thus far, I have shown that classifiers in certain cases serve for individuation regardless of the type of classifier (sortal or mensural). In this section, I claim that classifiers are also required by numerals in Japanese, by showing distributions of numerals and complementary distributions between numeral quantifiers and other quantifiers (Sudo 2014, 2016; also see Bale and Coon 2014, Krifka 1989 for other languages).

5.5.1 A numeral and a classifier form a structural unit

5.5.1.1 Numerals and classifiers need each other

Numerals are normally used with classifiers in Japanese, as in (86), (87), in a similar way to classifiers, which are normally used with numerals, as in (88).[26]

(86) San-nin-no gakusei-ga issyoni odotta.
3-CL-LIN student-NOM together danced
'Three students danced together.'

(87) *San-no gakusei-ga issyoni odotta.
3-LIN student-NOM together danced
(Intended) 'Three students danced together.'

(88) *Nin-no gakusei-ga issyoni odotta.
CL-LIN student-NOM together danced
(Intended) 'A student/Students danced together.'

Also, numerals cannot stand alone or be a predicate on their own, as in (89).

(89) kyoo-no okyakusan-wa zyuu-ni-*(nin)-da.
today-GEN guest-TOP 10-2-CL-COP
'The (number of the) guests today is 12.' (Sudo 2016:8)

As in (89), numerals require classifiers at the predicate position; otherwise the phrase becomes ungrammatical. The restriction that numerals cannot stand alone or cannot be a predicate by themselves, suggests that numerals require classifiers for modification (as well as nouns require classifiers for individuation).

[26]The restriction in (87) and (89) that numerals cannot stand alone or be a predicate, can be lifted when the numerals are large number numerals or approximate number numerals, as in (i) and (ii). As pointed out in Nomoto (2013), these types of numerals show comparable syntactic properties with lower number numerals.

(i) {San-zen/juu-ni-san}-(nin)-no gakusei-ga issyoni odotta.
{3-1000/10-2-3}-LIN student-NOM together danced
'{3,000/12 or 13} students danced together.'

(ii) kyoo-no okyakusan-wa {go-hyaku/ ni-san-zyuu}-(nin)-da.
today-GEN guest-TOP 5-1000/ 2-3-10-CL-COP
'The (number of the) guests today is {500/20-30}.'

5.5.1.2 Various operations target a unit of a numeral and a classifier

I show that numeral quantifiers (a numeral + a classifier), rather than sequences of a classifier and a noun, are closely tied in various operations. First, numeral quantifiers and other quantifiers are in complementary distributions, as in (90):

(90) {gozyuu-nin/ tasuu/ *gozyuu-nin tasuu/ *tasuu gozyuu-nin}-no gakusei
{50-CL lots.of 50-CL lots.of lots.of 50-CL}-LIN student
'fifty/lots of/*(lit.) 50 lots of /*(lit.) lots of 50 students'

The numeral quantifier *gozyuu-nin* and a count-sensitive quantifier *tasuu* are in complementary distribution, and cannot be merged together.

Rather, non-numeral quantifiers are not compatible with classifiers, as in (91).

(91) takusan-(*nin)-no student
lots.of-CL-LIN student
(Intended) 'lots of students'

Second, classifiers undergo various alterations together with numerals, but not with nouns. Syntactically, a unit of a numeral and a classifier (i.e., numeral quantifiers) passes traditional constituency tests:

(92) a. Coordination

Ano ie-de-wa inu-o **san-tou** to **go-hiki** katteiru.
that house-at-TOP dog-ACC 3-CL and 5-CL having

'They have three (larger) dogs and five (smaller) dogs in that house.'

b. Question

Gakusei-{nan-nin/dore-dake/donokurai}-ga ibento-ni sankasita no?
student-what-CL/which-only/which-about-NOM event-to participated QUES

'How many students participated in the event?'

c. Fragment answer

gozyuu-nin.
50-CL

'Fifty (people).' (As an answer to the questions in (b) above.)

With the test results in (92), a numeral and a classifier might be assumed to form a constituent, or at least it is fair to say that a numeral and a classifier form a unit structurally at a certain stage of its derivation.

Phonologically, alterations take place between a numeral and a classifier. Examine the following (note that /h/ corresponds to /b/ in voicing in Japanese):

(93) Gemination

a. iti + hiki (1+hiki) = i**p**-**p**iki

b. roku + hiki (6+hiki) = ro**p**-**p**iki

c. iti + hon (1+hon) = i**p**-**p**on

d. hati + hon (8+hon) = ha**p**-**p**on

e. roku + ken (6+ken) = ro**k**-**k**en

(94) Voicing

a. san + hon (3+hon) = san-**b**on

b. san + hai (3-hai) = san-**b**ai

c. san + ken (3-ken) = san-**g**en

As in (93) and (94), numerals and classifiers often undergo gemination or voicing. Importantly, such alternations are not observed between a noun and the following numeral. Consider (95), noting that voicing also takes place between numerals.

(95) a. Voicing of 1,000 (*sen*)

san + sen = san-zen
3 + 1000

'3,000'

b. kosan {sen-nin/ *zen-nin}
old.boy 1,000-CL
'1,000 old-timers'

In (95a), *sen* 'thousand' is voiced when it follows a numeral whose final consonant is voiced (e.g., -*san* '3'). However, as in (95b), -*sen* is not voiced even when it follows a word ending with -*san*, which is a homophony with *san* 'three'. This contrast is straightforward if we segment the phrases as [san-zen] for (95) and [kosan][sen] for (95), where the sequential voicing does not take place beyond the boundary.

Morphologically, suppletion targets a unit consisting of a numeral and a classifier, as in (96).

(96) Suppletion of a human classifier (and numerals)

a. 1-CL (??) iti-nin / **hitori**

b. 2-CL (?) ni-nin / **hutari**

c. 3-CL san-nin / ??mitari

In (96), to describe one person and two people, a unit of Yamato-origin numerals (*hi, fu*) and a classifier replace Sino-origin numerals (*iti, ni*) and a classifier.

5.5.1.3 Numerals and classifiers are inseparable

Next, numerals and nouns can be intervened by certain elements, but numerals and classifiers cannot. At the pre-nominal position, numeral quantifiers and the associate nouns should be intervened (or bridged) by the linker *-no*, as in *go-nin-**no** gakusei* (5-CL-LIN student).

At the post-nominal position, as in (97), a plural marker *-tati* should be attached to a noun, as in (97b), or a nominal complex formed by a noun, a numeral, and a classifier, as in (97d), but cannot appear in-between (97c).

(97) a. [gakusei-[san-nin]]
student-3-CL

b. [[gakusei-tati]-[san-nin]]
student-PL-3-CL

c. *gakusei-san-tati-nin

d. (?)[[gakusei-[san-nin]]-tati]

5.5.1.4 FNQs sustain the unit

Syntactically, FNQs (Miyagawa 1989 and subsequent works) also show a strong tie between a numeral and a classifier. Numeral quantifiers may appear in various locations in a sentence to remotely modify its associate noun:

(98) Possible locations of FNQs

(San-nin) (san-nin no) gakusei-(san-nin)-ga (san-nin) kinoo (san-nin)
3-CL 3-CL LIN student-3-CL-NOM 3-CL yesterday 3-CL
hon-o (*?san-nin) katta.
book-ACC 3-CL bought

'Three students bought a book yesterday.'

Descriptively, the quantifier *san-nin* '3-CL' may immediately precede or immediately follow a noun, intervene between a noun and a case marker, or appear with some distance from a noun it modifies (*gakusei* 'student' in (98)), without changing the meaning of the sentence drastically.

FNQ constructions cannot involve only one of a sequence of a numeral and a classifier, but should involve both of them together, as in (99).

(99) a. *San-~~nin~~-no gakusei-ga kinoo **nin** hon-o katta.
3-CL-LIN student-NOM yesterday CL book-ACC bought

b. *~~San~~-**nin**-no gakusei-ga kinoo **san** hon-o katta.
3-CL-LIN student-NOM yesterday 3 book-ACC bought

c. ~~San-nin~~(-no) gakusei-ga kinoo san hon-o nin katta.
3-CL-LIN student-NOM yesterday 3 book-ACC CL bought
(Intended) 'Three students bought a book yesterday.'

