

Research Article

Analyzing Chinese “de” Under Contextual Phase Theory

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Abstract

Chinese “de” plays the role of connecting the modifier and modified element in nominal structures. Different viewpoints about “de” have been argued from the perspective syntax in the literature. However, none of them presents a satisfactory explanation up to now. To solve this problem, we propose, “de” is a functional category with the feature [Nom]. Under contextual phase theory, with the existence of “de”, there is the corresponding projection “DeP”; and without “de”, there is only the projection of NP or ClassifierP and no DeP. This proposal can be illustrated with ellipsis phenomenon and left branch extraction phenomenon in Chinese. In DeP structures, the whole DeP or the complement of DeP can be elided. This is in accordance with ellipsis theory, under which only phase or the complement of phase can be elided. In DeP structures, only the Spec of DeP can be extracted and moved. This is in accordance with left branch extraction requirement, under which only the Spec of phase can be extracted and moved following the rule of successive movement, PIC and anti-locality. The different “de” structures are analyzed one by one from the perspective of ellipsis phenomenon or left branch extraction. Our viewpoint of DeP can explain more “de” structures in Mandarin Chinese.

Keywords

Chinese “de”, DeP, Ellipsis, Left Branch Extraction

1. Introduction of Chinese “de”

“De” is a widely used word in Chinese, but for its category, the agreement has not been reached due to different structures. In Chinese, the generalized form of “de” structure is

X Phrase (XP) +de + Nominal Phrase (NP)

This structure can be divided into several subcategories based on the category of the element before or after “de”, such as

(2) a. pronoun +de1 +noun

b. Wo de shu.

I de (GEN) book.

My book.

(3) a. Adjective+de2+noun

b. Hongse de pingguo.

Red de apple.

Red apples.

(4) a. Noun +de3 + noun

b. Mutou de fangzi.

Wood de house.

Wooden houses.

(5) a. Clause +de4+ noun

b. Wo xihuan de shu.

I like de book.

The book that I like.

(6) a. Noun +de5 +clause

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b. Zhangsan de ceng zaimeiguo liuxue¹ rang ta hen zixin.

Zhangsan de (GEN) ever in America visiting student make him very confident.

Zhangsan's ever visiting student in America makes him confident.

(7) a. Verb+de6+noun

b. Shuijiao de haizi.

Sleep de child.

Sleeping children.

In these structures, XP can be a pronoun, an adjective, a noun, a verb, or a clause. The XP before “de” is the modifier and the NP following “de” is the modified element. “De” plays the role of a linker between the modifier and the modified element. So “de” has been treated as a attributive marker [44], a nominal maker [10], a D category [23, 33, 36], a complementizer [31, 32], or a case maker [19]. But due to the diverse structures of “de”, linguists have not reach an agreement about its functional category, syntactic function, and generating process. So that is the goal for our analysis in this article.

In order to analyze “de” clearly, we label them with de1, de2, de3, de4, de5, de6. De1 is regarded as the possessor “de”. De2/de3 is regarded as the linker between modifier (adjective/noun) and the modified noun. De4 is treated as the focus maker. De5/de6 is regarded as the Complementizer of CP. In this case, “de” is the complementizer, and the structure is

(8) a. CP [_{Spec} Zhangsan_i C de [_{IP} _{Spec} t_i I ceng zaimeiguo liuxue]]

b. CP [_{Spec} woxihuan_i C de [_{IP} t_i shu]]

Among them, the most common usage is the linker de2/de3 inserted between the modifying adjective/noun/pronoun and the modified nouns, such as

(9) meili de hubo

Beautiful de lake.

Beautiful lakes.

As for de1, the possessor “de” is similar to the English possessor “s” or “of”, such as

(10) a. Zhangsan de shouji

Zhangsan de (GEN) cellphone.

Zhangsan's cellphone.

b. John's book.

c. A friend of mine.

In some structures in de1 and de2, “de” can be omitted, and the meaning does not change, such as in (11), (12), and (13). With or without the existence of “de”, the only meaning is “my teacher” in (11) or “my mother” in (12) or “exciting movie” in (13).

(11) a. Wo de laoshi

I de (GEN) teacher.

My teacher.

b. Wo laoshi.

I teacher.

My teacher.

(12) a. wo de mama

I de (GEN) mom.

My mom.

b. wo mama.

I mom.

My mom.

(13) a. Jingcai de dianying

Exciting de movie.

Exciting movie.

b. Jingcai dianying.

Exciting movie.

Exciting movies.

But for some structures, in de1, “de” can't be omitted, such as

(14) a. Ta de diannao

He de (GEN) computer.

His computer.

b. *Ta diannao.

(15) a. Zhangsan de laoshi

Zhangsan de teacher.

Zhangsan's teacher.

b. ?Zhangsan laoshi.

Zhangsan teacher.

Zhangsan's teacher or Zhangsan, the teacher

In the possessor (de1) structure, the first phrase is a pronoun referring to a person such as “wo” (I) in case (11), and the modified noun is an occupation or a kinship such as “laoshi” (teacher) in case (11) or “mama” (mother) in case (12). However, it is not acceptable if the first phrase is a person as in (14) and the second phrase is an item as in (15). The (15a) means the addressing of person with that occupation. It means that his occupation is a teacher, which is very common in Chinese to address a person to show respect. The phrase is ambiguous, whose meaning can be Zhangsan's teacher or Zhangsan being a teacher himself.

