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N′-ellipsis and the structure of noun phrases in Chinese and Japanese

Mamoru Saito · T.-H. Jonah Lin · Keiko Murasugi

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Abstract It has been widely assumed since Kitagawa and Ross (Linguist Anal 9: 19–53, 1982) that noun phrases in Chinese and Japanese are quite similar in structure. They are N-final in surface word order, they employ ''modifying markers'' (*de* in Chinese and *no* in Japanese) extensively, and they require classifiers for numeral expressions. In this paper, we argue that, contrary to appearance, they have quite distinct structures. We examine N′-ellipsis in the two languages and present supporting evidence for the hypothesis argued for by Simpson (in: Tang and Liu (eds.) On the formal way to Chinese languages, 2003), among others, that Chinese noun phrases are head-initial. According to this hypothesis, *de* is D, and a classifier heads another projection within DP. Japanese noun phrases, on the other hand, are head-final. *No* is a contextual Case marker, as proposed by Kitagawa and Ross (Linguist Anal 9: 19–53, 1982), and classifier phrases are adjuncts modifying nominal projections. Our discussion shows that Kayne's (The antisymmetry of syntax, 1994) analysis of N-final relatives applies elegantly to Chinese but not to Japanese. It thus suggests that Japanese relative clauses are head-final throughout the derivation.

M. Saito (✉)
Department of Anthropology and Philosophy, Nanzan University,
18 Yamazato-cho, Showa-ku, Nagoya 466–8673, Japan
e-mail: saito@nanzan-u.ac.jp

T.-H. J. Lin
Graduate Institute of Linguistics, National Tsing Hua University,
101, Section 2, Guangfu Road, Hsinchu 300, Taiwan
e-mail: jonahlin@mx.nthu.edu.tw

K. Murasugi
Department of British and American Studies, Nanzan University,
18 Yamazato-cho, Showa-ku, Nagoya 466-8673, Japan
e-mail: murasugi@nanzan-u.ac.jp

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1 Introduction

In this paper, we pursue a comparative syntax of noun phrases in Chinese and Japanese. Noun phrases in these two languages look quite similar on the surface. For example, they are both N-final, and they both employ ''modifying markers'' extensively, as shown in (1)–(2).

(1) *Chinese*
a. Laowang de che
de car
'Laowang's car'
b. yong shitou de gongji
with stone *de* attack
'an attack with stones'

(2) *Japanese*
a. Haruki no kuruma
no car
'Haruki's car'
b. isi -de no koogeki
stone-with *no* attack
'an attack with stones'

Furthermore, Chinese and Japanese are both classifier languages. This is illustrated in (3) and (4).

(3) *Chinese*
san -ben shu
three-CL book
'three books'

(4) *Japanese*
san -satu no hon
three-CL *no* book
'three books'

In this paper, we argue that despite these apparent similarities, the noun phrase structures in Chinese and Japanese are radically different. We compare the distributions of the Chinese ''modifying marker'' *de* and its Japanese counterpart *no* and also examine the patterns of N′-ellipsis observed in these languages. Based on this, we present evidence that Chinese is head-initial, where *de* is D, and a classifier is also a head in the nominal projection. Japanese, on the other hand, is head-final, and *no* is a contextual Case marker. The analysis that we arrive at for Chinese is similar to the one proposed in Simpson (2003), and that for Japanese is more or less the traditional one. The comparative study shows that Kayne's (1994) antisymmetry

theory, which entertains the hypothesis that phrase structure is universally head-initial, accounts elegantly for relative clauses in Chinese but not for those in Japanese. This paper suggests then that Japanese relative clauses are generated head-final from the initial point of the derivation.

In the following section, we review the similarities as well as the differences in the distrubutions of *de* and *no*. In Sect. 3, we argue for the head-initial analysis of Chinese and the head-final analysis of Japanese. We show there, based on the examination of N′-ellipsis, that the constituent that precedes *de* is always in DP Spec while *no* accompanies phrases in a variety of positions. In Sect. 4, we summarize our proposals, comparing our analysis of Japanese noun phrases with Watanabe's (2006).

2 The distributions of *de/no* and Kitagawa and Ross's (1982) Mod-Insertion rule

As noted above, *de* and *no* show similarities in their distributions. More examples are listed in (5) and (6) to illustrate this point.

(5) *Chinese*
   a. Luoma de huimie
      Rome *de* destruction
      'Rome's destruction'
   b. mingtian de tianqi
      tomorrow *de* weather
      'tomorrow's weather'
   c. yu Laowang de huimien
      with *de* interview
      'an interview with Laowang'

(6) *Japanese*
   a. Rooma no hakai
      Rome *no* destruction
      'Rome's destruction'
   b. asu no tenki
      tomorrow *no* weather
      'tomorrow's weather'
   c. Haruki-to no intabyuu
      -with *no* interview
      'an interview with Haruki'

(5c) and (6c), in particular, show that the distributions of *de/no* are wider than that of *'s* in English. Given this, Kitagawa and Ross (1982) hypothesized that *de* and *no* are general modifying markers and proposed the following insertion rule to account for their distributions:

(7) Mod-Insertion
   $[_{NP} \ldots XP\ N^{\alpha}] \rightarrow [_{NP} \ldots XP\ Mod\ N^{\alpha}]$, where Mod = *de/no*.

This rule inserts *de/no* after any constituent that is a sister of a projection of N.

However, it is also known that there are differences in the contexts where *de* and *no* appear. One case, noted by Kitagawa and Ross (1982), is when the XP in (7) is a relative clause. *De* is obligatory after a relative clause while *no* is never premitted in this position, as shown in (8)–(9).

(8) *Chinese*
[wo zuotian kanjian] *(de) ren
I yesterday see *de* person
'the person I saw yesterday'

(9) *Japanese*
[watasi-ga kinoo mita] (*no) hito
I -NOM yesterday saw *no* person
'the person I saw yesterday'

As (7) has no specification on XP, it predicts the Chinese pattern. Kitagawa and Ross (1982) postulate the following Japanese-particular Mod-deletion rule to account for non-occurrance of *no* after relative clauses:[1]

(10) Mod-Deletion (Japanese)
$[_{NP} \ldots XP(+tense)\ Mod\ N^{\alpha}] \rightarrow [_{NP} \ldots XP(+tense)\ N^{\alpha}]$, where Mod = *no*.

