愛知淑徳大学論集－文学部篇－　第47号　2022.3　37-48

Some notes on the morphosyntactic nature of CP and DP

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Key Words：complementizer, DP, functional categories, language change

1. Introduction

There is a general agreement in the Minimalist framework (Chomsky 1995) that human language has a hierarchical structure, which is made of lexical and functional layers. It is also assumed that a functional head takes a lexical projection as its complement, as in the relation of (1a) and (1b).

(1) a. $[_{CP}$ **C** $[_{TP}$ … T $[_{VP}$ V …]]]
b. $[_{PP}$ **P** $[_{DP}$ **D** $[_{NP}$ N…]]]

In the sense of Grimshaw (1991), regarding the verbal extended projection, the C subcategorizes the T projection, and then the head T takes VP as its complement. On the other hand, the highest projection of the nominal category is PP rather than DP in her system. However, the categorial status of P has long been controversial: lexical or functional.

In any case, what is a complementizer? Is the element really verbal although it is the same form as the pronominal *that*? This paper explores the morphosyntactic nature of CP, and examines intriguing parallelism between C and D. Thus, this paper takes issue with Grimshaw's (1991) view, where PP is the highest nominal extended projection. Rather, it will be shown that C and D must be the highest heads in the verbal and nominal projections, respectively.

2. Background

The discussion of the parallelism between clauses and nominal phrases dates back to the study of nominalization. Abney (1987) argues that the structure of sentences and nominal phrases are parallel, as shown in (2).

(2) a. John built a spaceship
b. John's building of a spaceship (derived nominal)

(3) a. [$_{IP}$ John [$_{I'}$ INFL [$_{VP}$ built a spaceship]]]
b. [$_{DP}$ John [$_{D'}$'s [NP building of a spaceship]]]

(Abney (1987: 19))

The subject of the sentence and the possessor in the derive nominal are semantically analogous to each other. Then, he assumes that the possessor noun occupies the specifier position of a functional projection headed by a functional head for the genitive Case maker *-'s*. Finally, Abney (1987) proposed the DP analysis, where a nominal phrase is headed by a functional head D, as in (3b).

After the introduction of the complementizer projection (CP), the unit of sentences is assumed to be CP rather than TP. Therefore, we will begin with the discussion of CP.

The roles of CP (complementizer phrase) vary between theoretical frameworks. It can be said, however, that CP has the following fundamental properties. First of all, the head of CP is occupied by an element called *complementizer*, which introduces a subordinate clause. In English, *'that'* is used in finite clauses, while *'for'* appears in infinitive sentences. It is also assumed that conjunctions *if*, *because*, *when*, and so on, occupy the same head.

(4) a. locus of complementizer
b. T-to-C movement
c. locus of WH/TOPIC elements
d. relative clauses
e. marking of sentence types

Second, the head C (or COMP) is used in interrogative transformation. It is important to note that traditional SAI (Subject-auxiliary inversion) is not inversion. Rather, the order is achieved by the movement of an auxiliary element to a position in front of the subject of the main clause. This operation is more economical than inversion because only one element undergoes a movement. In (3a), the subject stays in situ, while AUX (*be* or modal verbs) moves over the subject to C. With respect to main verbs, *do/does/did* appear first in T and then moves to C, as shown in (3b).

(5) a. [$_{CP}$ ø AUX$_i$ [$_{TP}$ subj t_i [$_{VP}$ (V)…]]]
b. [$_{CP}$ ø *do/does/did*$_i$ [$_{TP}$ subj t_i [$_{VP}$ V …]]]

Third, the specifier position of CP is the locus of WH elements. Question words appear in the most left-edge position of the sentence. Fourth, CP is used for relative clauses. Examples (6) illustrate that the relative element and the null operator appear in the CP domain (e.g. [Spec, CP]), although the present study does not pursue the detailed internal structure.

(6) a. the man [$_{CP}$ whom$_i$ ø [$_{TP}$ Tom saw t_i]]
b. the man [$_{CP}$ OP$_i$ (that) [$_{TP}$ Tom saw t_i]]

Finally, consider the case of empty COMP. It is generally assumed that the structure of the main clause contains an abstract CP even though no element appears in CP.

(7) [$_{CP}$ ø [$_{TP}$ subj [$_{T'}$ T [$_{vP}$ *v* [$_{VP}$ V…]]]]]

This is partly because the head C bears some kinds of illocutionary force; in other words, the status of C determines sentence types, as listed in (8)

(8) sentence types
a. declarative [-WH]
b. question [+WH]
c. imperative [-WH]
d. exclamatory [+WH]

If C is [-WH] and null, the sentence is declarative (=8a). Furthermore, C is [+WH] and occupied by AUX or *do*, the sentence is a question (=8b). However, there is controversy about how imperative and exclamatory sentences are determined.