As in (99a), a classifier alone cannot be separated from the associate noun. As in (99b), a numeral alone cannot be separated from the associate noun. As in (99c), when a numeral quantifier is separated from the associate noun (as an FNQ), the numeral and the classifier cannot be separated from each other, but need to sustain the unit and the order (the numeral + the classifier).

5.5.1.5 Section interim summary

Thus, the elements of numeral quantifiers, i.e., a numeral and a classifier, are closely connected morphosyntactically. The observations thus far may sound contradictory: (i) classifiers are for nouns (individuation), as discussed in Section 5.4, but (ii) classifiers are for numerals (counting), as discussed in Section 5.5. In Section 5.6, to accommodate both observations, I argue for the movement of classifiers to merge with numerals in the post-nominal position.

5.5.2 Typological study

The claim that classifiers are for both nouns and numerals is also supported by a typological study in Little et al. (2020), who present the diagnostics, as in (100), to distinguish classifier-for-noun languages (e.g., Shan (Tai Kadai)) and classifier-for-numeral languages (e.g., Ch'ol (Mayan)).

(100) Typology of numerals

		CL-for-N	**CL-for-Num**	**Japanese**
a	Only subsets of numerals require classifiers	NO	YES	NO
b	Some nouns are never used with classifiers	YES	NO	NO
c	Classifiers are used with non-numeral elements	YES	NO	NO
d	Numerals always require classifiers	NO	YES	NO

Interestingly, as indicated in (100), Japanese show properties of both types of languages. All numerals can appear with classifiers in Japanese (100a), and the classifiers are almost always used with numerals (100b). Classifiers cannot be used with non-numeral elements (e.g., demonstratives, adjectives)(100c). As introduced in the last chapter, some numerals may forgo classifiers (e.g., large numerals, approximate numerals) (100d). Also, when numerals are not used for counting, they can stand alone. Imagine a context where a teacher writes the number 3 on a chalkboard, and consider the example of Japanese in (101) in comparison to Ch'ol, a classifier-for-numeral language, in (102).

(101) *A teacher is pointing at the number three and says:*

kore-wa san desu.
this-TOP three be

'This is three.'

(102) *A teacher is pointing at the number three and says:*

Ili jiñ ux-*(p'ej). [Ch'ol]
this DET three-CL

'This is three.' (Little et al. 2020:7)

Thus, this typological study also indicates that Japanese classifiers are for both numerals and nouns.

5.6 Structures of numeral quantifier constructions

Based on the properties of each type of classifier and their readings as we have seen thus far, I map them onto nominal functional projections. The properties that we have seen are

summarized in (85), repeated here as (103).

(103) Classification of classifiers

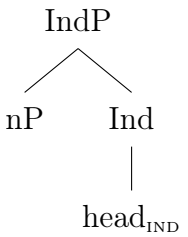
	Type	Reading	Ind	Pre-N	Post-N	FNQ	Ellipsis	Incomp.
a.	Sort.	count	Yes	ok	ok	ok	ok w/o *no*	ok
b.	Mens.	count	Yes	ok	ok	ok	ok w/o *no*	ok
c.	Sort.	mass	No	ok	*?	*	ok w/o *no*	*
d.	Mens.	mass	No	ok	*?	*	ok w/o *no*	*
e.	Sor./Men.	attri.	No	ok	ok?	*	ok with *no*	ok

In particular, I focus on how structures proposed in this section explain locations of numeral quantifiers and FNQs, ellipsis, and the (non-)specificity effect.[27]

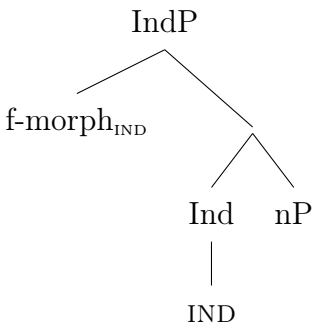
First, recall Borer's (2005a) model, where a range is assigned to the Ind head in two ways. The structures in (104) schematize range assignment to Ind in each case:

(104) Range assignment (adopted from Borer (2005a:36))

a. Head feature



b. f-morph

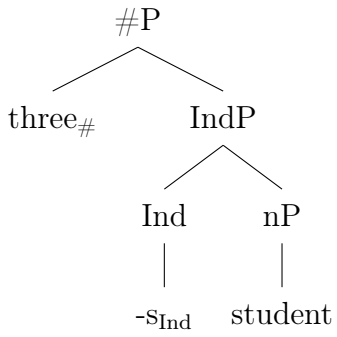


In (104a), the head itself carries a head feature IND, while in (105b), the f-morph at the specifier of IndP assigns a range IND to the head.

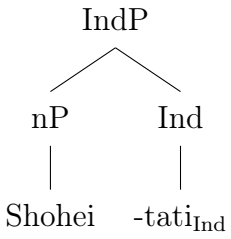
The structures in (105) and (106) exemplify the individuation in (104a).

[27] The structures proposed in this section do not explain how incompletive readings are achieved in count structures. I exclude it from the discussion in this section since incompletive readings are derived at the vP/VP level (Zhang 2018, 2020).

(105) Individuation by an overt Ind head



(106) a. Shohei-tati
Shohei-PLInd
'Shoeis, people all named Shohei'

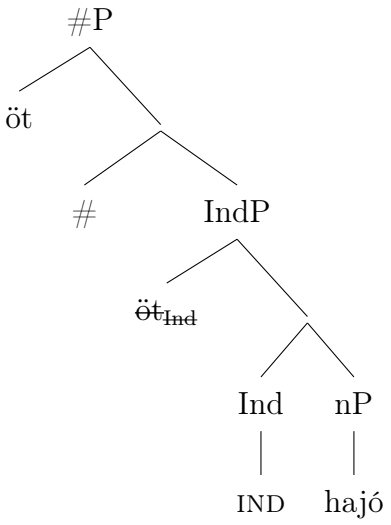
b.


In (105) and (106), the plural markers in English and in Japanese, respectively, are Ind heads, and serve for individuation.

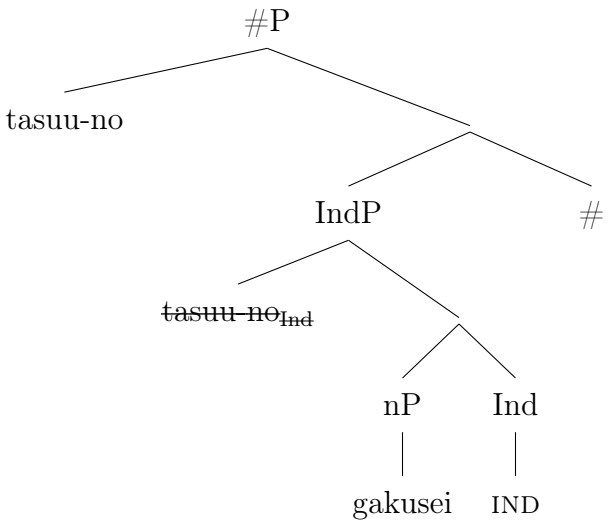
The structures in (107) and (108) exemplify the individuation in (104b).

(107) Individuation by a f-morph

a. öt hajó
five ship
'five ships' (based on Ortmann 2000:251-252)

b.


(108) a. tasuu-no gakusei
many-LIN student
'many students'

b. 

In this section, I show that pre-nominal numeral quantifiers employ the structure in (108b), whereas post-nominal numeral quantifiers employ the structure in (106b). I also argue that FNQs are derived from pre-nominal numeral quantifiers. In addition to the syntactic and semantic properties in (103), I also showed that classifiers are required both by nouns (for individuation) and by numerals (for counting). I argue for a movement of classifiers to numerals at the post-nominal positions, as discussed in Section 5.5.

