Why are antecedents raised? – A Generative Approach to Relative Clauses*

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1 Preliminaries

According to Chomsky (1995) we need a process called **Merge** to create phrases and sentences. Merge combines one constituent (such as a word) with another and gives us a larger constituent. For example, when we merge determiner *the* and NP *book*, we get a larger constituent (i.e. a phrase) *the book*. What is the overall category of [the book]? We cannot put the phrase [the book] in positions where NP usually occur. For example, [the book] cannot follow another determiner *a*, so the following sentence is ungrammatical **I want a [the book]*. Generative grammarians believe the phrase *the book* is a DP (Determiner Phrase). The constituent that determines the overall category of the phrase is called the **head** of the phrase. The constituent which merges with head but does not determine the overall category of the larger phrase is called **complement**.

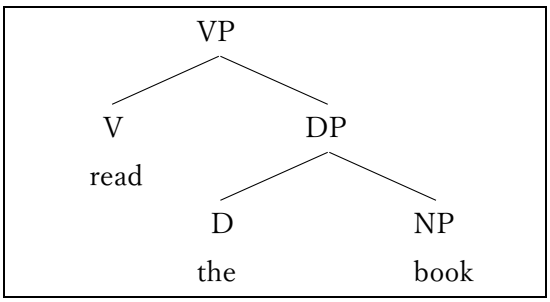
We merge this DP *the book* and V *read* to get VP *read the book*. This time V *read* determines the overall category of the larger phrase *read the book.* Evidence of the VP-hood of *write the book* is as follows. The phrase *read the book* can appear where verbs typically appear. Such as after modal auxiliary verbs: *He will [read the book]*. After infinitive *to: He want to [read the book]*. So, in this case, V-*read* determine the overall category of the phrase. V-read is the head of VP *read the book* and DP *the book* is the complement of the head V *read.*

At this point, we would like to draw a tree diagram for the VP *read the book.*

1) [VP [V read][DP the [NP book]]]

* This work was first presented at a linguistic graduate seminar held on 20th May 2022 at Kyoto University. I corrected minor errors in spelling and reference sections. Otherwise, this work is the same as the original version.

2)



Tree diagram in (2) shows internal structure of VP *read the book*. Every node of the tree diagram is binary branching –namely, two branching. This is because merge is a process which combines two constituents to create one larger constituent. Ternary branching tree diagram is impossible in generative grammar. Bracketed phrase (1) also tells us the same information, but this is difficult to read.

We find that all heads (such as V-*read* and D-*the*) precede complements (such as NP *boo*k and DP *the book*). According to Chomsky (1986, 1995), Radford (2004, 2009, 2016), Roberts (2007, 2019, 2021) and many other researchers, English is **head-first language**. There are only two options for human languages: **head-first** or **head-last**. In head-first languages, head precedes complement. So, head-first languages usually have VO word order and prepositions. In head last languages, head follows complements. In such languages, we usually find OV word order and postpositions. (See Greenberg 1963 and Roberts 2007, 2021 for word orders of languages around the world.)

According to Radford (2016), if a child has set his **parameter** in his blain as head-first, in all phrases he produces heads precede complement. So, all phrase he generates have head-complement word orders. (See Roberts 2021 for counterarguments to this claim. He mentions cases where a language has head-first parameter setting for CPs but head-last parameter setting for VPs and DPs.) We keep in mind such important concepts and move on.

We would like to build larger constituents. We merge T *will* and VP *read the book* to get a larger phrase *will read the book*. What is the category of the overall phrase? As I mentioned above, English is head-first type language. So T-*will* determines the overall category of the phrase. In other words, T-will is the head of the overall phrase *will read the book*. We would like to put the TP label on the phrase *will read the book*, but it seems we cannot do so. According to Radford (2009, 2016), a complete phrase can be used as a response. For example,

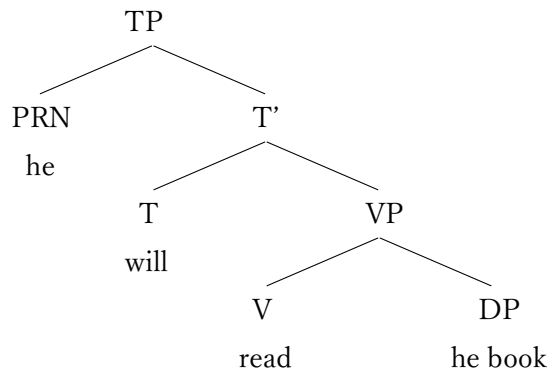
3) What will you do?

4) (a) *will read the book.
(b) I will read the book.