Another context where the distributions of *de* and *no* differ is when a noun is quantified by a numeral. As already shown in (3)–(4), *no* appears after *numeral + classifier* but *de* does not. The examples are repeated in (11)–(12).[2]

[1] One can parameterize the formulation of (7) as in (i) for Japanese and obtain the same effect.

(i) $[_{NP} \ldots XP(-tense)\ N^{\alpha}] \rightarrow [_{NP} \ldots XP(-tense)\ Mod\ N^{\alpha}]$, where Mod = *no*.

It is not obvious why tense should be relevant for the distribution of *no*. An anonymous reviewer points out that the effect may be morphological because *no* shows up in examples like (ii), where tense is arguably covert.

(ii) [Taroo-ga syuzinkoo] no monogatari
-NOM protagonist *no* story
'a story in which Taroo is the protagonist'

We leave this question open.

[2] The situation with Chinese is slightly more complex. Cheng and Sybesma (1998) make a distinction between genuine classifiers and ''massifiers,'' which are measure words such as *bei* 'cup' and *bang* 'pound'. Notably, the latter can be followed by *de,* as shown in (i).

(i)a. san-bei (de) shui
three-cup *de* water
'three cups of water'
b. san-bang (de) rou
three-pound *de* meat
'three pounds of meat'

The examples discussed in the text all involve genuine classifiers.

(11) *Chinese*
san -ben (*de) shu
three-CL *de* book
'three books'

(12) *Japanese*
san -satu *(no) hon
three-CL *no* book
'three books'

In addition, *no* follows nominal adjuncts and apparently licenses them, as in (13), while *de* never appears in this context, as (14) shows.

(13) *Japanese*
a. ame no hi
rain *no* day
'rainy day'
b. gakusei no hito
student *no* person
'a person who is a student'

(14) *Chinese*
a.*yu de tian
rain *de* day
'rainy day'
b.*xuesheng de ren
student *de* person
'a person who is a student'

Chinese would employ compounds or relative clauses to express (14), as shown in (15).

(15) *Chinese*
a. yu -tian
rain-day
b. [shi xuesheng] de ren
be student *de* person

In the following section, we examine N′-ellipsis in Chinese and Japanese and argue that *no* is a contextual Case marker, as in Kitagawa and Ross's (1982) analysis, while *de* is a D head, as proposed by Simpson (2003). We show that this explains the differences between *de* and *no* noted in this section.

3 The grammatical status of *de* and *no*

The argument based on N′-ellipsis that *no* is a contextual Case marker is already presented in Saito and Murasugi (1990). We summarize this in the following

subsection. Then we present our argument for the analysis of *de* as D in Sect. 3.2. Finally, we discuss the structure of Chinese relative clauses in Sect. 3.3.

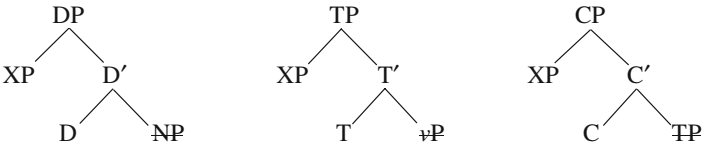
3.1 *No* as a contextual Case marker

Let us briefly discuss the general properties of N′-ellipsis before we examine the relevant Japanese data. As noted in Jackendoff (1971), N′-ellipsis is possible only when it strands a genitive phrase. Thus, the following contrast obtains:

(16)a. I have read Bill's book, but I haven't read [$_{DP}$ John's [$_{NP}$ ~~book~~]]
b. *I have edited a book, but I haven't written [$_{DP}$ a [$_{NP}$ ~~book~~]]
c. *I have seen the book, but I haven't had a chance to read [$_{DP}$ the [$_{NP}$ ~~book~~]]

Saito and Murasugi (1990), and Lobeck (1990) consider this an instance of a wider generalization that is observed in three well-known deletion phenomena, namely, N′-ellipsis, VP-ellipsis, and sluicing. These deletion phenomena all involve functional heads (D, T, C) and in each case, the deletion of the complement is allowed only when the Spec position is filled.[3] This is illustrated in (17).

(17) a. *N'-ellipsis* b. *VP-ellipsis* c. *Sluicing*



Thus, the so-called N′-ellipsis is NP-deletion within DP, and it is licensed only when a genitive phrase occupies the DP Spec position. Sluicing is TP-deletion within CP, and it takes place only when a Wh-phrase moves into CP Spec. Contrasts of the following kind, noted by Ross (1969), exemplify this generalization:

(18)a. John bought something, but I don't know [$_{CP}$ what [$_{TP}$ ~~he bought *t*~~]]
b. *John insisted that he turned in his homework, but I wasn't sure [$_{CP}$ whether [$_{TP}$ ~~he turned in his homework~~]]
c. *John insisted that he turned in his homework, and Bill reported to Mary [$_{CP}$ that [$_{TP}$ ~~he turned in his homework~~]]

(18b) does not meet the condition illustrated in (17c) if *whether*, like *that*, is not in CP Spec but is a C head. Similarly, VP-ellipsis is deletion of *v*P within TP, as shown in (17b). This general pattern can be extended to examples like (19), where a numeral appears in an argument position by itself.

[3] More precisely, the works cited propose that the deletion of the complement is allowed only when the Spec agrees with the head.

(19) John bought [$_{QP}$ three [$_{NP}$ books]], and Mary bought [$_{QP}$ five [$_{NP}$ ~~books~~]]

If a numeral occupies the Spec position of the functional head Q, this case also falls under the pattern in (17).[4]

Saito and Murasugi (1990) examine the noun phrase structure in Japanese on the basis of the generalization on N′-ellipsis illustrated in (17a). There is a complication in this language because it is not obvious what phrase occupies the DP Spec position. In English, we know that a genitive phrase is in DP Spec. But the distribution of *no*, which corresponds to *'s* in many cases, is wider than the English genitive, as noted above. For example, a Japanese noun phrase can contain multiple *no*-phrases, as shown in (20).