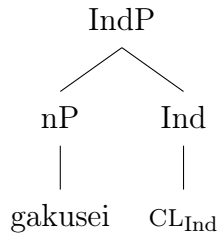
5.6.1 Post-nominal numeral quantifiers (sortal, count)

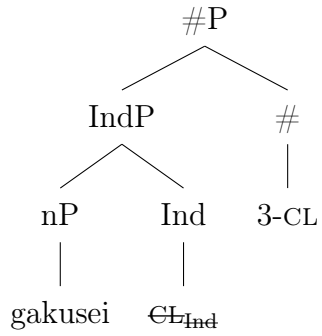
I claim that post-nominal numeral quantifiers employ the structure in (106b), where classifiers (whether sortal or mensural) head IndPs and serve for individuation. As shown in (103) and as discussed in Section 5.4, post-nominal numeral quantifiers necessarily involve individuation (except some irregular cases of post-nominal attribute numeral quantifiers). Sortal classifiers and mensural classifiers build distinct projections.

Sortal classifiers at the post-nominal position head IndPs, as in (109b), where classifiers individuate nouns. Due to their clitic nature, classifiers move up to #, as in (109c), as discussed in Section 5.5. (The structures in (109b, c) are revised later.)

(109) Post-nominal numeral quantifiers (Sortal, Count)

a. gakusei-3-nin
student-3-CL
'3 students'

b.


c.


In the past literature, numerals are often put at the specifier position of #Ps or other functional projections (e.g., Ochi 2012, Watanabe 2006). This claim is derived from the observation, as in (110), that numerals appear phrasal.

(110) a. John-wa **sukunakutomo san-satu-no** hon-o katta.
John-TOP at.least 3-CL-LIN book-ACC bought
'John bought at least three books.'

b. John-wa hon-o **sukunakutomo san-satu** katta.
John-TOP book-ACC at.least 3-CL bought
'John bought at least three books.' (Watanabe 2006:254)

In (110), the numeral quantifier also contains an adverbial *sukunakutomo* 'at least', which makes the numeral quantifier appear to be phrasal.

In contrast to the pre-nominal position as in (110), however, complex numerals are at best marginal at the post-nominal position, as in (111).

(111) a. *(?)John-wa hon-**sukunakutomo-san-satu**-o katta.
John-TOP book-at.least-3-CL-ACC bought
'John bought at least three books.'

b. *?John-wa hon-san-satu-**izyou**-o katta.
John-TOP book-3-CL-or.more-ACC bought
'John bought more than 3 books.'

Also, not only can numerals be complex, but numeral quantifiers can be complex, as in (112).

(112) a. Haruko-wa okiagaru-to tabako-ni-hon-**han**-o sutta.
Haruko-TOP get.up-when cigarette-2-CL-half-ACC smoked
'After she got up, Haruko smoke two and a half cigarette.'

b. Haruko-wa sensyuu syoosetu-ni-satu-**tyotto**-o yonda.
Haruko-TOP last.week novel-2-CL-a.bit-ACC read
'Haruko read two novels and a bit more (i.e., the beginning of the third one) last week.'

Note that these "complex" numeral quantifiers can be used at the post-nominal position. Note also that *han* 'half' and *tyotto* 'a bit (more)' follow classifiers rather than immediately following numerals. Moreover, *-han* in (112a) suggests that the numeral, the classifier, and *-han* 'half' are fused. First, *han* is not a classifier since it does not stand alone as a classifier, as in (113).

(113) *Haruko-wa hon-san-**han**-o yonda.
Haruko-TOP book-3-half-ACC yonda
(Intended) 'Haruko read 3.5 books.'

Second, *-han* is a special type of numeral, and hence, it is possible that *-han* is used as a numeral itself, as in (114) (although such examples are not fully natural and somewhat sporadic).

(114) a. ??Haruko-wa keeki-han-ko-o tabeta.
Haruko-TOP cake-half-CL-ACC ate
'Haruko ate half a cake.'

b. ?Haruko-wa asupirin-han-zyoo-o nonda.
Haruko-TOP aspirin-half-CL-ACC drank
'Haruko took half a tablet of aspirin.'

The quantification of 'half' is identical in (114) and (112a). In (114), *-han-ko* and *-han-zyoo* mean 'half a cake' and 'half a tablet' respectively. In (112a), the quantification of "half" applies to a singular (created by the classifier), rather than the whole numeral. Namely, *ni-hon-han* means 2.5 rather than the half of 2 (i.e., 1). With these, I claim that *ni-hon-han* (2-*cl*-half) is a fused form of a numeral *ni...han* "2 and a half" and a classifier *hon*. I also consider this fusion of numerals and classifiers as a supporting clue for the movement of classifiers.

Thus, apparent "complex numerals" are derived from a fusion of numerals and classifiers to form a complex head. Although, apparently, this does not work for all the complex numerals observed, I leave numerals that contain more than a head for future research.

Pre-nominal numeral quantifiers show salient semantic properties, i.e., specificity, as discussed in Section 5.2, repeated here as (115)

(115) Heikinsuru to, kono byooin-de-wa maishuu,...
average-do when, this hospital-at-TOP every.week
'On average, every week in this hospital,...'

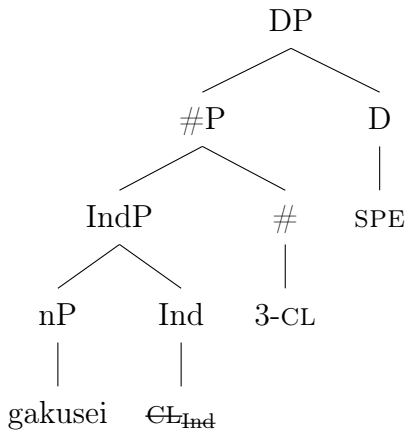
a. san-nin-no akanboo-ga umare-teiru. [Pre-nominal]
3-CL-LIN baby-NOM be.born

b. *akanboo-san-nin-ga umare-teiru. [Post-nominal]
baby-3-CL–NOM be.born

c. akaboo-ga san-nin umare-teiru. [FNQ]
baby-NOM 3-CL be.born
'... three babies are born.' (Ochi 2012:92)

The context in (115) forces a non-specific reading, provided that the same baby/babies cannot be born every week. Following the claim in the last chapter that the specificity effect is a sign of DP projection, I revise the structure in (109c) as (116), where SPE, a feature for specificity, heads the DP.

(116)



The structure in (116) correctly predicts that case-marked numeral quantifiers used without the associate nouns are necessarily specific. Consider (117), where the numeral quantifier in the second clause is necessarily anaphoric.

(117) Gakusei-tati-wa syomei-o atumeteiru node, kinoo Haruko-no ofisu-ni
student-PL-TOP signature-ACC collecting because yesterday Haruo-of office-to
gakusei-3-nin-ga kita. Kyoo-mo ~~gakusei-~~**san-nin-ga** kita.
student-3-CL-NOM came today-also student-3-CL-NOM came
'Because students are collecting signatures, three students came to Haruko's office yesterday. {The three (they)/*(Another) three} came today, too.'

As in (117), case-marked numeral quantifiers without the associate noun can only be used anaphorically. The case-marking indicates that the numeral quantifier is not an FNQ, but a DP (from which the associate head noun is elided). The numeral quantifier in the second sentence in (117) is derived by deleting the head noun from the structure in (116). It is straightforward that the numeral quantifier left after the ellipsis is case-marked and specific.

5.6.2 Post-nominal numeral quantifiers (mensural, count)

I claim that post-nominal numeral quantifiers with mensural classifiers also employ the structure in (106b), where classifiers head IndPs and serve for individuation. As shown in (103) and as discussed in Section 5.4, post-nominal numeral quantifiers necessarily involve individuation (except some irregular cases of post-nominal attribute numeral quantifiers). I argue, however, that numeral quantifiers with mensural classifiers involve different projections from sortal classifiers.

Recall, first, that mensural classifiers can be used to count in a container reading, as discussed in Section 5.4, repeated here as (118).