Just as we talked about above, in some de2 structures, “de” cannot be omitted either, such as

(16) a. Gao shu

Tall tree.

Tall trees.

b. Yimi gao de shu.

One-meter tall de tree.

One- meter tall tree.

c. *Yimi gao shu.

One-meter tall tree.

(17) a. Hao daxue

Good university.

Good university.

b. Feichang hao de daxue.

Very good de university.

Very good university.

c. *Feichang hao daxue.

Very good university.

In these ungrammatical cases, the modifier is not one ele-

1 This structure can be found in the sentence, Zhangsan de ceng zaimeiguo liuxue rang ta hen zixin. Zhangsan de (GEN) ever in America visiting student make him very confident. Zhangsan's ever visiting student in America makes him confident.

ment, but has other element to modify it. “Gao” (tall) is an adjective. In case (16b/c), it is modified with a noun “yi mi” (one meter), and the “de” cannot be omitted.

In de4/de5/d6 structures, “de” cannot be omitted, either, such as

(18) a. Wo xihuan de shu

I like de book.

The book that I like.

b. Wo xihuan shu.

I like book.

I like books.

If the “de” is omitted, the sentence structure will be changed to an Inflection Phrase (IP) as in (18b), not a nominal phrase any longer.

As we can see, the omission of “de” can be illustrated both in de1/de2/de3 with no changes in meaning, but not in de4/de5/.

Besides the omission of “de” in some structures, in ellipsis structures, the “de” must appear, otherwise, the structure would be ungrammatical, such as

(19) a. Wo xihuan ganren de gushi, ta xihuan youmo de gushi

I like moving de story, he like humor de story.

I like moving stories, and he likes humorous stories.

b. Wo xihuan ganren de gushi, ta xihuan youmo de gushi.

I like moving de story, he like humor de story.

I like moving stories, and he likes humorous stories.

c...., *Ta xihuan youmo de gushi.

He like humor.

In summary, we can find there are different “de” structures to link the modifier and the modified elements. The modifier can be different categories, such as adjectives, nouns, verbs, or clauses. “de” in some structures are necessary and in others as in de1/de2/de3 are optional. “de” has different usages to connect the modifier and the modified elements. With the variety of usages, what should “de” be classified as? A functional category D or a just linker, or another different category?

2. “De” Phrase is Not a DP, NP

2.1. Not DP

Abney [2] proposes the universal Determiner Phrase (DP) hypothesis. Chomsky [11] (p. 263) proposes that a nominal phrase is the projection of a functional category D. The head D of DP is filled with determiners, possessive agreement element and a pronoun. He and Wang [18], Lu [25], Simpson [33], Xiong [41], among others introduce DP to Chinese syntactic study and argue that “de” should be treated as D of DP. According to this hypothesis, “de” is D. But, in fact, Chinese “de” is not possessive agreement element. Chinese is a language lack of inflection element and there is no reason for existence of possessive agreement element. Tang [36] (p. 421) exemplifies that Chinese “de” is different from English

“s” with reasonable cases. For Chinese “de”, it doesn’t belong to any of these three categories. So the DP viewpoint is not well grounded.

Besides Tang’s argument, Aoun & Li [3] provides further evidence that there is no DP in Chinese with relative clause and coordination. Bošković [5, 6], and Despić [14] argue that the presence/absence of the DP projection may serve as a window into language typology; in particular, languages may be classified based on whether a language has the DP projection or not. They argue that in languages without articles there is no DP, with arguments from binding, free word order, and relative clause. Chinese is a language without articles, so in Chinese there is no DP and the viewpoint of “de” being D is not on the right track. In addition, in English, the possessor cannot be located before the determiners, such as

(20) a. *His these books

b. *John’s the book.

The only possible structure is the adjunct element for that possessor, such as

(21) a. These books of his

b. the book of John’s.

The reason is that only three categories can be the head D of DP, the determiner, possessive agreement element, and pronoun. The possessor belongs to the possessive element, and takes the place of D, so it can’t coexist with the determiners in the head of DP. This also proves another rule: There could be one and only one main DP layer in one projection.

But in Chinese, the possessor can be located before the determiners, such as

(22) a. Wo de nage shubao

I de (GEN) that-cl bag.

That bag of mine.

b. ?Nage wode shubao.

That-cl I de bag.

That bag of mine.

(23) a. Wo de jingcai de yanjiang

I de wonder de speech.

My wonderful speech.

b. *Jingcai de wo de yanjiang.

Wonder de I de speech.

My wonderful speech.

(24) a. Wo de lvse de shubao

I de green de bag.

My green bag.

b. *Lvse de wo de bag.

Green de I de bag.

My green bag.

In these structures, we can find the possessor is located before the adjectives or the determiners as in (22a), (32a) (24a). Otherwise the sentence would be a little unacceptable or ungrammatical as in (22b), (23b), (24b).

Following that adjectives are the adjuncts of nouns, possessors must be in different position from the adjectives or demonstratives in the syntactic structures. So “de” is not a D.

2.2. Not NP

In addition to DP viewpoint, another viewpoint is that Chinese nominal phrase is a NP and “de” is just a linker, and “de” doesn’t have its own projection. As we mentioned above, Bošković [6] distinguishes that in languages with articles, the noun phrase are DP, and in languages without articles, the noun phrases are NP or other highest projections. Adjectives are adjuncts of NP. But this viewpoint cannot explain the ellipsis phenomenon in Chinese “de” phrases, for example:

(25) a. Ni xihuan hongse de paoche, haishi lanse de paoche?