(20)a. yuubokumin no tosi no hakai
nomads *no* city *no* destruction
'the nomads' destruction of the city'
b. Taroo no Yooroppa-e no ryokoo
no Europe -to *no* trip
'Taroo's trip to Europe'

Are the *no*-phrases all in DP Spec or just some of them? Saito and Murasugi argue that N′-ellipsis provides an answer to this question.

It seems that Japanese allows N′-ellipsis sometimes but not always in similar contexts. Thus, (21a–b) contrast sharply with (22a–b).[5]

(21)a. [Taroo no taido] -wa yoi ga, [Hanako no ~~taido~~] -wa yokunai
no attitude-TOP good though *no* attitude-TOP good-not
'Though Taroo's attitude is good, Hanako's isn't.'
b. [Rooma no hakai] -wa [Kyooto no ~~hakai~~] -yorimo hisan datta
Rome *no* destruction-TOP *no* destruction-than miserable was
'Rome's destruction was more miserable than Kyoto's.'

(22)a. *[Hare no hi] -wa yoi ga, [ame no ~~hi~~] -wa otikomu
clear *no* day-TOP good though rain *no* day-TOP feel-depressed
'Clear days are OK, but I feel depressed on rainy days.'
b. * Taroo-wa iti -niti-ni [san -satu no hon] -o yomu ga,
-TOP one-day-in three-CL *no* book-ACC read though
Hanako-wa [go -satu no ~~hon~~] -o yomu
-TOP five-CL *no* book-ACC read
'Taroo reads three books in a day, but Hanako reads five.'

(21a–b) are fine with or without ellipsis, but ellipsis makes (22a–b) ungrammatical.

[4] This generalization on ellipsis remains to be explained. See Richards (2003) for an attempt to derive it from the mechanism of linearization. Unfortunately, it requires further work to make his proposal compatible with the discussion in this paper.

[5] See Saito and Murasugi (1990) for detailed discussion of these and other relevant examples. As noted there, there is a homonym *no*, which corresponds roughly in meaning to the pronoun *one* in English, and it is necessary to construct examples that exclude this interpretation of *no* in order to pinpoint the possible contexts for N′-ellipsis.

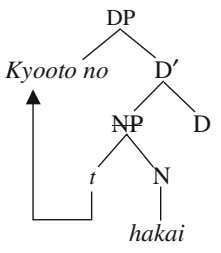
The comparison of (21a–b) and (22a) leads us to a clear generalization. The stranded *no*-phrase is a subject in (21a) and an object in (21b). That is, they are arguments. In (22a), on the other hand, *ame* 'rain' is an adjunct. The generalization, then, is that *argument* + *no* licenses the ellipsis of the following material, but *adjunct* + *no* does not. And there is indenpendent suggestive evidence that arguments can move to DP Spec, but adjuncts cannot. Thus, (23a) contrasts with (23b).

(23)a. [$_{TP}$ John seemed yesterday [$_{TP}$ *t* to be sick]]
b. *[$_{TP}$ Yesterday seemed *t* [$_{CP}$ that John was sick]]
(cf. [$_{TP}$ It seemed yesterday [$_{CP}$ that John was sick]])

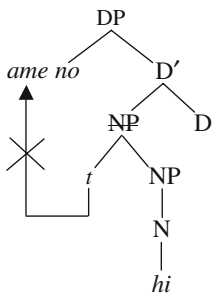
These examples show that an argument can move to TP Spec to satisfy the EPP requirement of T while an adjunct cannot. This is not surprising because if an adjunct is raised to TP Spec, the movement will be an improper movement from an A′-position to an A-position. And this naturally extends to movement to DP Spec as well.

The contrast between (21a–b) and (22a), then, is what we expect. In (21b), for example, *Kyooto*, being an object, can move to DP Spec and license the deletion of NP, as shown in (24a).

(24) a.



b.



Ame in (22a), on the other hand, cannot move to DP Spec because it is an adjunct. Hence, the example cannot satisfy the licensing configuration of N′-ellipsis in (17a). This is illustrated in (24b). Thus, N′-ellipsis in Japanese follows the general pattern in (17).

The grammatical examples in (25) appear to be problematic for the analysis just presented.

(25)a. [Kyoo no ondo] -wa [kinoo no ~~ondo~~] -yorimo takai
today *no* temperature-TOP yesterday *no* temperature-than high
'Today's temperature is higher than yesterday's.'
b. [Kyoo no Bagudaddo no bakugeki]-wa
today *no* Baghdad *no* bombing -TOP
[kinoo no ~~Bagudaddo no bakugeki~~]-yorimo nagaku tuduita
yesterday *no* Baghdad *no* bombing -than long continued
'Today's bombing of Baghdad continued longer than yesterday's.'

If *kinoo* 'yesterday' in these examples is an adjunct, it should not be able to move to DP Spec, and hence the N′-ellipsis should be illicit. However, the following English examples show that temporal and locative phrases can appear in DP Spec:

(26)a. yesterday's temperature
b. last year's protest against war
c. Taipei's weather

Anderson (1983) argues that temporal and locative phrases can be base-generated in the Spec position as ''extended possessors'' at least when the head noun is concrete. We assume here that those phrases, generally, can be merged directly at DP Spec.[6] (25a–b), then, are correctly predicted to be grammatical.

The analysis of N′-ellipsis discussed above has implications for the status of *no* and numerals within Japansese noun phrases. Let us first consider the distribution of *no*. According to the analysis presented, *ame* 'rain' in (13a), repeated below as (27), cannot move to DP Spec because it is an adjunct, and this is the reason why N′-ellipsis is illicit in (22a).

(27) ame no hi
rain *no* day
'rainy day'

But (27) is grammatical as it is. Thus, *ame* must be able to appear within NP (as opposed to DP), accompanied by *no*. It follows that *no*-marked phrases are not necessarily in DP Spec and that *no* serves as a ''modifying marker'' within NP. That is, Kitagawa and Ross's (1982) Mod-Insertion rule correctly accounts for the distribution of *no*.[7] Note that (25b) provides an additional piece of evidence that *no* is inserted within NP as a contextual Case marker. In this example, the temporal phrase *kinoo* 'yesterday' is in DP Spec and licenses N′-ellipsis. On the other hand, the object *Bagudaddo* 'Baghdad' remains within NP and is elided with the head noun. The structure of this DP is shown in (28b), together with its antecedent for deletion in (28a).