(118) Post-nominal numeral quantifiers (mensural, count)

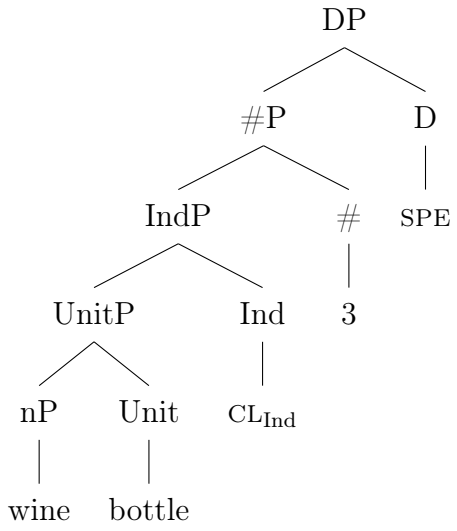
Haruko-wa wain-(botoru-)san-bon-o nonda.
Haruko-TOP wine-bottle-3-CL-ACC drank

'Haruko drank three bottles of wine.'

In a count reading, what is counted is not the content (wine) itself, but containers that contain the content (i.e., bottles containing wine). Recall also that mensural classifiers are often used with container phrases (e.g., *botoru* 'bottle' in (118)) to indicate what container is used to count or measure.

I reflect these properties on the structure as in (119), where a Unit Phrase hosts a container phrase.

(119)



The container phrase provides a unit of counting (or measuring) for nouns (in particular, mass terms). I claim that mensural classifiers always project UnitPs, whether container phrases are overt or covert. Whether container phrases are overt or covert, the existence of a container (in reality or in imagination) is implied when mensural classifiers are used. The container phrase is individuated by the classifier, and undergoes count syntax (i.e., modified by a numeral). (The classifier in (119) head-moves to the numeral, as discussed in the previous section.)

The examples in (120) show the headness of a container phrase. Container phrases at the post-nominal position can not be modified by adjectives, while those at the pre-nominal position can.[28,29]

[28]Note that the modifiability of container phrases is not the same as that of mensural/mass classifiers in Mandarin, as in (i), where the classifier is modified by an adjective (e.g., Cheng and Sybesma 1999, Li 2013, Tang 1990). In contrast, the adjective in (120) modifies a container phrase, rather than the classifier. If the container phrase is removed from (120), the phrase yields ungrammaticality, as in **ookii-go-hai-no biiru* (big-5-CL-LIN beer).

(i) san da-wan tang
3 big-CL soup
'three big-bowls of soup'

[29]The example in (120a) is ameliorated by inserting a dative case marker *-ni* after the container phrase. As Watanabe (2006) observes, the insertion of a dative case marker is restricted, and a phrase with the dative marker might involve another projection, e.g., CaseP. Therefore, I leave the possibility of inserting a dative case marker for future research.

(i) biiru ookii-gurasu-**ni** go-hai
beer big-glass-DAT 5-CL
"5 big-glasses of beer'

(120) a. Post-nominal

biiru (*__ookii__)-gurasu-go-hai
beer big-glass-5-CL

(Intended) '5 big-glasses of beer'

b. Pre-nominal

__ookii__-gurasu-go-hai-no biiru
big-glass-5-CL-LIN beer

'5 big-glasses of beer'

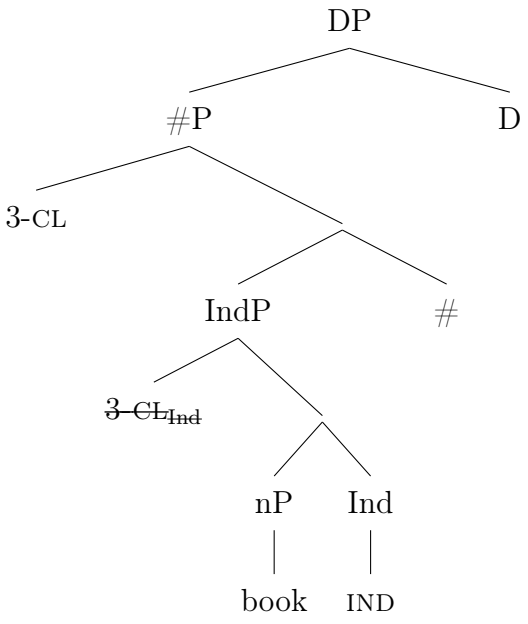
5.6.3 Pre-nominal numeral quantifiers (sortal/mensural, count)

Pre-nominal numeral quantifiers, whether sortal or mensural, and whether count or mass, all reside at the specifier of a functional projection. I propose the structure in (121b) for pre-nominal numeral quantifiers with sortal classifiers in a count reading. (Recall, as discussed in Section 5.2, that the linker -*no* is inserted at PF post-syntactically.)

(121) Pre-nominal numeral quantifier (Sortal, Count)

a. Haruko-wa __san-satu__-no hon-o katta.
Haruko-TOP 3-CL-LIN book-ACC bought
'Haruko bought three books.'

b.



In a similar way to count-sensitive quantifiers/demonstratives, pre-nominal numeral quantifiers with individuating classifiers are at the specifier of IndPs, and assign a range IND to

the Ind head, thereby, individuating nouns. To assign a range to #, the numeral quantifier moves up to the #P level.

The structure in (121b) correctly predicts that the associate noun modified by numeral quantifiers cannot be elided, as in (122) (e.g., Hiraiwa 2016, Kamio 1983, Saito et al. 2008).

(122) *Taro-wa iti-niti-ni [san-satu-no hon]-o yomu-ga, Hanako-wa
Taro-TOP one-day-in [3-CL-LIN book]-ACC read-though Hanako-TOP
[**go-satu-no** ~~hon~~]-o yomu.
[5-CL-LIN book]-ACC read
(Intended) 'Taroo reads three books in a day, but Hanako reads five.'

(Saito et al. 2008:253)

That numeral quantifiers do not allow the head noun to be elided, indicates that numeral quantifiers are outside of nPs. As pointed out by Hiraiwa (2016), only the elements inside nPs allow the head noun to be elided. The example in (122) contrasts with (123), where ellipsis (and *one*-replacement) is licensed for nP-internal elements, including a nominal argument, as in (123a), and adjunct modifiers, as in (123b, c).

(123) a. Nominal arguments

[Rooma-no hakai]-wa [Kyooto-no ~~hakai~~]-yorimo hisan datta.
[Rome-LIN destruction]-TOP [Kyoto-LIN destruction]-than miserable was

'Rome's destruction was more miserable than Kyoto's.' (Saito et al. 2008:253)

b. Adjectives

[Akai kuruma]-wa Naomi-no kuruma desu. [Kuroi **no**(=kuruma)]-wa
[red car]-TOP Naomi-GEN car be [black one(=car)]-TOP
Ken-no desu.
Ken-GEN be

'The red car is Naomi's and the black one is Ken's.' (Hiraiwa 2016:1346)

c. Relative clauses

[Haruko-ga katta] kuruma-wa taka-katta-ga, [Zin-ga katta]
[Haruko-NOM bought] car-TOP expensive-PAST-but [Zin-NOM bought]
no(=kuruma)-wa yasu-katta.
one(=car)-TOP inexpensive-PAST

'The car that Haruko bought was expensive, but the one that Zin bought was inexpensive.'

Nominal arguments, as in (123a), license the ellipsis of the head noun.[30] Similarly, adjectives and relative clauses are eligible for *one*-replacement, as in (123b, c), respectively. The contrast between (122) and (123) indicates that the numeral quantifiers in (122) are outside of the nP.