Example (4a) is impossible as a response to a question (=example 3). According to Radford (ibid.) example (4a) is unacceptable because it is not a **maximal projection**. The phrase *will read the book* is somehow incomplete. This incomplete phrase is called an intermediate projection and written as T' or T-bar. We make an maximal projection (in this case TP) by merging a specifier with this intermediate projection. In this case, we merge specifier (subject) *he* with T-bar *will read the book*, and get TP *he will read the book*. When we draw a tree diagram of this TP, it will be like (6) below.

5) He will read the book.

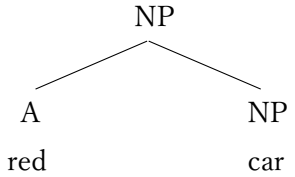
6)



Cinque (2013) and some other researchers claim that specifier is a kind of **adjunct**. An adjunct merges with a constituent and makes it an even larger constituent. For example, when we merge an adjunct *red* with NP *car*, we get an even larger NP *red car*. Merging an adjunct does not change the grammatical category of the overall phrase. The tree diagram (7ab) shows internal structures of NP *car* and a larger NP *red car.*

7) (a)

(b)

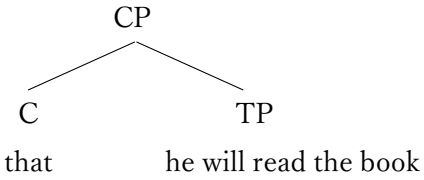


Indeed, specifier *he* does not change the grammatical category of T-bar *will read the book.* Specifier *he* merges with T-bar and makes it an even larger phrase, namely TP. So, at first sight, their claim that specifier is a kind of adjunct seems to be reasonable. However, specifier and adjunct are different. If you examine NP adjunct *red*, you realize that this adjunct *red* is optional. *I want a [NP car]* is grammatical and *I want a [NP red car]* is also grammatical. However, specifier is compulsory when it is used. For example, *he will read the book* is grammatical but **will read the book* without subject (specifier) is ungrammatical. Specifier merges with an **intermediate projection** and makes it a **Maximal Projection**. So, I separate an adjunct and a specifier.

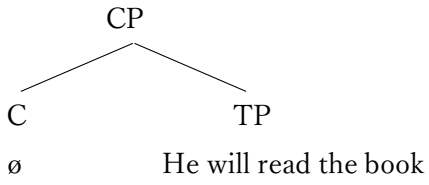
Thus far, we made TP *he will read the book*, but is this a complete sentence? According to Radford (1988, 2004, 2009, 2016), Roberts (2007, 2019, 2021) and many other researchers, the answer to the question is negative. We need a **complementizer** phrase. Overt (and covert) complementizes appear when we use embedded clauses.

8) (a) I know [CP **that** he will read the book]
(b) I know [CP [C **ø**] he will read the book]
(c) I do not know [CP what [C **ø**] he has got in his pocket]
(d) I cannot forget [CP what a great time [C **ø**] I had]

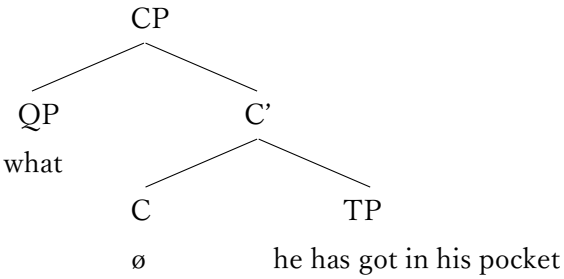
9) (a)



(b)



(c)



Bracketed clauses in the 8 examples are called embedded clauses. Tree diagrams in (9) show internal structures of (8) examples. The questions we should ask are why embedded clauses in (8ab) are interpreted as declarative; that in (8c) is interpreted as interrogative; that in (8d) is interpreted as exclamatory clause. The answers to these questions are as follows: the embedded clause in (8a) has declarative complementizer *that* in the head of C position; the embedded clause in (8b) has no specifier in CP but has null declarative *ø* as the head of C, which is the null counterpart of a declarative complementizer *that*; the embedded clause in (8c) has a wh-question word *what* in specifier of C position; the embedded clause in (8d) has exclamatory phrase *what a good time* in specifier of C position. Head and specifier are called the edge of the projection. So as Radford (2016, 2020) claims, we determine whether a clause is declarative, interrogative or exclamatory by checking the edge of the complementizer phrase. This hypothesis is called **clause typing condition**. This idea is originally put forward by Stockwell, Schachter and Partee(1973) and developed by Radford (2016, 2020) and many other researchers.

Radford (ibid.) also claims that conditional clauses and relative clauses are interpreted as such because the edges of these clauses have conditional or relative **operators**.