(28)a. [$_{DP}$ kyoo no [$_{NP}$ Bagudaddo no bakugeki]]
today *no* Baghdad *no* bombing
b. [$_{DP}$ kinoo no [$_{NP}$ ~~Bagudaddo no bakugeki~~]]
yesterday *no* Baghdad *no* bombing

[6] A piece of evidence for this is presented in Sect. 3.2 below.

[7] Or the revised formulation of the rule in Fn 1. If possessors as in (2a), repeated below in (i), and temporal and locative phrases are merged directly at DP Spec as suggested in the text, *no*-insertion should apply in the projections of D as well as N, as proposed in Saito and Murasugi (1990).

(i) Haruki no kuruma
no car
'Haruki's car'

This clearly indicates that an object with *no* need not be in DP Spec but can be within NP.

Second, the ungrammaticality of (22b), repeated in (29), suggests that numerals are adjuncts within Japanese noun phrases.

(29) *Taroo-wa iti -niti-ni [san -satu no hon] -o yomu ga,
-TOP one-day-in three-CL *no* book-ACC read though
Hanako-wa [go -satu no ~~hon~~] -o yomu
-TOP five-CL *no* book-ACC read
'Taroo reads three books in a day, but Hanako reads five.'

If *go-satu* 'five-CL' is in DP Spec or QP Spec, N′-ellipsis should be allowed exactly as in the English (19), repeated in (30).

(30) John bought [$_{QP}$ three [$_{NP}$ books]], and Mary bought [$_{QP}$ five [$_{NP}$ ~~books~~]]

(29), then, shows that *numeral + classifier + no* is not in a Spec position. On the other hand, if it is an adjunct and is adjoined to a projection of N, (29) is correctly predicted to be ungrammatical. Like *ame* 'rain' in (22a), it cannot move to a Spec position, and hence (29) fails to meet the licensing condition on ellipsis. Thus, the contrast between (29) and (30) indicates that numerals occupy different positions in Japanese and English.

We have shown in this section that Japanese follows the general conditions on A-movement and ellipsis. Its language-specific properties include the *no*-insertion rule, which determines the distribution of *no* as a contextual Case marker. Another related peculiarity of the language is that *numeral + classifier* is licensed by *no* as an adjunct to a projection of N. These properties of Japanese are responsible for the pattern of N′-ellipsis it exhibits. In the following subsection, we turn to the Chinese *de* and argue that it is quite unlike *no* and is a D.

3.2 *De* as the head of DP

Simpson (2003) proposes that *de* is D in his pursuit of the antisymmetry analysis of Chinese relative clauses. In this section, we present two pieces of direct evidence for this proposal.

First, recall that *de*, unlike Japanese *no*, can never follow a nominal adjunct. The relevant examples in (14) are repeated below in (31).

(31)a. *yu de tian
rain *de* day
'rainy day'
b. *xuesheng de ren
student *de* person
'a person who is a student'

This fact follows directly if *de* is D and the phrases that precede *de* are in DP Spec. It was shown in the discussion of Japanese N′-ellipsis that adjuncts, as opposed to arguments, cannot move to the DP Spec position. Thus, (31a–b) are excluded by the illicit movement of *yu* 'rain' and *xuesheng* 'student' to DP Spec.

Secondly, both Chinese and Japanese allow multiple *de*/*no* phrases within a single nominal projection, as shown in (32) and (33), but the two languages exhibit a difference here as well.

(32) *Chinese*
a. Zhangsan de Chiaomusiji de shu
de Chomsky *de* book
'Zhangsan's book by Chomsky'
b. qu-nien liu-yue de xuesheng de kangyi
last-year June *de* student *de* protest
'last June's protest by the students'

(33) *Japanese*
a. Taroo no Tyomusukii no hon
no Chomsky *no* book
'Taroo's book by Chomsky'
b. kyonen roku-gatu no gakusei no koogi
last-year June *no* student *no* protest
'last June's protest by the students'

In Japanese, two arguments can appear with *no*. The subject and the object are both followed by *no* in (34).

(34) yabanzin no Rooma no hakai
barbarian *no* Rome *no* destruction
'the barbarians' destruction of Rome'

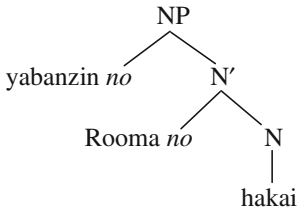
On the other hand, Chinese does not allow multiple arguments with *de*. (35a–b) are grammatical, but the Chinese counterpart of (34) in (36a) as well as its variant in (36b) are not.

(35)a. Luoma de huimie
Rome *de* destruction
'Rome's destruction'
b. manzu de huimie
barbarian *de* destruction
'the barbarians' destruction'

(36)a. *manzu de Luoma de huimie
barbarian *de* Rome *de* destruction
'the barbarians' destruction of Rome'
b. *Luoma de manzu de huimie
Rome *de* barbarian *de* destruction
'Rome's destruction by the barbarians'

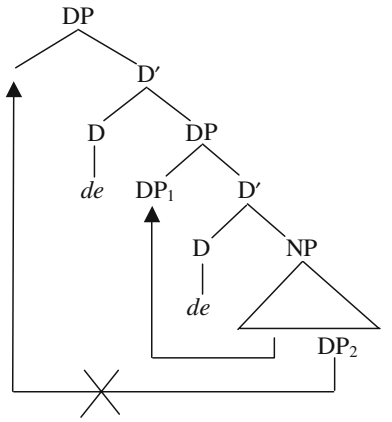
The Japanese pattern in (34) is expected given our discussion in the preceding section. Since *no* is a contextual Case marker, it can be inserted after the subject and the object, as in (37).[8]

(37)



So why are the Chinese (36a–b) ungrammatical? Again, the hypothesis that *de* is D readily provides an explanation. Given this hypothesis, those examples are derived as in (38).

(38)



The movement of DP_2 to the higher DP Spec necessarily takes place across the lower DP Spec occupied by DP_1. The movement violates minimality, and (36a–b) fail to be generated.