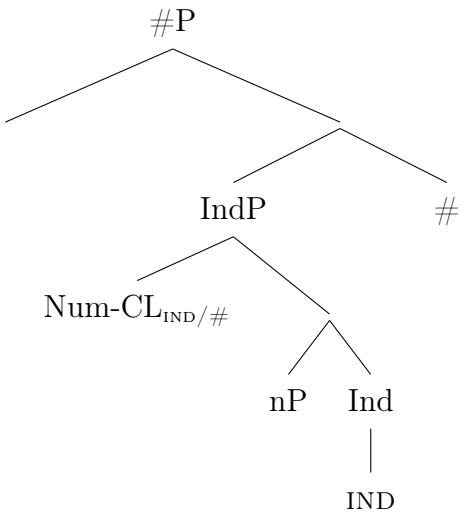
As predicted, other quantifiers (whether or not they are count-sensitive) pattern with numeral quantifiers. As in (124), quantifiers, which are at the specifier of #Ps or QPs in the assumption in this thesis, do not license the ellipsis of the head noun -*gakusei*.

(124) *Kono kurasu-de-wa subete-no gakusei-ga siken-ni goukakusita-ga,
this class-in-TOP all-LIN student-NOM test-DAT passed-but
tonari-no kurasu-de-wa {tasuu/syoosuu/nan-nin-ka}-no ~~gakusei~~-ga otita.
next.to-LIN class-in-TOP {many/a.few/what-CL-QUES}-LIN student-NOM failed
(Intended) 'All the students passed the exam in this class, but {many/a few/some} (student) failed in the class next to.'

In a count reading, numeral quantifiers at the specifier position function as an f-morph to assign a range IND to the Ind head, which enables the noun to participate in count syntax, as in (125a). Numeral quantifiers move up to the #P level to assign a range to the # head, as in (125b)

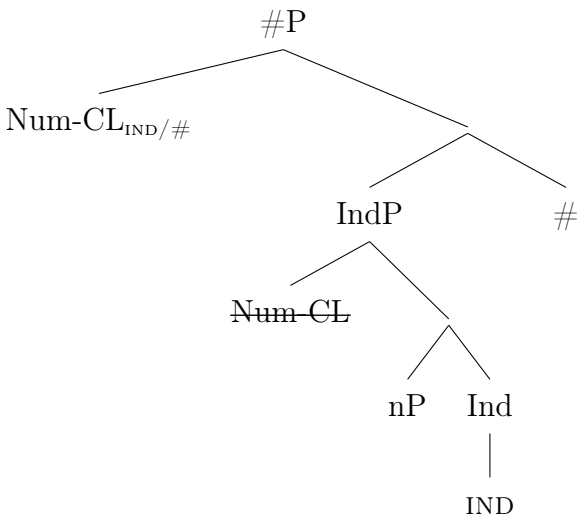
(125) Pre-nominal numeral quantifiers (count)

a.



[30]It is not obvious whether -*no* in (123a) is a proform -*one* or a linker. Hiraiwa (2016) argues that it is a proform, while Saito et al. (2008) argue that it is derived through ellipsis (i.e., *no* is a linker). For the discussion in this chapter, either analysis works and does not affect the proposal here.

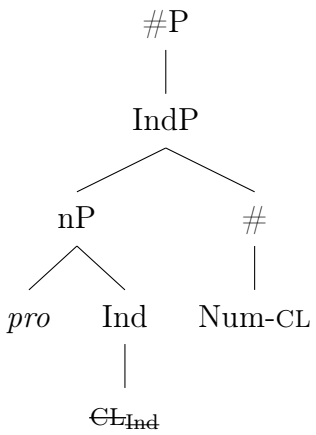
b.



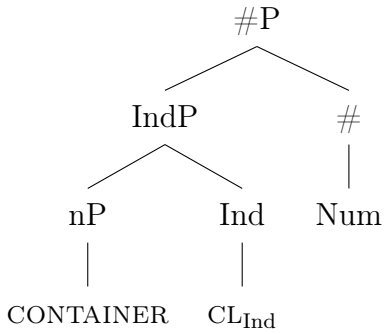
Internal structures of pre-nominal numeral quantifiers are shown in (126). Numeral quantifiers with a sortal classifier are headed by a null pronoun, as in (126a), whereas numeral quantifiers with a mensural classifier are headed by a container phrase, as in (126b) (cf. Watanabe 2006).

(126) Internal structures of pre-nominal numeral quantifiers (Count)

a. Sortal

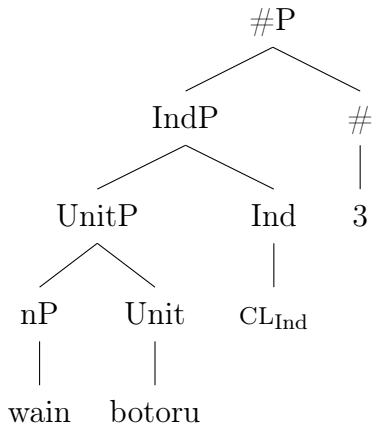


b. Mensural



The structure of #P in (126b) is different from the #P at the post-nominal position, as in (119), repeated here, where the UnitP are projected between the IndP and the nP.

(127) Post-nominal numeral quantifiers (mensural, count) (= 119)



Whether it is pre- or post-nominal, what is counted is containers. The difference between pre- and post-nominal numeral quantifiers is their syntactic status. Container phrases at the post-nominal positions are heads, while container phrases at the pre-nominal position are nPs, As shown in (120), repeated here, the container phrase at the post-nominal position cannot be modified by an adjective, whereas the container phrase at the pre-nominal position can.

(128) a. Post-nominal

biiru (*__ookii__)-gurasu-go-hai
beer big-glass-5-CL

(Intended) '5 big-glasses of beer'

b. Pre-nominal

__ookii__-gurasu-go-hai-no biiru
big-glass-5-CL-LIN beer

'5 big-glasses of beer'

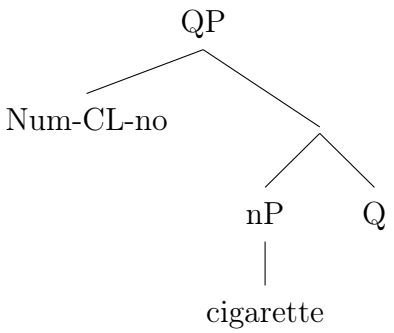
5.6.4 Pre-nominal numeral quantifiers (Mass)

Pre-nominal numeral quantifiers, whether containing a sortal or mensural classifier, in a mass reading reside at the specifier position of QPs, as in (129b) and (130b), where QPs host the numeral quantifiers.

(129) Pre-nominal numeral quantifiers (sortal, mass)

a. Haruko-wa yon-hon-han-no tabako-o sutta.
Haruko-TOP 4-CL-half-CL cigarette-ACC smoked
'Haruko smoked cigarettes, amount to four cigarettes and the half of another.'

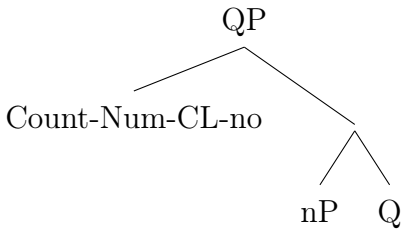
b.



(130) Pre-nominal numeral quantifiers (mensural, mass)

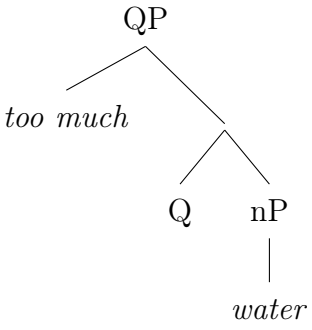
a. Haruko-wa tansu-mit.tu-no huku-o motteiru.
Haruko-TOP chest-3.CL-LIN clothes-ACC have
'Haruko has three chestfuls of clothes.'

b.



Recall that mass nouns lack IndPs and #Ps, but instead may project QPs, as in (131).

(131) *too much water*



In a similar way to the quantifier phrase *too much* in (131), the numeral quantifiers in (129b) and (130b) are at the specifier of QPs to quantify the mass term.

The structures in (129b) and (130b) correctly predict that pre-nominal numeral quantifiers do not license ellipsis of the head noun, as in (132).