You like red de race-car, or blue de race-car.

Do you like red racing cars or blue racing cars?

b. Wo xihuan hongse de paoche.

I like red de race-car.

I like red racing cars.

c. Wo xihuan hongse de paoche.

I like red de race-car.

I like red racing cars.

d. [_{Adjunct} hongse de _{NP} paoche]

According to NP viewpoint, the structure of noun phrases are NP [Adjunct NP]. So the structure in (25c) is (25d). “paoche” is NP and only part of the phase and is not the complement of phase. So it cannot get elided according to the ellipsis rule, under which only phase or complement of a phase can be elided [7]. But, on the contrary, this ellipsis is grammatical, So NP viewpoint is not appropriate.

2.3. DeP Viewpoint

Ning [26], Si [32], Zhang [43] propose that “de” should be treated as a functional category, and has its projection De Phrase (DeP). This DeP then is merged with DP. The whole noun phrase is related to IP. This analysis was under government and binding theory or later Chomsky’s static phase theory. Si’s analysis is from the semantic point of view. Zhang’s analysis is that DeP is the complement of DP. At that time, DP is the universal point of view for noun phrases. They believe that DeP is under DP. This analysis is a little redundant, as Bošković [7] illustrates that there is no DP in languages without articles. There is no necessity for the existence of IP or DP in terms of generating simplicity.

In the literature review, we find that “de” has been treated as D of DP, or just a linker, or head (De) of DeP. These viewpoints has its strength and weakness, and cannot provide a universal explanation for all the “de” structures. So in our analysis, we try to make a new proposal. Under the latest contextual phase theory, we propose that “de” is a functional category and has own projection DeP.

(26) DeP [Spec De [NP]]

In this structure “de” is head of DeP with adjective or pronoun being the Specifier (Spec) of DeP. Different from Huang et al. [20], De is not just a linker between adjectives and nouns. Its existence has its good reasons. With the existence of “de”, the whole “de” structure is definitely a nominal

structure. This “de” has no lexical meaning. We follow Wu [40] and Zhang [43] and that “de” has the formal feature [Nom] which needs to checked with the modifier and the modified element. But different from their viewpoint, we propose that there is no DP involved. DeP is the highest projection of the nominal phrase and is a phase. The modifier is located in the Spec of DeP. We argue this DeP can apply to all the “de” structures in Section 1. If there is no Chinese “de”, there is no projection of DeP, and only NP is generated. The structure is NP [adjunct NP] with adjective being the adjunct.

In the following sections, we will analyze the different structures one by one.

3. Ellipsis Structure

To prove the existence of “DeP”, I will analyze this structure from two aspects, the ellipsis structure and the left branch extraction phenomenon under contextual phase theory following the rule of PIC and anti-locality. Some syntacticians would choose binding as a tool to analyze the status of nominal phrases in Chinese. But as for binding, it is a controversial topic because of existence of long distance binding and the uniqueness of anaphors in Chinese. The uniqueness refers to that the anaphor “ziji” (self) in Chinese can be used alone to refer to a person², which is different from anaphors in other languages. There has not been a consensus viewpoint for binding of anaphors in Chinese. Therefore we choose only ellipsis and left branch extraction as the analyzing tools over binding to analyze the “de” structures in Chinese.

3.1. Contextual Phase Theory

Chomsky [12, 13] propose the phase theory, under which languages are generated phase by phase, with Complementizer Phrase (CP), v Phrase (vP) and DP being phases. According to Chomsky, phases are rigid and static. However, the criteria are not uniform in CP and vP. CP is defined on Force, while vP is defined on thematic roles. Later, based on Chomsky’s phase theory, Bošković [7], den Dikken [15] among others make some amendment and propose that phases are dynamic and are determined by contexts. Bošković [7] proposes that phases are contextual and the highest projection of each lexical category is a phase. Therefore, the highest projection of verb can be vP or AspectP in different contexts, thus vP or AspectP being phase, not necessarily vP being phase. Similarly the highest projection of a noun can be NP, DP, KP, QP or CIP in different contexts, with each being a phase. Based on contextual phase theory, we propose that in Chinese, the highest projection of a noun is not static, and it can be NP, DeP or ClassifierP (CIP) in different contexts. This is also in accordance with Bošković [5] and Bošković and Hsieh [9]. They argue that in languages without articles, NP or

2 For example: zhuyi ziji de yanxing. Pay attention to self de behavior. pay attention to your behavior. In this structure the anaphor “ziji” is used alone and has no antecedent, which is not acceptable in English or other languages.

other highest projection is a phase, and in languages with articles DP is a phase.

Chinese is a language without articles, so NP or other highest projection of the noun is a phase. Therefore we propose in “de” structures, DeP in Chinese is a phase. This can be illustrated with the ellipsis theory and left branch extraction.

3.2. Adjective+de+NP Structure

First, we would like to analyze the adjective+de+noun structure (the de2 structure), as in (27). We can see in these cases the noun can be elided, with only “adjective +de” left, for example:

(27) a. Ni xihuan da de pingguo, haishi xiao de pingguo?

You like big de apple, or small de apple?

Do you like big apples or small apples?

b. Wo xihuan da de pingguo, ta xihuan xiao de pingguo,

I like big de apple, he like small de apple.

I like big apples, and he likes small apples.

c. Wo xihuan da de pingguo, ta xihuan xiao de pingguo,

I like big de apple, he like small de apple.