Note that (32a–b) are predicted to be grammatical as long as Chinese allows DP recursion. We assumed above in the discussion of Japanese N′-ellipsis that possessors as well as temporals and locatives can be directly merged at DP Spec. Given this, *qu-nien liu-yue* 'June, last year' in (32b), for example, can be merged at the

[8] The subject may then move to DP Spec because it is an argument. This is confirmed by the following example of N′-ellipsis:

(i) [Gakusei no seihu no hihan] -wa [kyooin no ~~seihu no hihan~~] -yorimo
student *no* government *no* criticism-TOP faculty *no* government *no* criticism-than
kibisii
severe
'The students' criticism of the government is more severe than the professors'.'

higher DP Spec without violating any constraint on movement. Thus, the contrast between (32a–b) and (36a–b) is correctly captured.

We have shown so far that the analysis of *de* as D enables us to explain two differences between Chinese and Japanese; one concerns adjuncts, and the other concerns multiple arguments. The analysis is also consistent with the data on N′-ellipsis in Chinese. If *de* is D and the phrase preceding *de* is in DP Spec, we predict that the material following *de* can always be elided. This is so because the configuration for N′-ellipsis in (17a) is satisfied. The prediction is borne out by the following examples:

(39)a. [Zhangsan de che] bi [Lisi de ~~che~~] geng gui
de car compare *de* car more expensive
'Zhangsan's car is more expensive than Lisi's.'

b. [Luoma de huimie] bi [Bali de ~~huimie~~] geng canlie
Rome *de* destruction compare Paris *de* destruction more disastrous
'Rome's destruction was more disastrous than Paris's.'

c. [Taipei de jiaotung] bi [Dongjing de ~~jiaotung~~] geng luan
de traffic compare Tokio *de* traffic more messy
'Taipei's traffic is worse than Tokyo's.'

There are two more differences between *de* and *no* to be accounted for. One is that only the former appears after relative clauses. This is taken up in the following subsection. The other is that *no* is required but *de* is disallowed after numerals. The relevant examples in (11) and (12) are repeated in (40) and (41).

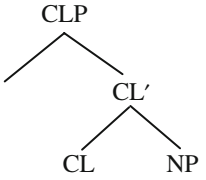
(40) *Chinese*
san -ben (*de) shu
three-CL *de* book
'three books'

(41) *Japanese*
san -satu *(no) hon
three-CL *no* book
'three books'

We examine this difference in the remainder of this subsection.

Again, the Japanese pattern is correctly predicted by Kitagawa and Ross's (1982) Mod-Insertion rule. The case to be accounted for is the absence of *de* in (40). It is a standard assumption by now in the literature on Chinese noun phrases that a classifier heads its own projection and takes an NP complement, as in (42).

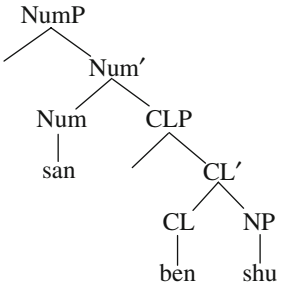
(42)



The hypothesis was proposed by Tang (1990), and supporting arguments are provided by Cheng and Sybesma (1999) and Li (1999), among others. The absence of *de* in (40) in fact constitutes a straightforward piece of evidence for this hypothesis. *San-ben* 'three-CL' cannot be in DP Spec since if it were, it should be followed by the D head *de*. On the other hand, if a classifier is an independent head within DP, we correctly predict the absence of *de*.

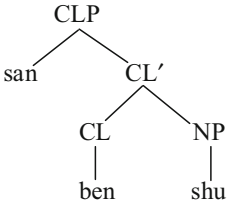
There are two possibilities for the position of the numeral *san* 'three'. Cheng and Sybesma (1999) hypothesize that the numeral is also a head. The structure of (40) is then as in (43), where *Num* stands for *Number*.

(43)



An alternative would be to place the numeral in the Spec position of CLP, as in (44).

(44)



Under either analysis, the numeral and the classifier do not form a constituent. And there is indirect evidence that this aspect of the analysis is in fact correct. Note first that *san-satu* 'three-CL' in the Japanese (41) is an adjunct to the noun *hon* 'book' and hence is a constituent. It is then not surprising that it can appear independently in a position not adjacent to the noun, as shown in (45b).[9]

(45)a. Taroo-wa san -satu no hon -o katta
-TOP three-CL *no* book-ACC bought
'Taroo bought three books.'
b. San -satu, Taroo-wa hon -o katta
three-CL -TOP book-ACC bought

There is no parallel phenomenon in Chinese, as the total ungrammaticality of (46b) indicates.

[9] This is the widely discussed ''quantifier float'' phenomenon in Japanese. See, for example, Miyagawa (1989) and Kawashima (1998) for detailed discussion of the relevant facts. The former argues that ''floating quantifiers'' are secondary predicates and are licensed by predication.

(46)a. Zhangsan mai-le san -ben shu
buy-PERF three-CL book
'Zhangsan bought three books.'
b. *San -ben, Zhangsan mai-le shu
three-CL buy-PERF book

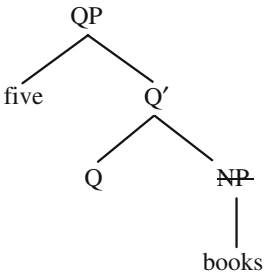
This is what we expect given the structures in (43) and (44). Since the numeral and the classifier do not form a constituent, they cannot be ''displaced.''

Ellipsis provides suggestive data that distinguish between (43) and (44). Recall the account for the English (19), repeated below as (47).

(47) John bought [$_{QP}$ three [$_{NP}$ books]], and Mary bought [$_{QP}$ five [$_{NP}$ ~~books~~]]

We suggested above that this example satisfies the context for ellipsis, as in (48).

(48)



Q is a functional head, and its complement can be elided when its Spec position is filled. And we argued in Sect. 3.1 that the Japanese counterpart of (47) is ungrammatical because *numeral* + *no* in Japanese is an adjunct and consequently cannot occupy a Spec position. The exact Japanese counterpart of (47) is shown in (49).

(49) *Taroo-wa [san -satu no hon] -o katta ga, Hanako-wa
-TOP three-CL *no* book-ACC bought though -TOP
[go -satu no ~~hon~~] -o katta
five-CL *no* book-ACC bought
'Taroo bought three books, but Hanako bought five.'