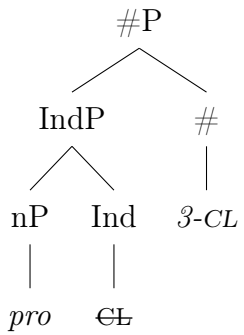
(132) *Haruko-wa tansu-mit.tu-no huku-o motteiru-ga, Zin-wa tansu-yot.tu-no
Haruko-TOP chest-3.CL-LIN clothes-ACC have-but Zin-TOP chest-4-CL-LIN
~~huku~~-ACC motteiru.
clothes-ACC have
'Haruko has three chestfuls of clothes, but Zin has four chestfuls of clothes.'

As discussed in Section 5.4.3, only modifiers (or arguments) within nPs license the ellipsis of the head noun. Obviously, the numeral quantifiers in (129b) and (130b) are outside of the nPs, and hence, those resist nominal ellipsis, as in (132).

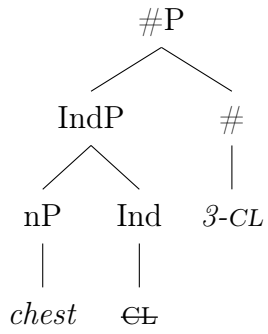
The internal structures of pre-nominal numeral quantifiers in a mass reading are identical to those in a count reading, as shown in (133).

(133) Internal structures of pre-nominal numeral quantifiers (Mass)

a. Sortal: *yon-hon* (cigarette-4-CL; 129)



b. Mensural: *tansu-mit.tu* (chest-3.CL; 130)



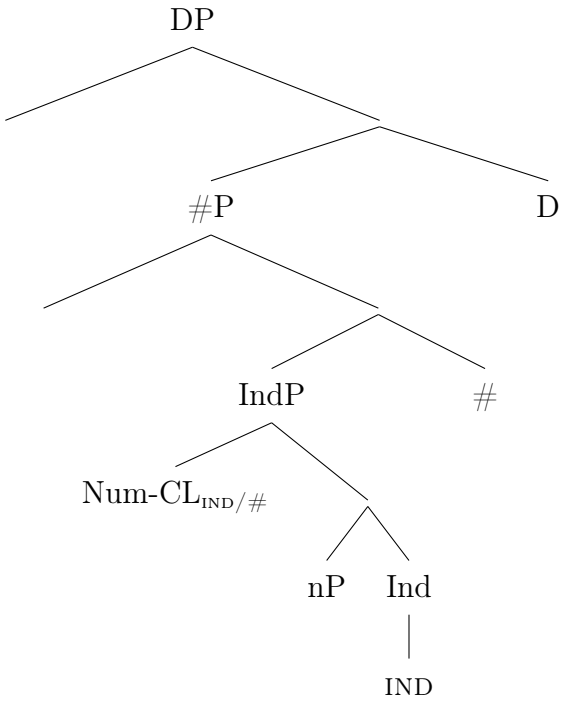
5.6.5 FNQs

As discussed in Section 5.2, I follow a movement view for the structure and derivation of FNQs in Japanese (e.g., Fitzpatrick 2006, Huang and Ochi 2014, Kitahara 1993, Miyagawa 1989 and subsequent works, Ochi 2012, Watanabe 2006 and subsequent works). In this section, I further argue that FNQs are derived from pre-nominal numeral quantifiers, as in (134) and (135). (Note that as discussed in Section 5.2, the linker *no* is inserted at PF; e.g., Watanabe 2006, 2010.)

(134) Base structure

a. **san-nin**-no gakusei-ga kinoo tesuto-o uketa.
3-CL-LIN student-NOM yesterday test-ACC took
'Three students took the test yesterday.'

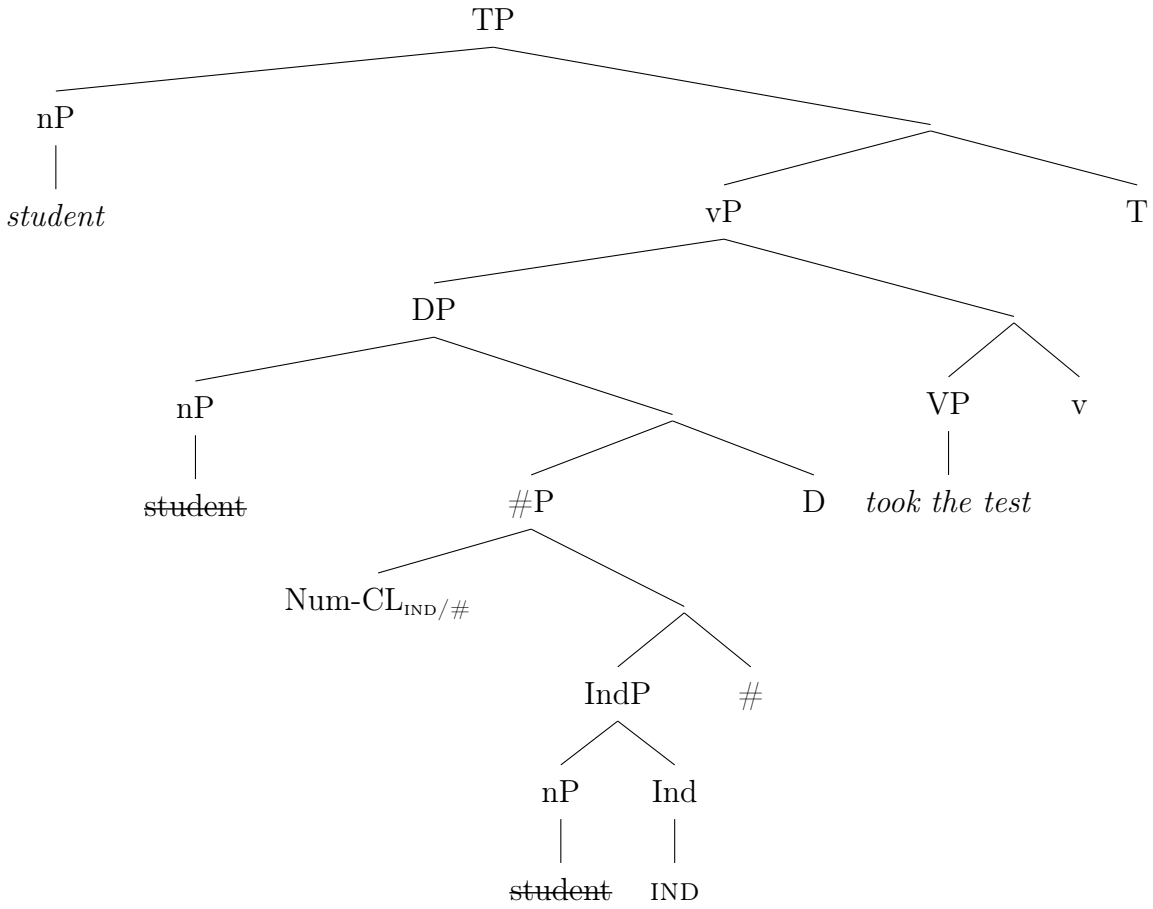
b. Pre-nominal numeral quantifiers (count)



(135) FNQs

a. Gakusei-ga kinoo **san-nin** tesuto-o uketa.
student-NOM yesterday 3-CL test-ACC took
'Three students took the test yesterday.'

b. Floating out of the DP via the specifier of it



FNQs are derived from pre-nominal numeral quantifiers, as in (134). I present two reasons for pre-nominal numeral quantifiers rather than post-nominal ones. First, FNQs allow numerals to be complex, as in (110), repeated here as (136), which is at best marginal for post-nominal numeral quantifiers, as in (111), repeated here as (137).

(136) a. John-wa **sukunakutomo san-satu-no** hon-o katta. [Pre-nominal]
John-TOP at.least 3-CL-LIN book-ACC bought
'John bought at least three books.'

b. John-wa hon-o **sukunakutomo san-satu** katta. [FNQ]
John-TOP book-ACC at.least 3-CL bought
'John bought at least three books.' (Watanabe 2006:254)

(137) *(?)John-wa hon-**sukunakutomo-san-satu**-o katta. [Post-nominal]
John-TOP book-at.least-3-CL-ACC bought
'John bought at least three books.'