I like big apples, and he likes small apples.

d. *Wo xihuan da de pingguo, ta xihuan xiao de pingguo.

I like small de apple, he like small de apple.

I like big apples, and he like big apples.

(28) a. Ta xihuan hongse de paoche, wo xihuan lvse de paoche.

He like red de race-car, I like green de race-car.

He likes red racing cars, and I like green racing cars.

b. Ta xihuan hongse de paoche, wo xihuan lvse de paoche.

He like red de race-car, I like green de race-car.

He likes red racing cars, and I like green racing cars.

c. *Ta xihuan hongse de paoche, wo xihuan lvse de paoche.

He like red de race-car, I like green de race-car.

He likes red racing cars, and I like green racing cars.

In these cases, as we can see, if there is “de”, the ellipsis in (27c) and (28b) is acceptable. But if there is no “de” left as in (27d) and (28c), the ellipsis is not grammatical or acceptable.

Jackendoff [21] proposes that N'-ellipsis is possible only when it strands a genitive phrase. Thus, the following contrast obtains:

(29) 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 [29] and Lobeck [24] make some amendment and propose that the deletion of the complement is allowed only when the Spec position is filled.

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

b. John bought something, but I don't know [_{CP} what [_{TP} he bought *t*]]

In (30a), Quantifier (Q) is a functional head of Quantifier

Phrase (QP), and its complement can be elided when its Spec position is filled. In (30b), CP is a phase, “what” takes the position of the SpecCP. So the ellipsis is grammatical.

With the development of theory, Rouveret [28] and Bošković [7] propose that only phase and the complement of phase can be elided, not other elements. In contextual phase theory, the so called N'-ellipsis is NP-deletion within a phase (DeP /DP) and it is licensed only when a genitive phrase occupies the Spec position of phase.

The ellipsis in Chinese nominal phrase can prove the existence of DeP in “de” structures.

(31) a. Ni xihuan da de pingguo, haishi xiao de pingguo?

You like big de apple, or small de apple?

Do you like big apples or small apples?

b. Wo xihuan da de pingguo, ta xihuan xiaode pingguo.

I like da de apples, he like small de apples.

I like big apples, and he likes small ones.

c. $_{VP}[_{Spec} \text{wo } _V \text{xihuan}_i [_{VP} \text{v } t_i \text{DeP } [_{Spec} \text{da } _{De} \text{de } [_{NP} \text{pingguo}]]]]]$

d. $_{VP}[_{Spec} \text{ta } _V \text{xihuan}_i [_{VP} \text{v } t_i \text{DeP } [_{Spec} \text{xiao } _{De} \text{de } [_{NP} \text{pingguo}]]]]]$

In structure (31c), under contextual phase theory, DeP is a phase with “de” being the head, and the adjective “da” (big) being a Spec, and the noun “pingguo” (apple) being the complement of the head “de”. The elided part “pingguo” (apple) is the complement of the phase DeP. This is well in accordance with the ellipsis requirement (only phase and the complement of phase can be elided). So this structure proves that “de” has its own projection and DeP is a phase. Our proposal is well grounded.

If “de” doesn't project and is just a linker, the whole structure will not be DeP, and just a NP would be projected. The structure would be

(32) $_{NP} [_{Adjunct} \text{Da } _{De} \text{ } _{NP} \text{pingguo}]$

Traditionally, there is the viewpoint that adjectives are adjuncts of NP. But for this adjective-adjunct analysis, we cannot explain the ellipsis phenomenon in Chinese as in (31). The whole NP in (32) would be a phase, with the adjective “da” (big) being the adjunct and “de” being just a linker, and NP being part of the phase. In this structure, the noun is elided, and the adjective is left. According to ellipsis theory, only phase and complement of phase can be elided. So this ellipsis is in contradiction with ellipsis requirement. Therefore the adjective in “de” structures cannot be an adjunct. So NP viewpoint is not reasonable. The whole structure should not just be a NP, and therefore “de” is a head and does project DeP. In this structure, the adjective takes the position of the Spec of DeP.

If there is no “de” in this structure, ellipsis cannot work, for example,

(33) a. Ni xihuan da pingguo, haishi xiao pingguo?

You like big apple, or small apple?

Do you like big apples or small apples?

b. *Wo xihuan da pingguo, ta xihuan xiao pingguo.

I like big apples, he like small apples,

I like big apples, and he likes small apples.

- c. $vP[Spec\ v\ [VP\ V\ NP\ [Adjunct\ NP]]]$
 d. $vP[Spec\ wo\ v\ xihuan_i\ [VP\ v\ t_i\ NP\ [Adjunct\ big\ NP\ pingguo]]]$

In this structure, there is no “de”, so no DeP is projected. The whole NP “da pingguo” (big apples) is a phase with the adjective “da” (big) being the adjunct of the phase NP, and the noun “pingguo” (apple) being part of the phase NP. The elided part “pingguo” is only part of a phase, not a whole phase or the complement of a phase, so this structure is not grammatical.

So the existence of “de” plays an important role in ellipsis structures. De projects and generates DeP with adjectives being the spec of DeP. Without de, there is no DeP and only NP with adjectives being the adjunct of NP.

3.3. Possessor+de+noun Structure

The analysis above is for de2 (adjective+de+noun) structure. We can also find argument in other “de” structures. In de1 (possessor+de+noun) structure, we can also find the ellipsis phenomenon, for example,

(34) a. Wo de shubao fangzai dishang, Ni de shubao fangzai naer?