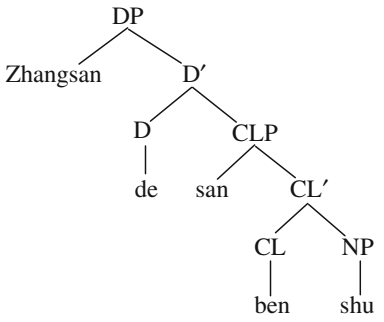
Interestingly, Chinese patterns with English in this respect. The Chinese counterpart of (47) is grammatical.

(50) Suiran Zhangsan mai-le [san -ben shu], dan Lisi mai-le
though buy-PERF three-CL book but buy-PERF
[wu -ben ~~shu~~]
five-CL book
'Zhangsan bought three books, but Lisi bought five.'

This is straightforwardly explained with the structure in (44). CL is the relevant functional category, and its complement NP can be elided because the numeral occupies the Spec position. We tentatively conclude then that the Chinese noun phrase structure is as in (51).[10]

(51)a. Zhangsan de san -ben shu
de three-CL book
'Zhangsan's three books'

b.



3.3 Remarks on the structures of relative clauses

In this subsection, we discuss the last difference in the distributions of *de* and *no*: the former appears after relative clauses, but the latter does not. The relevant examples in (8) and (9) are repeated below in (52) and (53).

(52) *Chinese*
[wo zuotian kanjian] *(de) ren
I yesterday see *de* person
'the person I saw yesterday'

(53) *Japanese*
[watasi-ga kinoo mita] (*no) hito
I -NOM yesterday saw *no* person
'the person I saw yesterday'

[10] The conclusion is tentative because there are other possible structures that can accommodate the ellipsis data. For example, we could maintain the number projection with a null head and place the numeral in its Spec position, as in (i).

(i) [$_{\text{NumP}}$ san [$_{\text{Num}}$ [$_{\text{Num}}$ *e*] [$_{\text{CLP}}$ [$_{\text{CL}}$ ben] [$_{\text{NP}}$ shu]]]]

Then, if CL adjoins to Num, the ellipsis can be analyzed as deletion of CLP within the Num projection. (i) is basically the structure Li (1999) proposes; she places the numeral in NumP Spec and reserves the Num head position for the plural marker *-men*. In addition, it is, as far as we can tell, consistent with the proposal in Cheng and Sybesma (1999) to account for the distribution of indefinite noun phrases in terms of the licensing of null Num heads.

We first argue that relative clauses in Chinese are in DP Spec and hence that the occurrence of *de* in (52) is indeed expected. Then, we briefly review Simpson's (2003) antisymmetry analysis of Chinese relatives, which yields the desired structure. Finally, we note some loose ends in the analysis that need to be tightened.

Let us briefly discuss the Japanese (53) before we start the examination of Chinese relative clauses. As noted in Sect. 2, *no* is inserted only after a [-tense] constituent. This is reflected in the Mod-Insertion rule for Japanese stated in Fn 1. Although this is a stipulation, it straightforwardly accounts for the absence of *no* after relative clauses. Furthermore, relative clauses are adjuncts according to the traditional analysis. The analysis works well for Japanese. Adjuncts cannot move to DP Spec as we have seen repeatedly, and this indeed seems to be the case with Japanese relative clauses. Let us consider the following illicit example of N′-ellipsis:

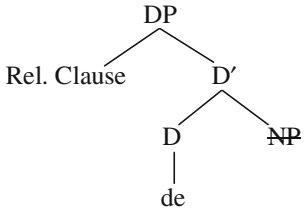
(54) *[[Taroo-ga kinooo atta] hito] -wa yasasii ga,
-NOM yesterday saw person-TOP kind though
[[Hanako-ga kinoo atta] ~~hito~~] -wa kowai
-NOM yesterday saw person-TOP scary
'The person Taroo saw yesterday is kind, but the person Hanako saw yesterday is scary.'

The relative clause *Hanako-ga kinoo atta* 'Hanako saw yesterday', being an adjunct, cannot move to DP Spec, and hence this example fails to satisfy the condition for N′-ellipsis.

The situation in Chinese is more complex and interesting. If Chinese relative clauses are also adjuncts, they cannot move to DP Spec. But since they are followed by *de*, they must be in DP Spec if *de* is D as we argued. Thus, we have an apparent contradiction. Let us sort out this problem by first examining whether Chinese relative clauses are in DP Spec or not.

If Chinese relative clauses are in DP Spec, then the Chinese counterpart of (54) should be grammatical. This is so since the example would satisfy the condition for N′-ellipsis, as illustrated in (55).

(55)



And this prediction is indeed borne out by (56).

(56) [[Wo zuotian kanjian] de nanhai] bi [[ni zuotian kanjian]
I yesterday see *de* boy than you yesterday see
de ~~nanhai~~] geng youqian
de boy more rich
'The boy I saw yesterday is richer than the boy you saw yesterday.'

Thus, we have good evidence that Chinese relative clauses are in DP Spec. Relative clauses after all do not pose a problem for our analysis of *de* as D.

The remaining question is how those relative clauses come to occupy the DP Spec position. Here Simpson's (2003) antisymmetry analysis readily provides an answer. Kayne (1994) proposes a uniform base for N-initial and N-final relative clauses. According to his theory, the English (N-initial) example in (57a) is derived as in (57b).

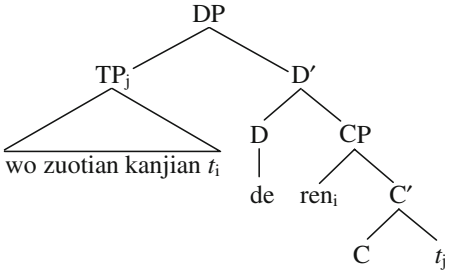
(57)a. the book that John bought yesterday
b. $[_{DP}\ [_{D}$ the$]\ [_{CP}$ book$_i$ $[_{C'}\ [_{C}$ that$]\ [_{TP}$ John bought t_i yesterday$]]]]$

A relative clause has a D-CP structure, and the head noun directly moves into CP Spec. N-final relatives are derived with one more step. That is, the TP moves into DP Spec, as illustrated in (58).

(58) $[_{DP}\ [_{TP}$ John bought t_i yesterday$]_j\ [_{D}$ the$]\ [_{CP}$ book$_i$ $[_{C'}$ C $t_j]]]$

Simpson (2003) argues that this is the correct way to analyze relative clauses in Chinese, based on the assumption that *de* is D. The structure of (52) is then as in (59).