Second, FNQs and post-nominal numeral quantifiers do not share properties on specificity. As discussed in Section 5.2, FNQs require a non-specific reading, as in (138), whereas

post-nominal numeral quantifiers require a specific reading, as in (139).

(138) Heikinsuru to, kono byooin-de-wa maishuu,...
average do, this hospital-at-TOP every.week
'On average, every week in this hospital,...'

a. san-nin-no akanboo-ga umare-teiru. [Pre-nominal]
3-CL-LIN baby-NOM be.born

b. *akanboo-san-nin-ga umare-teiru. [Post-nominal]
baby-3-CL–NOM be.born

c. akaboo-ga san-nin umare-teiru. [FNQ]
baby-NOM 3-CL be.born
'... three babies are born.' (Ochi 2012:92)

(139) a. John-wa ni-dai-no piano-o kai-tagatta. [Pre-nominal]
John-TOP 2-CL-LIN piano-ACC buy-wanted

b. John-wa piano ni-dai-o kai-tagatta. [Post-nominal]
John-TOP piano 2-CL-ACC buy-wanted

c. John-wa piano-o ni-dai kai-tagatta. [FNQ]
John-TOP piano-ACC 2-CL buy-wanted
'John wanted to buy two pianos.' (Watanabe 2008:520)

Pre-nominal and post-nominal numeral quantifiers as in (139a, b) are ambiguous whether John has two specific pianos in mind (specific reading), or any two pianos, presumably, the number of pianos that John wants to buy is at issue (non-specific reading). However, FNQs, as in (139c), only allow non-specific reading, and the example cannot be used when John has two specific pianos in mind.

Since pre-nominal numeral quantifiers are neutral in terms of specificity, as in (138a) and (139a), it is more reasonable to associate FNQs with pre-nominal numeral quantifiers than with post-nominal numeral quantifiers.[31]

5.6.6 Attributive numeral quantifiers

Numeral quantifiers in attributive readings are modifiers, since they allow one-replacement, as introduced in the previous section. As discussed above, the quantifier of this type is

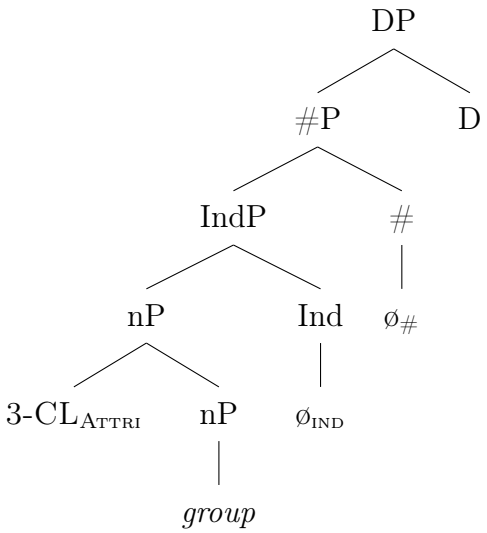
[31]The claim that FNQs are derived from pre-nominal numeral quantifiers further leads us to claim that a specific reading (that is possible for pre-nominal numeral quantifiers) is lost through movement to derive FNQs. Although I leave for future research how the specific reading is lost when FNQs are generated, it is noteworthy that FNQs lose other semantic properties as well that pre-nominal numeral quantifiers allow (i.e., collective reading, attributive reading) (e.g., Hiraiwa 2016, Nakanishi 2007, 2008).

within nPs, as in (140), since only nP-internal elements license the ellipsis of the head noun.

(140) Attributive reading

a. san-nin no gruupu
3-CL LIN group
'a group/groups of 3 people'

b.



Numeral quantifiers in attributive readings cannot be used in FNQ constructions. It is straightforward to consider them as modifiers. Namely, Japanese does not allow the head noun to move out of the DP, leaving the adjunct modifier behind, as in (141).

(141) a. *Haruko-wa **kuruma-o** kinoo [akai ~~kuruma-o~~] katta.
Haruko-TOP car-ACC yesterday [red car-ACC] bought
(Intended) 'Haruko bought a red car/red cars.'

b. *Haruko-wa **hon-o** Zin-ni [kinoo katta]-~~hon-o~~ ageta.
Haruko-TOP book-ACC Zin-DAT [yesterday bought]-book-ACC gave
(Intended) 'Haruko gave Zin the book that she bought yesterday.'

5.7 Summary of Chapter 5

In this chapter, we have seen how and when classifiers serve for individuation. At odds with past studies (e.g., Cheng and Sybesma 1999), both sortal and mensural classifiers allow either count or mass readings (cf. Li 2013 for Mandarin). Numeral quantifiers are also used as modifiers, which bring attributive readings. As a result, I proposed five types of classifier constructions, as in (142).

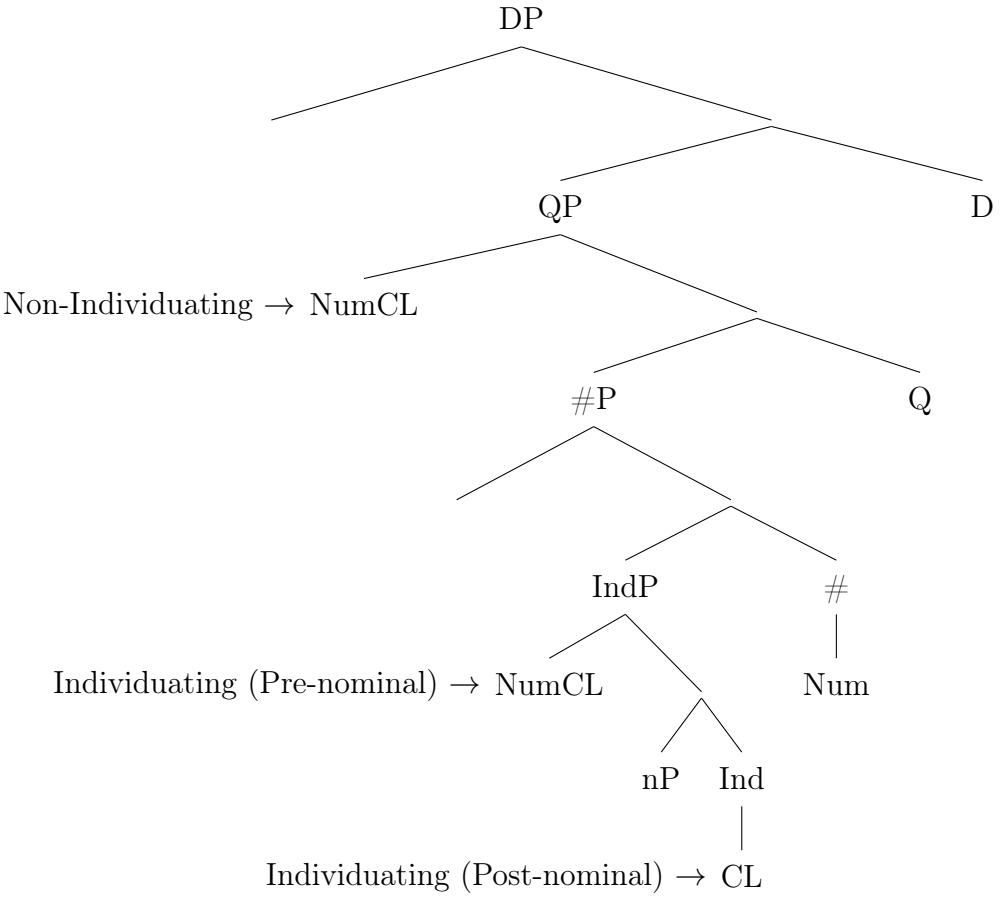
(142) Classification of classifiers

	Type	Reading	Ind
a.	Sortal	count	Yes
b.	Sortal	mass	No
c.	Mensural	container (count)	Yes
d.	Mensural	measure (mass)	No
e.	Sort./ Mens.	attributive	No

I showed that possible locations of each type, nominal ellipsis, and incompletive readings can be used as diagnostics to classify classifiers into one of (142).