10) (a) [CP [C **If** [TP I fail the exam]]], I will cry.
(b) The amount of money [CP <u>which</u> [C **ø**] [TP I lost by gambling]] is more than 1 million yen.
(c) The amount of money [CP <u>OP-REL</u>[C **ø**] [TP I lost by gambling]] is more than 1 million yen.

In (10a) example, the CP *If I fail the exam* is interpreted as conditional clause because there is a conditional operator *if* in the head of C position. In (10b) example, the CP *which I lost by gambling* is interpreted as a relative clause because there is a relative operator *which* in specifier of C position. In (10c) example, the CP *I lost by gambling* is understood as relative clause. Why is this? The answer to this question is that the CP has null relative operator in specifier of CP position. In (8c) example above, wh-question word *what* acts as wh-question operator and this gives the CP the meaning of wh-question.

Radford (ibid.) even claims that main clauses have CP layers.

11) (a) [CP [C **ø**][TP He [T will [VP pass the exam]]]]
(b) [CP <u>OP-YNQ</u> [C **Will**] [TP he [T ~~will~~ [VP pass the exam]]]]
(c) [CP <u>what</u> [C **will**] [TP he [T ~~will~~ [VP get]]]

(11c) example is interpreted as wh-question sentence because it has wh-question word *what* in specifier of C position. This word acts as wh-question operator. (11b) example is interpreted as yes-no question because it has yes-no question operator in specifier of C position. If we suppose that *will* in the head of C acts as yes-no question operator, (11c) can be interpreted as yes-no question clause. (11a) has null C head, so it is understood as declarative clause like (8ab).

So, a clause is a CP. A head C takes TP as its complement. A head T usually takes VP as its complement. We determine the type of the clause (i.e. is it declarative, interrogative, exclamatory, conditional or relative?) by checking the edge of a CP.

2 What is a relative clause construction?

According to Hiraiwa (2017), relative clauses are CPs which modify NPs. Cinque (2020) defines relative clauses as CPs or TPs (IP in his terminology) which modify NPs, but essentially their definitions are the same. TP relatives lack CP layers. What Cinque (2020) claims are TP relatives are examples like below:

12) (a) I have something [TP to eat]
(b) I have books [TP to read]

(12b) means "books which should be read" or "books I should read." I will discuss below whether these constructions are TPs or CPs.

CP relatives are typical English relative constructions. Examples of these are as follows:

13) (a) [D the [NP book [CP which he wrote]]]
(b) [D the test [CP he took] was easy.

In (13a) example, CP *which he wrote* modifies NP *book.* In essence, the CP *which he wrote* tells us what kind of book is mentioned now. Hiraiwa (2017) calls a NP (or DP) outside the CP **external Head**. In traditional grammar, external Heads are called antecedents. In (9 ab) examples, *(the) book* and *(the) test* are both external Heads of relative clause constructions.

In contrast to external Heads, a NP (or DP) inside a relative clause CP is called **internal Head.** Some languages show internal Heads in relative clause constructions. (14a) is from Lakhota, which is a Native American Language. (14b) is from Ancash Quechua, which is a

Peruvian indigenous language.

14) (a) [[Mary *owįža* wą kağe] ki] he ophewathų.
Mary quilt ID make D DEM 1SG. Buy
'I bought the quilt that Mary made.' (Hiraiwa, 2017: 2045)

(b) [Numa *bestya-ta* ranti-shqa-n] alli bestya-m ka-rqo-n.
man horse-ACC buy-PERF-3 good hourse-VALID be-PAST-3
'The horse that the man bought was a good horse.' (ibid.)

Hiraiwa (2017) claims that in (14a) *owįža* 'quilt' in relative clause is the internal Head of relative clause construction, and in (14b) *bestya-ta* 'horse' in relative clause is the internal Head of relative clause construction.

Examples like (13-14) make us believe that relative clause constructions have either internal or external Heads. However, there are some languages which show both internal and external Heads.

15) (a) [[**doü** adiyano-no] **doü**] deyalukhe
[[**sago** give.3PL.NONFUT-CONN] **sago**] finished. ADJ
'The sago that they gave is finished.' (Cinque 2020: 90, he cites this example form De Vries 1993 *Forms and Functions in Kombai, an Awyu Language of Irian Jaya*, :77 and 78)

(b) [[**gana** gu fali-kha] **ro**] na-gana-y-a.
[[**bush.knife** 2SG carry- **thing**] my bush. knife-
go. 2SG.NONFUT] TR-PRED
'The bush knife that you took away is my bush knife.' (ibid.)

Examples (15ab) are from a Papuan Trans New Guinea OV language Kombai. Both internal and external Heads appear in Kombai relative clause constructions. Bold typed nouns in (15ab) examples are internal and external Heads of Kombai relative clauses. Cinque (2013, 2020) names this structure **double-Headed**.