3. Historical development of functional heads in Indo-European languages

Intriguingly, the definite article *the* and the complementizer *that* in English were derived from the same word: the demonstrative pronoun *that*. Furthermore, the two functional heads share the following properties in common.

(9) a. agreement of Case
b. agreement of ø-features and tense

In the following sections, we will discuss the historical development of the two functional

heads: D and C.

3.1 Historical development of the D system in Indo-European languages

Articles might not be fundamental elements in human language. According to WALS1[1], 198 languages lack neither definite nor indefinite articles (See Table 1 below). It is also shown (in WALS 38A) that the Japanese language has only an indefinite article (*aru*)[2], but lacks definite articles. Even European languages DID NOT have articles. It can be said from the data that there is no clear etymological relationship between C, D, and P.

The use of articles is closely associated with discourse. Present-day English has the definite article '*the*' to encode definiteness, specificity, and anaphoric relationships. The definite article refers to a specific thing, whose information is shared by the speaker and the hearer or familiar with everyone. The article can also refer back to things mentioned in the preceding discourse. Therefore, it is reasonable to assume that the article was derived from the demonstrative pronoun *that*, which also functions as a deictic or anaphoric expression to indicate specific things in context[3]. Many Indo-European languages followed the same step, too. According to WALS, 69 languages still keep using demonstrative pronouns as markers of definiteness.

Table 1: types of definite articles

i.	Definite word distinct from demonstrative	216
ii.	Demonstrative word used as marker of definiteness	69
iii.	Definite affix on noun	92
iv.	No definite article but indefinite articl	45
v.	Neither definite nor indefinite article	198
	Total:	620

Table 1 illustrates that there are at least three manifestations of definiteness: independent words, demonstrative pronouns, and pronominal affixes. Interestingly, in this case, the third person pronoun is likely to be the definite affix. This phenomenon is closely associated with the choice of demonstrative pronouns as a determiner. That is to say, *that* rather than *this* tends to be definite since both third-person pronouns and *that* refer to things far from the speaker from the deictic viewpoints.

[1] Chapter 37A: definite articles https://wals.info/chapter/37
Chapter 38A: indefinite articles https://wals.info/chapter/38
[2] This word approximately corresponds to *some*, although many researchers believe that Japanese does not have definite nor indefinite articles.
[3] See Hawkins (2004) in detail.

3.2 Historical development of the C system in Indo-European languages

In school grammar, the complementizer *that* is just a clause-linking marker or conjunction; therefore, this topic is not treated so seriously. Typologists have sometimes tried to draw semantic maps of complementizers. In his web discussion[4], for example, Baunaz and Lander (2017) proposed 'nanosyntax,' in which the co-expression patterns of complementizers in European languages. The authors argue that there is a clear tendency in the functional sequence of demonstratives, complementizers, relativizers, question pronouns, and indefinite pronouns (e.g. *something*). However, Haspelmath (2018) briefly points out problems with their approaches[5]. (10) illustrates that Comp could be lexicalized by Dem, not the other way around. In the same way, Rel could be expressed by Comp. According to him, demonstratives subsume all the other elements and have the features that all others have (=(11)).

(10) Dem > Comp > Rel > Wh > Indet

(11) [Dem [Comp [Rel [Wh [Indet]]]]]

On the other hand, studies of complementizers are much crucial in historical and theoretical linguistics. As mentioned in (2), the C head plays several roles in grammar. Moreover, the status of C takes charge of the availability of verb-second word order and complementizer doubling found in many European languages. See (12) and (13) below.

It is common that complementizers are mainly derived from demonstrative pronouns in many languages, as Haspelmath (2018) points out. The development of complementizers has another path; for example, *que* and *che* are strongly related to an interrogative pronoun '*what*' in Spanish, French, and Italian. Furthermore, the complex complementizers (*wh*+*that*) are used in some languages. Look at the following examples.

(12) *Densya-ga ugokidasita* ***kato*** *omotta-ra, mata tomatta.*
(I) the train started-to-move Q+C thought, again (it) stopped
'I thought that the train started moving, but it stopped again.'

(13) *Hon vet inte vem *(som) ø kommer i dag.*
she knows not who that comes today
'She doesn't know who will come today.'

(Teleman et al. (1999))

[4] Haspelmath, Martin (2018) *Coexpression patterns of complementizers, nanosyntax, and productivity* (https://dlc.hypotheses.org/1029)
[5] His discussion is based on Baunaz et al. (2018), rather than Baunaz and Lander (2017).