I de bag put-on ground, You de bag put-in where?

My bag is put on the ground, where is your bag put?

We propose in this structure, “de” also projects and generates DeP. The structure is

(35) $DeP[Spec\ ni\ De\ de\ [NP\ shubao]]$

Under contextual phase theory, the highest projection of the nominal phrase is a phase. DeP is phase with the pronoun “ni” (you) being the Spec, “de” being the head, and NP “shubao” (bag) being the complement of the phase. The elided part NP “shubao” (bag) is the complement of the phase. And the Spec is filled with a pronoun or a R-expression. This operation is in accordance with the ellipsis theory. The grammaticality of this structure proves that “de” does generate DeP.

3.4. Relative-clause+de+noun Structure

(36) Wo daile zuotian mai de shuiguo. Ta daile jintian mai de shuiguo

I take-PERF yesterday buy de fruit. He take-PERF today buy de fruit.

I took the fruit bought yesterday. He took the fruit bought today.

As in (36), the whole noun phrase is the highest projection and is a phase. With the existence of “de”, there is the projection of DeP.

(37) $DeP[Spec\ [IP\ e\ zuotianmai_i]\ De\ de\ [NP\ [t_i\ NP\ shuiguo]]]$

The Spec of DeP is filled with the clause “e zuotianmaide” (bought yesterday) and the head is “de”. The complement of DeP is “shuiguo” (fruit). This “de” has the Focus function to highlight the fronted element. In this structure, the focused part is “zuotianmai” (e bought yesterday) [32]. The phase complement NP “shuiguo” (fruit) is elided. This operation is in accordance with ellipsis theory and offers argument to the DeP viewpoint.

3.5. Verb+de+NP Structure

In this de6 structure, the ellipsis can also work, for example (38) a. Wo zhaoguo shuijiao de haizi, ni zhaoguo dushu de haizi

I take-care-of sleep de child, you take-care-of read-book de child.

I take care of the sleeping children, and you take care of the reading children.

b. $DeP[Spec\ shuijiao\ De\ de\ NP\ haizai]$

In this structure, DeP is a phase and “haizai” (children) is the complement of DeP. “shuijiao” is the Spec of DeP. The complement (haizi) of DeP is elided. This ellipsis is in accordance with the ellipsis requirement.

This case proves that there is DeP in “de” structure. If “de” does not project, there will be no DeP and only NP. In NP phase structure, “haizi” is part of the phase NP, and would not be elided, and the ellipsis would be ungrammatical. But on the contrary, this structure is grammatical, so there is DeP in this structure.

With the analysis of ellipsis above, we can make a conclusion that “de” does project DeP, with adjectives, pronouns or relative clause being the Spec of DeP, and “de” being the head, and NP being the complement of the phase DeP. In this structure, it is possible for the ellipsis to operate in generating process in Chinese. Without de, there would be no DeP, and ellipsis would not be conducted grammatically. Ellipsis offers strong argument for the projection of DeP.

3.6. Comparison with Japanese “no”

Kitagawa and Ross [22] propose that noun phrases in Chinese and Japanese are quite similar in structure. They employ “modifying markers” (“de” in Chinese and “no” in Japanese) extensively. Kitagawa and Ross [22] hypothesize that “de” and “no” are general modifying markers to be inserted between the modifier and the modified noun, such as:

(39) a. Haruki no kuruma (Japanese)

Haruki no car.

Haruki’s car.

b. ishi -de no koogeki (Japanese).

stone-with no attack.

attack with stones.

Ellipsis phenomenon in Japanese “no” structures are also very common [30, 39], for example,

(40) a. [Taroo no taido] -wa yoi ga, [Hanako no taido] -wa yoku nai

Taroo no attitude-TOP good-PRES though Hanako no attitude-TOP good not-PRES.

Though Taroo’s attitude is good, Hanako’s isn’t.

[7] (p. 44)

In these cases, the noun “taido” (attitude) following “no” can be elided to generate the ellipsis structure. This phenomenon illustrates that for Japanese “no”, there is also a separate projection No Phrase (NoP) in Japanese, which is similar to Chinese DeP.

In summary, in nominal phrases, Chinese “de” and Japanese “no” are similar, and there is the projection of DeP or NoP which can be proved with ellipsis.

4. Analysis of Left Branch Extraction

4.1. Left Branch Extraction in Serbo-Croatian

In this section, we will exemplify the left branch extraction phenomenon in Chinese to prove the existence of DeP. Left branch extraction can be found in many languages without articles. In Serbo-Croatian (SC), there is case checking between the adjective and the noun. Adjectives can undergo left branch extraction, for example,

(41) Pametne_i on [_{VP} t_i [_{VP} [_{VP} cijeni [_{NP} t_i NP [priatelj_e]]]]]
(SC)

smart he appreciates friends.

‘He appreciates smart friends’. [8] (p. 607)

(42) a. *Smart_i he appreciate t_i friends. (English)

b. DP [_{Spec} pronoun_D article/possessor [_{NP} [Adjunct adjective/preposition NP]]]

In SC, adjectives can be extracted and moved to the Spec of a higher phase following PIC and anti-locality. While in English, the whole noun phrase is DP. In DP structure, the extraction of adjunct (adjective) violate anti-locality. Adjective is the adjunct of NP, and its movement must cross the Spec of DP, which is too short and violates anti-locality. Abels [1] and Grohamn [16] propose the rule of anti-locality. Movement can’t be too short and must cross a whole phrase and not just part of a phrase. A moves to B, and A must cross a structure different from B. Chomsky [12] proposes Phase Impenetrability Condition (PIC), only the Spec of a phase can be moved, and movement must be via the Spec of a phase. We would analyze left branch extraction in Chinese with anti-locality and PIC.