Lastly, I proposed the structures as in (143) for each type of classifier in (142):

(143) Individuating and Non-individuating classifiers in various locations



6

Summary and Closing remarks

Throughout this thesis, I argued for the existence of a grammaticized mass-count distinction in Japanese, and for a heterogeneous analysis of nominal functional constructions. In Chapter 3, I showed that bare nouns in Japanese are bare on the surface, but can be complex underlyingly. I identified two types of bare nouns, including nP bare nouns and DP bare nouns:

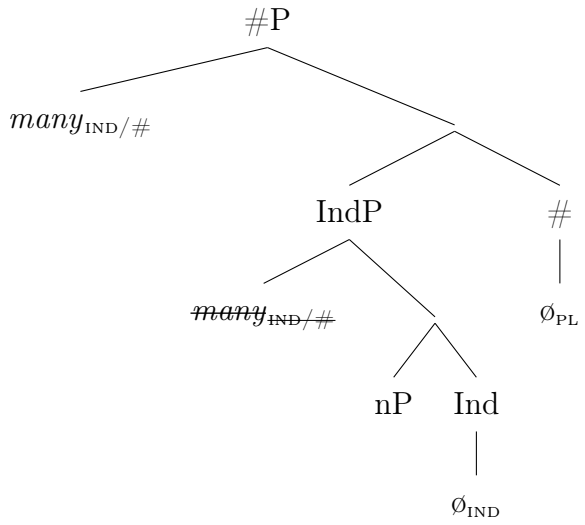
(1) Wide scope and narrow scope bare nouns in Japanese
   a. Wide $[_{\text{DP}}\ [_{\#\text{P}}\ \emptyset_{\#}\ [_{\text{IndP}}\ \emptyset_{\text{Ind}}\ [_{\text{nP}}\ \text{n}\ \text{ROOT}\ ]]]]$
   b. Narrow $[_{\text{nP}}\ \text{n}\ \text{ROOT}\ ]$

I showed the properties of these two bare nouns (scope, kind reference, telicity, discourse anaphora), and provided distinct structures for each of them. I proposed that nP bare nouns projects nPs (i.e., lacks IndPs) and patterns with number neutral bare nominals in other languages (Carlson 1977, Chierchia 1998a, 1998b for English, Rullmann and You 2006 for Mandarin, Bliss 2004 for Turkish, Kramer 2015, 2017 for Amharic). DP bare nouns, on the other hand, are full DPs, involving individuation (i.e., the grammaticized mass-count distinction) with a covert Ind head, and pattern with indefinite DPs in English.

In Chapter 4, I showed that the grammaticized mass-count distinction is observed in plural expressions in Japanese. Count-sensitive modifiers (e.g., *tasuu* 'many') license the

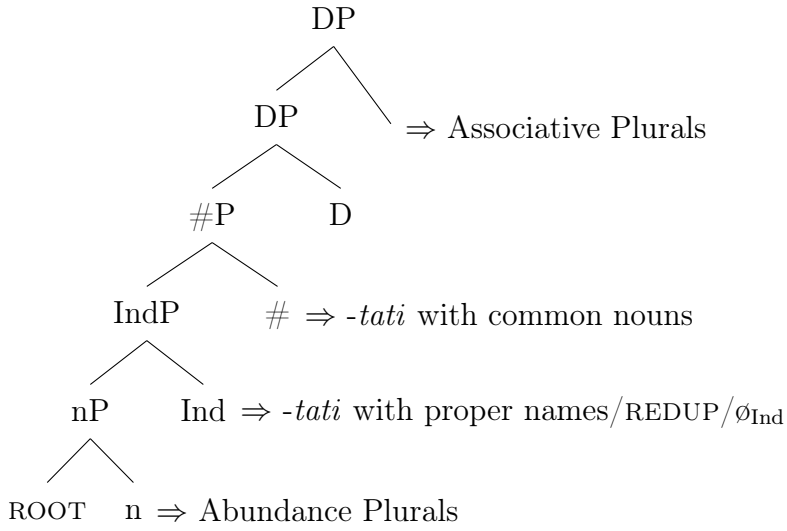
null Ind head, as in (2).

(2) Count-sensitive modifiers and individuation



Plurals individuate nouns via the Ind head. However, plurals are realized in various ways, including individuation and non-individuating plurals (counting plurals, lexical plurals) (Mathieu 2014, Wiltschko 2021):

(3) Plurals in Japanese

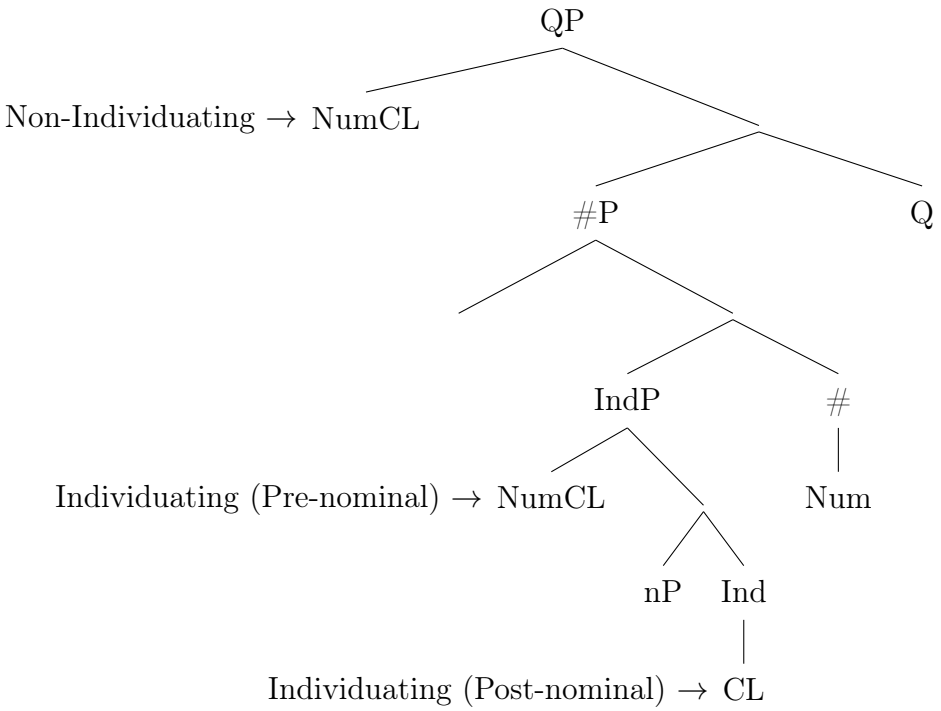


-*Tati* plurals used with proper names and plurals via reduplication show the properties of individuating plural (i.e., inclusive plural readings, relative scope, kind reference), and pattern with bare plurals in English. I showed that the analysis of the head/modifier plurals in Wiltschko (2008) is not tenable with the observations of plurals in Japanese.

In Chapter 5, I claimed that classifiers in Japanese also show mixed properties of individuating and non-individuating classifiers. Using locations of numeral quantifiers,

floating numeral quantifiers, nominal ellipsis, and incompletive readings, I proposed that both sortal and mensural classifiers allow either a count or mass reading, and that the individuating/non-individuating distinction lies in the structural positions where classifiers appear, as in (4).

(4)



Count syntax, the grammaticized mass-count distinction, or grammatical number are often regarded as irrelevant to Japanese in past literature (e.g., Inagaki and Barner 2009). However, the expressions and constructions investigated in this thesis all show that Japanese exhibits the grammaticized mass-count distinction. In English, on the other hand, the grammaticized mass-count distinction is overtly indicated by the plural marker. Namely, the difference between Japanese and English or other number languages is that individuation and number specification are done covertly in many cases in Japanese, and that Japanese shows more diversity in terms of number and individuation.

Although it is undeniable that classifiers and bare nouns are dominantly present in number and individuation in Japanese, several residual ways to encode the grammaticized mass-count distinction in the absence of classifiers are present.

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