Example (12) is a Japanese sentence, where the question marker *ka* and the complementizer *to* co-occur, meaning that the speaker of the sentence does not make sure that the train started moving. This expression is quite similar to "*be wondering that*", which is not grammatical in English. On the other hand, Swedish has a kind of 'doubly filled comp' construction (cf. (13)); in other words, the complementizer must appear even in the question sentence as long as the subject of the subordinate clause is *pro*. In Icelandic, the complementizer can occur with the relative element.

What is a categorial status of C/CP? Etymologically, the category must be nominal [+N]. Theoretically, its categorial status should be nominal again[6] when it is the direct object of V in the sense of C-selection (cf. Chomsky and Lasnik (1993)). This is parallel to DP objects.

Regarding the complement structure, they show a difference, in that the D head subcategorizes NP, while C does the TP projection.

(14) a. D NP complement
b. C TP complement

One of the clearest differences is that TP is a clause while NP is not. Another difference is the status of the heads; T is functional, while N is lexical. What is worse, the status of T is not stable; there is an argument to show that human language has more articulated functional projections. For example, Shlonsky (1998) claims that the INFL projection in Hebrew should be decomposed into Tense, Voice, and Gender projections.

4. Agreement of D and C

Rather than P, C shows a similar pattern with D in agreement. In this section, we will see agreement patterns shared by the two heads.

First of all, D agrees with NP in Case, number, and gender. German (and Old English) follows this pattern, while D of Romance languages agrees in number and gender. In nominal projections, agreement of number and gender is shown in determiners, nouns, and sometimes adjectives. In Semitic languages like Hebrew, for example, the marking of the definite article is realized on adjectives (or demonstratives), too.

(15) a. *ha-sefer ha meyuhad*　　b. *sefer meyhad*
the-book the-special　　*book special*

[6] Within the framework of Extended Projection (cf. Grimshaw (1991, 2005), CP is a verbal extended projection, because the head movement of V is limited to T and C, or V or T are cliticized into C in the main clause.

In (15a), the definite article *ha* is cliticized to the adjective *meyuhad*. On the other hand, in (15b), no marking is realized on the two words in an indefinite interpretation. This implies that the head of D has some phi-features that must be checked with some words in the D projection.

It is widely known that Japanese lacks overt definite and indefinite articles (See 3.1 for a different view). Instead, demonstrative and deictic pronouns function like determiners. It is interesting to note that deictic pronouns agree in person.

Determiner	Pronoun	Location	Direction
ko-no	*ko-re*	*ko-ko*	*ko-tira*
so-no	*so-re*	*so-ko*	*so-tira*
a-no	*a-re*	*aso-ko*	*a-tira*

Table 2: the Japanese deictic system

In the first row of Table 2, all words have the same prefix *ko-* in common, which refers to the territory of the speaker. Therefore, it can be said that this is the 1st person marker. Next, the prefix *so-* is strongly associated with the hearer; that is to say, this is the 2nd person marker. Finally, the prefix *a-* indicates someone or something away from both the speaker and the hearer. This is quite similar to the role of 3rd person pronouns.

In Hebrew, the accusative marker *et* is required only with definite objects. Without it, objects are understood to be indefinite. The definite article *ha-* occurs with the accusative marker in (16a), while neither the article nor the marker appears in (16b).

(16) a. *Moshe kara et ha-sefer*.
Mose read the book
b. *Moshe kara sefer*.
Mose read a book.
c. *Moshe kara sefer ze*.
Mose read book this

Interestingly, a demonstrative pronoun *ze* is definite even though the accusative marker does not appear, as shown in (16c).

Furthermore, in Finnish, the object of transitive verbs receives either partitive (default) or accusative case. Based on Kiparsky (1998), Akton (2014: 8) points out that a partitive object is ungrammatical if the VP is bounded, and an accusative object is ungrammatical if the VP is

unbounded.

(17) a. *Ammu-i-n* *karhu-j-a*.
shoot-Past-1Sg bear-Pl-Part
b. *Ammu-i-n* *karhu-t*.
shoot-Past-1Sg bear-Pl-Acc

(Kiparsky (1998: 38))

These examples from the two languages clearly show that there is a strong correlation between Case and definiteness/boundedness (D).

Next, let us examine complementizer agreement. Although Baker (2008) points out that complementizer agreement is rare across languages, complementizers can show agreement for phi-features with the embedded subject in some dialects of German and Dutch. (cf. Haegeman (1992), Haegeman and Koppen (2012), and Zwart (1997, 2006)).

(18) a. *dan-k* *(ik)* *komen*
that-1sg-cl I come-1sg
b. *da-j* *(gie)* *komt*
that-2sg-cl you come-2sg

(Zwart (1997: 138))

Examples in (18) illustrate that the complementizer *da* is inflected according to the embedded subject.