(59)



As far as we can see, this analysis still needs some refinements. First, an issue could arise with respect to the unbound trace t_i in (59). Furthermore, the movement of TP to DP Spec apparently violates minimality. However, we believe that there are ways to approach these problems that are not implausible. For example, it is possible that the relative head is directly merged at CP Spec and binds *pro* in the relative clause.[11] For the minimality problem, it is suggested in Lin et al. (2001) that *de* originates in C and moves to D, making CP Spec and DP Spec ''equidistant'' for TP in the sense of Chomsky (1993). This suggestion is based on Hsieh's (1998) proposal that there is a homophone *de* which appears as C in cleft sentences and also in simple sentences such as (60).[12]

[11] See Murasugi (2000) for much relevant discussion on this possible analysis.

[12] If Chinese is consistently head-initial, the TP in (60) must have raised from the complement position of *de* to a higher Spec position.

(60) Laowang yinggai qu Taipei de
should go *de*
'Laowang should go to Taipei'

In this example, *de* simply stands for mood that has the connotation of affirmation. Although the role of ''equidistance'' in derivations is far from clear at this point, as noted in Chomsky (1995), it may still be possible to solve the problem by refining the formulation of minimality.

It is beyond the scope of this paper to pursue a precise analysis of Chinese relative clauses. But we have argued that they are indeed in DP Spec, and we hope to have shown that Simpson's (2003) antisymmetry analysis is a promising possibility for the explanation of this fact. On the other hand, the comparison of Chinese and Japanese suggests that Kayne's theory of N-final relatives cannot be maintained for the latter. The theory places TP in DP Spec, as illustrated in (58), and this is exactly what we want for Chinese. In this language, N′-ellipsis can strand a relative clause, as in (56). If Japanese relative clauses, being also N-final, are derived in the same way, we would expect the language to exhibit the same pattern as Chinese. But (54) shows that this is not the case. Our discussion thus suggests that the traditional head-final analysis should be maintained for Japanese.[13]

4 Concluding remarks

We have argued that noun phrases in Chinese and Japanese are quite different in their internal structures. Although *de* and *no* appear to have similar distributions, we have shown that only the latter is a modifying marker in the sense of Kitagawa and Ross (1982), presenting evidence that the former is D. Both Chinese and Japanese are known to be classifier languages. But we have argued that a classifier in Chinese occupies a head position in the nominal structure while *numeral* + *classifier* in Japanese is an adjunct. Finally, relative clauses are in DP Spec in Chinese and are adjuncts in Japanese. Most of our arguments were based on the distributions of *de* and *no* and the patterns of N′-ellipsis the two languages exhibit.

Our proposal can be made clearer by contrasting it with an alternative proposed in the literature. Before we conclude this paper, we would like to briefly consider Watanabe's (2006) analysis of Japanese. We start with the discussion of Simpson's (2005) analysis of Thai because it employs massive movements similar to the ones used by Watanabe.

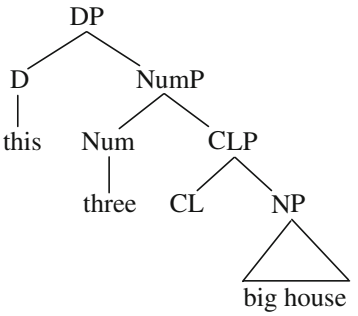
Simpson first postulates the structure in (61b) for the Chinese (61a), assuming that a demonstrative is D.

[13] The straightforward conclusion that is drawn from this is that the head-parameter is an indispensable part of UG (Universal Grammar; see Chomsky (1965, 1981, 1995)). Another possibility, if we maintain Kayne's theory, is that Japanese relative clauses are not relative clauses. This is pursued in Murasugi (2000), where it is suggested that Japanese relative clauses are pure complex NPs and hence, are adjoined to a projection of N instead of having the structure in (58).

(61) *Chinese*

a. zhe san zuo da fangzi
this three CL big house
'these three big houses'

b.



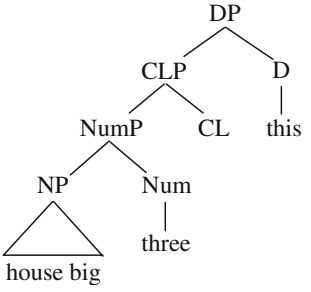
Then he argues that the Thai example in (62) has an identical base structure.

(62) *Thai*

baan yai saam lang nii
house big three CL this

The word order in (62) is different from the Chinese (61). As Thai noun phrases are assumed to be head-final, it is tempting to assign the following structure to the example:

(63)

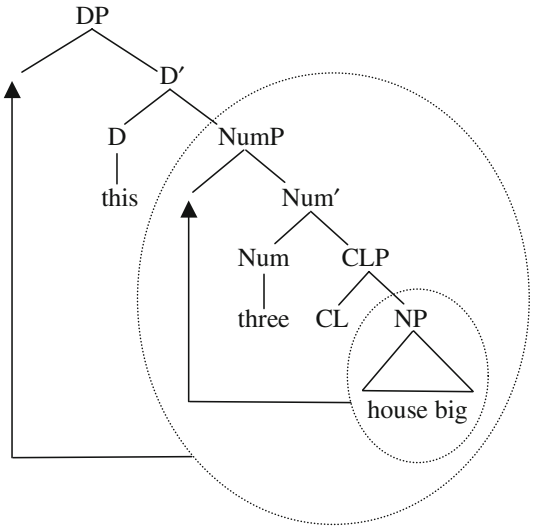


However, Simpson points out that the dominance relation between CLP and NumP in (63) is inappropriate. The classifier should classify not 'three big houses' but just 'big houses'. To put it differently, the NP should first be individuated by the classifier and then be assigned a number. Hence the NumP should dominate the CLP.

Given this, Simpson assigns the same base structure to the Thai (62) as the Chinese (61) and proposes to derive the surface order by movement. That is, starting

from (61b), the NP moves to NumP Spec, and then the NumP moves into DP Spec. This yields the surface word order in (62), as illustrated in (64).

(64)



Simpson thus accounts for the word order variation with a uniform base structure and extensive movement.