4.2. Left Branch Extraction in Chinese

In Chinese, there is no agreement in gender, number, and case between the adjective and the noun as in SC, so adjectives cannot undergo left branch extraction as in SC, such as in (43). But there are some special structures in Chinese that do undergo left branch extraction, such as in the ergative verb structure, the “bei” structure (passive structure), and the “ba” structure, such as in (44), (45), (46).

(43) a. Wo xihuan youqu de gushi

I like interesting de story.

I like interesting stories.

b. *[youqu de]_i, wo xihuan t_i gushi.

Interesting de I like story.

(44) a. Ta de sike taoshu sile. (Ergative verb structure)

He de four-cl peach-tree die-PERF.

Four of his peach trees died.

b. Ta sile sike taoshu.

He die-PERF four-cl peach tree.

Four of his peach trees died.

(45) a. Zhangsan de qianbao beitoule (passive structure)

Zhangsan de wallet bei-steal-PERF.

Zhangsan’s wallet was stolen.

b. Zhangsan beitoule qianbao.

Zhangsan bei-steal-PERF wallet.

Zhangsan’s wallet was stolen.

(46) a. Diren ba ta daduan le yitiao tui.

Enemy ba he beat-break PERF one-CL leg.

The enemy broke one of his legs.

b. Diren ba ta de yitiao tui daduan le.

Enemy ba he de one-CL leg beat-break PERF.

The enemy broke one of his legs.

As we analyze above, there is DeP in Chinese “de” structure. The only NP analysis could not solve the issue of ellipsis. With DeP viewpoint, the structure of nominal phrase is

(47) DeP [Spec De [NP]]

In this structure, DeP is the highest projection of the nominal phrases, thus, being a phase. In DeP, the pronoun is located at the Spec of DeP. Under phase theory, Spec can be extracted and moved to the Spec of a higher phase. In Wang [38], this movement is attributed to the case assignment. As in ergative structure, the verb does not have the accusative case assigning ability [27] and the noun in VP could not get case assigned, so this movement is feature checking driven.

As in case (44), “si” (die) is an ergative verb. It has no accusative case assigning ability. In generating process, first DeP is generated,

(48) DeP [_{Spec} ta_{De} de [_{NP} siketaoshu]]

And then the verb “si” (die) gets extracted from LA, and VP is generated. The ergative verb “si” (die) has no accusative case assigning ability, so DeP has to be moved to get case-assigned to meet the requirement of UTAH. In this case, one choice is that DeP can be moved as a whole; or the second choice is part of the DeP is moved, and the other part is left behind. In these structures, there is the aspect marker “le” in Chinese. According to contextual phase theory, the highest projection of the verb is the Aspect Phrase (AspectP), so AspectP is phase [37] (p. 774). In the first choice, the whole DeP is moved to the Spec of AspectP, and get nominative case assigned, and case is satisfied. The structure (49a) will be generated.

In the second choice, as in structure (44b), only the Spec of DeP is extracted. The corresponding part is the possessor noun “ta”, and “ta” is moved to the Spec of AspectP as in (49b). This movement is in accordance with PIC and successive cyclic movement. As for the part left behind, its case can get satisfied with partial case or case transmission chain [4, 17, 42].

(49) a. AspectP [_{Spec} [_{DeP} tade siketaoshu]_i Aspect si_j+le [_{VP} v t_j DeP t_i]]]

b. AspectP [_{Spec} ta_i Aspect si_j+le [_{VP} v t_j DeP [_{Spec} t_i De_{NP} siketaoshu]]]]]

In generating process, after the extraction, “de” disappears.

We believe that “de”, besides being the head of DeP, plays the role of a linker. Since the modifier is extracted, there is no necessary linking ability for “de”. So “de” has no realization in PF and LF. This is different from ellipsis structure. As in adjective+de+noun structure, the elided noun does not have overt realization, but it is still covert there, so linking is still necessary, so “de” still has overt realization.

In case (45), this is the passive structure in Chinese, the passive marker in Chinese is “bei”. With the structure of “bei+verb”, the verb loses its ability to assign accusative case. So the noun following the verb couldn’t get case assigned. Thus, under the requirement of case theory, the noun has to be moved to get case assigned. Similar to Chinese ergative verb structure, one choice is to move the whole NP to the Spec of next phase. Under this circumstance, “le” is the aspect makers, so AspectP is the highest projection of the verb and is phase. So, the whole NP is moved to the Spec of AspectP. Thus the structure (45a/50a) is generated. The second choice is only the Spec of DeP to be extracted and moved to the Spec of AspectP. Thus the structure (45b/50b) is generated. The part left in DeP can get its case with case transmission or partial case.

- (50) a. $\text{AspectP} [\text{Spec} [\text{Zhangsan de qianbao}]_i \text{Aspect} \text{beitou}_j + \text{le} [\text{BeiP } t_j \text{NP}[t_i]]]$
 b. $\text{AspectP} [\text{Spec} \text{Zhangsan}_i \text{Aspect} \text{beitou}_j + \text{le} [\text{BeiP } t_j \text{NP}[t_i \text{qi-aobao}]]]$

In case (46), Chinese “ba” is also a controversial topic in syntactic study. It has been treated as a light verb, or a preposition, or a verb. But for our analysis, it is not very important what its category is. In generating process, first DeP is generated.