In Present-day English, the complementizer *that* can be freely omitted in many cases, although its deletion causes ungrammaticality in the complement of factive verbs. (19a) is the case of non-factive verbs, where null COMP is accepted. On the other hand, the complementizer is obligatory in (19b).

(19) a. John *said/believed* (that) he would miss the meeting. non-factive
b. John *regretted/realized* *(that) he missed the meeting. factive

A factive verb involves a PRESUPPOSITION that the particular events or states described by the complement clause are true. From the viewpoint of definiteness, the complements of factive verbs should be definite. It can be said, therefore, that the requirement of the complementizer *that* is a realization of definiteness agreement.

The set of data under consideration is limited. However, there are pieces of evidence to show the possibility that C and D are associated with each other in properties of agreement.

5. Some counterexamples

In the final section, we will briefly touch upon the cases where C might have a stronger relationship with P than D.

5.1 elements in COMP

The head of CP is occupied by the following elements. They seem to be prepositional. If this is the case, C and P are analogous to each other.

(20) a. it is important [$_{CP}$ ***(for)** [$_{TP}$ him [$_{T'}$ to study harder]]]
b. Tom went to bed [$_{CP}$ **before** [$_{TP}$ Mary came home]]
c. Tom went to bed [$_{CP}$ **after** [$_{TP}$ Mary came home]]

(20a) shows that the subject of the infinitival clause must be modified by *for*. However, the status of *for* in the infinitival construction is not clear because the *for-to* was formerly used in English. In addition, *for* introduces finite constructions like *that*.

(21) I told her to leave, *for* I was very tired.

Similarly, *before* and *after* are both prepositions and conjunctions. On the other hand, at least, other conjunctions like *because, when, if, whether*, or *though*, are not prepositional, but nominal or adverbial. Therefore, I assume that *before* and *after* are originally adverbial, rather than prepositional.

5.2 Person marking on adpositions

Next, some languages show person marking on adpositions, according to Feature 48A in WALS[7]. For example, in Maybrat, a preposition agrees with its object 'stick' in person. In the following sentence, the preposition *kah* agrees with its object *ara* in number.

(22) *T-ai m-kah ara*.
1sg-hit 3sg.n-with stick
'I hit with a stick.'

[7] Chapter 48A: Person Marking on Adpositions https://wals.info/chapter/48

(Dol (1999: 88))

In this paper, I will leave the problem open because of my limited knowledge.

5.3 Japanese suffixes *'no' and 'to'*

Japanese is an agglutinative language, with several particles or suffixes which mainly show Cases. As mentioned above, Japanese lacks a definite article. However, there are genitive Case markers *-no*[8] and *-ga*, which are in the head of DP. On the other hand, this language has a complementizer *to*, which corresponds to the English complementizer *that*. Take a look at the following sentences.

(23) a. I think [$_{CP}$ ***that*** Tom is intelligent].
b. *Watashi-wa* [$_{CP}$ Tom-*ga kashikoi* ***to***] *omou*.
c. **Watashi-wa* [$_{CP}$ Tom-*ga kashikoi* ø] *omou*.

In (23a) and (23b), the subordinate clauses are headed by *that* and *to* respectively. Unlike English, the standard Japanese does not permit complementizer deletion[9], as shown in (23c).

It is also known that such suffixes are used as postpositions in Japanese. Therefore, someone might claim that C is more similar to P than D in Japanese. It is indeed that there is no historical trace that C was derived from D in Japanese. However, we will show that the complementizer is more strongly associated with D, rather than P. First, the function of the complementizer *-to* is different from P: (i) the coordinate conjunction like *and*, (ii) the coordinate clause conjunction like *when*, and (iii) the complementizer. Second, there is an interesting correlation between C and D in Japanese.

(24) a. *Watashi-wa* [$_{CP}$ *kinoo oya-ga kita* ***no****-wo*] *shiranakatta*.
I.nom yesterday my parents.nom came that-topic didn't know
b. *Watashi-ga* [$_{CP}$ *hajime-te Kyoto-ni itta* ***no****-wa*] *sannnenn mae datta*.
I.nom first time to Kyoto went. That-topic three years be

In (24), the genitive markers *-no* are used as a complementizer.

6 Concluding remarks

We have seen empirical evidence to show that there are cross-categorial similarities between

[8] The suffix *-no* is used as a demonstrative pronoun like '*yasui-**no** kudasai*' (I'll take a cheaper **one**).
[9] The complementizer can be deleted in some dialects like the Osaka dialect.

C and D. This view is different from the extended projections, in which C and P are parallel. However, it is more important to focus on the parallelism between C and D to analyze language change and evolution.

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