Watanabe (2006), on the other hand, is concerned mainly with word order variation internal to Japanese. As shown in (65), a numeral modifying an argument can appear in various positions within a sentence.

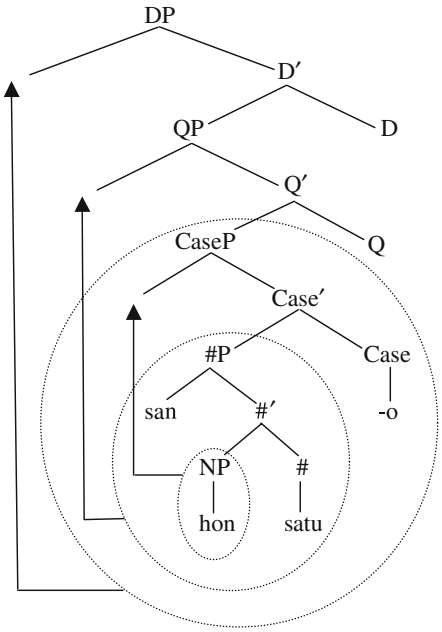
(65)a. Taroo-wa hon san -satu-o katta
-TOP book three-CL -ACC bought
'Taroo bought three books.'
b. Taroo-wa san -satu no hon -o katta
-TOP three-CL *no* book-ACC bought
c. Taroo-wa hon -o san -satu katta
-TOP book-ACC three-CL bought

(65b) is what we have been dealing with, and (65c) is an instance of ''quantifier float'' alluded to in Fn 9. (45b), repeated below as (66), is derived from (65c) by scrambling *san-satu* 'three-CL' to the sentence-initial position.

(66) San -satu, Taroo-wa hon -o katta
three-CL -TOP book-ACC bought
'Taroo bought three books.'

In addition, *numeral* + *classifier* can be preceded by the associate noun and be followed by a Case marker, as in (65a). Watanabe proposes to derive all three word orders from a uniform base, as in (67).

(67)



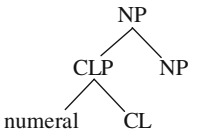
(65a) is derived when the NP moves to CaseP Spec. Next, (65b) obtains with further movement of #P to QP Spec. Finally, when CaseP moves to DP Spec, we have the word order in (65c).

Watanabe's analysis not only relates the three possible word orders in Japanese but also raises the possibility that noun phrase structure is uniform across languages. Although (67) is different from the structure Simpson posits for Chinese and Thai, the similarity is striking. The analysis, however, does not seem compatible with the data discussed in this paper. Aside from the fact that it is unclear how the distribution of *no* is to be acounted for, we would predict that all sorts of ellipsis are possible with the massive movements to Spec positions in (67). For example, the derivation of (65b) places #P in the Spec position of Q, and this should license the deletion of the complement CaseP, which contains only *hon(-o)* 'book(-ACC)'. But we have seen that this kind of ellipsis is impossible in Japanese, in contrast with English and Chinese. A relevant example in (49) is repeated below in (68).

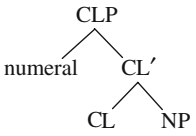
(68) *Taroo-wa [san -satu no hon]-o katta ga, Hanako-wa
-TOP three-CL *no* book-ACC bought though -TOP
[go -satu no ~~hon~~](-o) katta
five-CL *no* book-ACC bought
'Taroo bought three books, but Hanako bought five.'

Our analysis implies that the universality in noun phrase structure is observed at a more abstract level.[14] For example, classifiers are available in human language and are employed in Chinese and Japanese. They can be combined with NPs in two distinct ways: classifiers phrases can serve as adjuncts to NPs, as in (69a), or classifiers can take NPs as their complements, as in (69b).

(69) a.

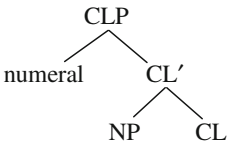


b.



Japanese employs the former option. This is possible in part because the language has the Mod-Insertion rule that licenses classifier phrases as nominal adjuncts with *no*. We suspect that the latter option is not available in Japanese because a classifier has to cliticize to the associated numeral. Since the language is head-final, the intervening NP would block the cliticization, as illustrated in (70).

(70)



This line of reasoning predicts that if a language is head-final and its classifiers are clitics on numerals, then *numeral + classifier* must be employed as adjuncts.

The situation in Chinese is quite different. First, since Chinese is head-initial, the numeral and the classifier are adjacent even if the latter takes an NP complement, as can be seen in (69b). Hence, a classifier can take an NP complement even if it has to

[14] Unlike Watanabe (2006), we do not have a concrete proposal for the analysis of (65a). One complication is that there is significant difference in meaning between the forms in (65a) and (65b), as discussed in detail in Toyama (2008). Thus, (ia) and (ib) contrast in grammaticality.

(i)a. gurando sanzyus-syuu (no tokkun)
field thirty -CL *no* special training
'(a special training of) thirty rounds of the field'

b. *sanzyus-syuu no gurando (no tokkun)
thirty -CL *no* field *no* special training

Similarly, the underlined part of (iia) means '100 pages of a book' while that of (iib) refers to 'a book of 100 pages'.

(ii)a. Taroo-wa hon hyaku-peezi-o yonda
-TOP book 100 -page-ACC read
'Taroo read 100 pages of a book'

b. Taroo-wa hyaku-peezi no hon -o yonda
-TOP 100 -page *no* book-ACC read
'Taroo read a book that is 100 pages long'

See also Okutsu (1984) for detailed discussion on the interpretations of the three forms in (65).

cliticize to the numeral. Furthermore, we have seen that the language does not allow nominal adjuncts within a projection of N. We speculate that this is because those elements require a licenser like *no* in Japanese. That is, since Chinese lacks Mod-insertion, there is no way to license nominal adjuncts within NPs. If the classifier phrase in (69a), being a nominal adjunct, requires a licenser, we have an account for why (69a) is impossible in Chinese and (69b) is the only option for this language.

According to our analysis, Chinese and Japanese employ similar morphemes, but they combine them in different ways. The possible ways to construct noun phrases with those morphemes depend not only on universal principles but also on the value for the head parameter and the presence/absence of licensing mechanism for nominal adjuncts. This, we argued, is the source of the variation observed between Chinese and Japanese.

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