- (51) $[\text{DeP}_{\text{Spec}} \text{ta}_{\text{De}} \text{de}_{\text{CIP}} \text{yitiaotui}]$

Under contextual phase theory, AP is also a phase. In this structure, first the small clause AP is generated,

- (52) $\text{AP} [\text{NP} \text{ta de yitiaotui} \text{A} \text{duan}]$

And then the verb “da” (beat) is merged. The head of small clause, “duan” is merged with the verb “da” to generate a compound verbal phrase. Then the aspect maker “le” (PERF) is merged, and the compound verb “daduan” is moved to merge with “le” to generate the head of AspectP. If there is no “ba”, the structure (53a) is generated. If there is “ba” in LA, then under the requirement of “ba”, the generation proceeds. One choice is the Spec of DeP is extracted to generate (53b). The second choice is the whole DeP is extracted to generate (53c).

- (53) a. $\text{AspectP} [\text{Spec} \text{diren da}_j + \text{duan}_i + \text{le} [\text{VP } v \text{ } t_j [\text{AP} [\text{DeP} \text{ta de NP yitiaotui}] \text{A} \text{ } t_i]]]$
 b. $\text{BaP} [\text{Ba} \text{ba ta}_k \text{AspectP} [\text{Aspect} \text{da}_j + \text{duan}_i + \text{le} [\text{VP } v \text{ } t_j [\text{AP}_{\text{Spec}} [\text{DeP} \text{tk NP yitiaotui}] \text{A} \text{ } t_i]]]]]$
 c. $\text{BaP} [\text{Ba} \text{ba} [\text{DeP} \text{ta de yitiaotui}]_k \text{AspectP} [\text{Aspect} \text{da}_j + \text{duan}_i + \text{le} [\text{VP } v \text{ } t_j [\text{AP}_{\text{DeP}} [\text{Spec} \text{tk A } t_i]]]]]]]$

From the analysis above, we can find, this extraction is in accordance with PIC and anti-locality. With this analysis, we can reach the conclusion that DeP is well grounded, and has good reason for its existence. The nominal phrases with “de” structure in Chinese is not a DP, or a NP, but a DeP.

4.3. Comparison with Japanese Left Branch Extraction and English Structure

In Japanese, there is also left branch extraction phenomenon [34, 35]. They analyze left branch extraction from the perspective of scope, not syntactic. In this article, we argue, that in Japanese ergative verbs, there is similar syntactic operation to Chinese counterpart, for example,

- (54) a. Kare no chichioya ga xini maxita. (Japanese)
 He no father ga die-ni past.
 His father died.
 b. kara wa chichioya ni xinale maxita.
 he wa father ni die-respect past.
 his father died.

From these examples, we can find there is also left branch extraction in Japanese ergative structures. The whole phrase is “kara no chichioya” (his father). As we analyze in Section 3.6, Japanese “no” is similar to Chinese “de” in the left branch extraction phenomenon. The generating process is similar to Chinese counterpart. With the existence of “no”, there is also a projection of NoP similar to Chinese DeP,

- (55) $\text{NoP} [\text{Spec} \text{kara No}^{\text{NP}} \text{chichioya}]$

The extraction can be the Spec of the whole noun phrase, or the whole noun phrase, thus, different structures being generated. If the whole NoP is moved, the structure (54a) is generated. If the Spec of NoP is extracted and moved, the structure (54b) is generated. The Japanese examples offers good argument for the existence of DeP.

4.4. Left Branch Extraction in Multiple Possessor Structure

There is also another kind of structure in which more than one possession relations exist, such as

- (56) a. ?Ta de fuqin de zhaopian
 He de father de picture.
 His father’s picture.
 b. Tafuqin de zhaopian.
 he-father de picture.
 His father’s picture.
 (57) Yike gao de da de shu
 Yike gaoda de shu.
 A tall big de tree.
 A big and tall tree.

In case (56), the first possession structure is “ta de fuqin” (his father). The second possession structure is “fuqin de zhaopian” (father’s picture). In this case, the second structure (56b) is preferred over the first one (56a). This shows that in Chinese, one “de” is preferred over two or more “de”. Therefore there is only one main DeP projection, not two or more, in the noun phrases. This phenomenon shows that in generation process, simplicity is chosen over complexity. Simplicity is the principle of language generating process.

This simplicity can also be found in English. There is only one main DP layer in one English nominal phrase, such as

- (58) a. His friend
 b. A friend of his father.
 c. His father's friend.

The corresponding structure is

- (59) a. DP [_{Spec} His _{DP} NP [friend]]
 b. DP [_D a _{NP} [friend _{Adjunct} [of DP [his father]]]]
 c. DP [_{Spec} [DP his father] _D 's _{NP} picture]

In structure (59b), there is only one main DP layer. "a" takes the position of D. "his father" is also DP with the possession relation, but it takes the position of an adjunct of DP. In structure (59c), the main DP layer is ['s picture]. The other DP takes the position of Spec of DP. So simplicity requires there is only one main DP or DeP in generating process.

With this only-one main DeP layer, we turn back to Chinese DeP and analyze the multiple "de" structure, such as,

- (60) a. Zhangsan de taitai sile fuqin
 Zhangsan de wife die-PERF father.
 the father of Zhangsan's wife died.
 b. *Zhangsan sile taitai de fuqin.
 Zhangsan die-PERF wife de father.
 c. Zhangsan taitai de fuqin sile.
 Zhang wife de father die-PERF.
 The father of Zhangsan's wife died.
 d. ?Zhangsan de taitai de fuqin sile.
 Zhangsan de wife de father die-PERF.
 The father of Zhangsan's wife died.

In this multiple possessor structure, there are two layers of possessor relations, with one being [Zhangsan de taitai] (Zhangsan's wife), and the other being [[Zhangsan (de) taitai] de fuqin] (father of Zhangsan's wife). In this structure, simplicity is realized with only one "de" being overt, so one "DeP" structure is preferred, otherwise the whole structure will be a little redundant. So simplicity is the rule of language generating. For this structure, first, "Zhangsan" and "taitai" are merged to generate "Zhangsan de taitai" (Zhangsan's wife),

- (61) _{DeP2} [_{Spec} Zhangsan _{De} de [_{NP} taitai]]

Then "fuqin" is extracted to merge with "Zhangsan de taitai", and for simplicity, the first "de" loses its overt realization. So the whole structure is generated "Zhangsan taitai de fuqin".

- (62) _{DeP1} [_{Spec} _{DeP2} [Zhangsan taitai] _{De} de [_{NP} fuqin]]

The Spec of DeP1 is DeP2 "Zhangsan taitai", and the head is "de", and NP "fuqin" is the complement of DeP2.

With this structure, the Spec of DeP1 can be extracted to be moved to the Spec of a higher phase. This is the ergative verb structure, and there is the aspect maker "le". Therefore the highest projection of the verb is AspectP. So the Spec "Zhangsan taitai" (DeP2) is moved to the Spec of AspectP, and the structure (60a/63a) is generated. Or the whole DeP1 is extracted to move to spec of a higher phase AspectP and the structure (60c/63b) is generated. Both are grammatical. This movement is case checking driven, as the ergative verb "si" (die) has no accusative case ability.

- (63) a. _{AspectP} [_{Spec} [_{DeP2} Zhangsan de taitai] _i _{Aspect} si_j+le _{VP} [_v _{t_j} _{DeP1} _{t_i} _{De} de fuqin]]]

- b. _{AspectP} [_{Spec} [_{DeP2} Zhangsan taitai de fuqin] _i _{Aspect} si_j+le [_{VP} _v _{t_j} _{DeP1} _{t_i}]]]

But if it is not grammatical for the Spec "Zhangsan" of DeP2 [Zhangsan taitai] to be extracted. As this extraction violates the PIC and anti-locality. Or this is referred to as Complex XP Constraint [8], under which extraction cannot be taken from the inside of an element of a phase. "Zhangsan" is the Spec of DeP2. The first target of its movement must be the Spec of phase DeP1, and then this movement is too short, and is forbidden due to anti-locality. Anti-locality requires that movement must cross a whole phrase. Therefore in the multiple possession structure, only the whole DeP2 can be extracted, not the Spec of DeP2.

This argument is supportive for the existence of DeP viewpoint.

4.5. Left Branch Extraction in de5

Besides the left branch extraction phenomenon in possessor structures, we can also find left branch extraction in de5, such as

- (64) Zhangsan de ceng zaimeiguo liuxue
 Zhangsan de ever in America visiting learning.
 Zhangsan's visiting student in America.

- (65) _{DeP} [_{Spec} Zhangsan _i _{De} de _{NP} [_{AspectP} _{Spec} _{t_i} _{Aspect} ceng-zaimeiguoliuxue]

The original structure is

- (66) _{AspectP} [_{Spec} Zhangsan _{Aspect} ceng+liuxue _i [_{VP} _v _{t_i} _{Adjunct} zaimeiguo]]]

According to the contextual phase theory, the highest projection of the verb is a phase. In this case there is Aspect maker "ceng" (ever), so AspectP is the highest projection and is a phase with "Zhangsan" being located in the Spec of the phase. When "de" is extracted from LA, and merged with AspectP, the Spec (Zhangsan) of AspectP is extracted and moved to the Spec of DeP. This movement is in accordance with PIC and anti-locality. So this is grammatical.

We have illustrated that there is no DP in Chinese nominal phrases. So the operation of left branch extraction supports the argument that the moved element is in the Spec position. So the left branch extraction in De5 offers argument for the existence of DeP in Chinese.

5. Conclusion

We have proved that in Chinese "de" phrases, there is the projection of DeP, and DeP is phase, with adjectives/pronoun/clause being the Spec of DeP, and De being the head. This proposal is illustrated with ellipsis phenomenon and left branch extraction phenomenon in Chinese. In "de" phrases, the noun following "de" can be elided, this is in accordance with ellipsis theory. The Spec of DeP can be extracted and moved to the Spec of a higher phase. This left branch extraction is in accordance with PIC and anti-locality. This DeP projection can also be found in some structures in Japanese

and other languages.

Abbreviations

AspectP	Aspect Phrase
CIP	Classifier Phrase
CP	Complementizer Phrase
DeP	De Phrase
DP	Determiner Phrase
IP	Inflection Phrase
NoP	No Phrase
NP	Nominal Phrase
PIC	Phase Impenetrability Condition
QP	Quantifier Phrase
SC	Serbo-Croatian
Spec	Specifier
vP	v Phrase
XP	X Phrase

Author Contributions

Shilong Wang is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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