Cinque (2020) reports other languages which show double-Headed constructions. A Sintic language Wenzhounese is one of them. This language, according to him, has double-Headed relative constructions.

16) (a) ŋa33-bo21 ɦo342 **na42-ŋ'44** ke?0 **na42-ŋ'4**…
grandma draw **child** rel **child**
the child who the grandma draws… (Cinque 2020: 93, he cites this example from Hu, S., Cecchetto,C. and Guasti, M. T. 2018 "A new case for structural intervention: Evidence from Wenzhounese relative clauses." *Journal of East Asian Linguistics* 27 (3))

In (16), bold faced NPs (i.e. **na42-ŋ'44** 'child') are internal and external Heads of this relative clause constructions.

Languages which usually show either internal or external Head relative clauses sometimes show double-Headed constructions. Japanese relative clause is usually externally Headed (*pace* Hiraiwa 2017).

17) (a) Naomi-wa [[Ken-ga katte-kitekure-ta] *ringo*]-o tabe ta.
Naomi-TOP Ken-NOM buy-come.BEN-PAST apple-ACC eat-PAST
(Hiraiwa 2017: 2041)

In this (17) example, *ringo* 'apple' is the overt Head of the relative clause and, according to Hiraiwa (2017) and Cinque (2020), this is positioned outside the relative clause. So, Japanese has external-Headed relative clause constructions. Hiraiwa (2017) cites examples similar to (18) as cases of Japanese internal relative clause constructions. However, Cinque (2020) is indecisive.

18) (a) Naommi-ga [Ken-ga naku no]-o nagusameta.
Naomi-NOM Ken-Nom weep no-ACC comforted
'Naomi comforted Ken, who was crying.' (Cinque 2020: 80, he cites this example from Kitagawa, C. 2005. "Typological variations of head-internal relatives in Japanese." *Lingua* 115: 1245)

According to Hiraiwa (ibid.), the internal Head of the relative clause in (18) is *Ken*. However, this seems to me dubious.

We put aside this issue now and move on. Japanese, which usually shows externally-Headed relative clause constructions, sometimes shows doubly-Headed relative clause constructions. Cinque (2020) reports the following cases.

19) (a) [[watakusi ga **sono hito** no namae o wasurete-simatta] **okyaku-sama**]…

[I NOM　　that person's　namae　　ACC have forgotten]　　guest]
'a guest whose name I have forgotten…　　(Cinque 2020: 82, Kuno 1973: 237)

This (19) example may not be a true relative case. This may be just a pragmatically related clause.

There is a following principle called **structural uniformity principle.**

20) **Structural Uniformity Principle**
All constituents of the same type belong to the same category.　(Radford 2016: 396)

This principle is based on the Uniformity Principle put forward by Chomsky (2001).

21) **Uniformity Principles**
In the absence of compelling evidence to the contrary, assume languages to be uniform, with variety restricted to easily detectable properties of utterances.　(Chomsky 2001: 2)

These are widely accepted by many researchers on generative grammar.

Structural Uniformity Principle (20) means that an internal structure of a given expression is the same. For example, I mentioned so called TP relative clauses above. For reasons of convenience, I repeat (12) as (22)

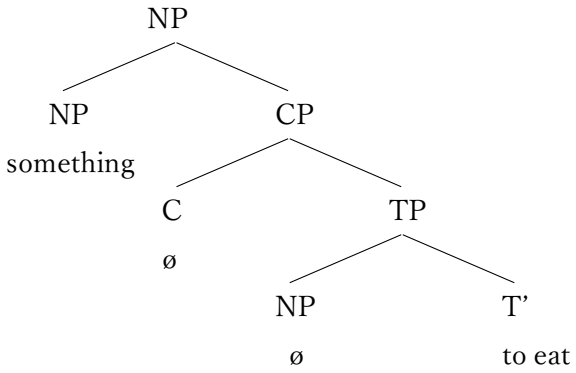
22) (a) I have something [TP to eat]
(b) I have books [TP to read]

There are also examples like (23).

23) (a) There is nothing [CP *for* me [TP to talk about]]
(b) This library has many books [CP *for* students [TP to read]]
(c) I found a book [*for* you to read]　　(Chomsky and Lasnik 1977: 434)

(22) and (23) are different in that (23ab) have *for + subject*. However, their interpretations are similar. Both (22) and (23) allow 'should' readings. If you accept structural uniformity principle, you need to admit that internal structures of both (22) and (23) are the same—namely, CPs. (22ab) have null Cs as heads of their projections. We can draw tree diagrams of (22b) and (23b) as follows:

24)



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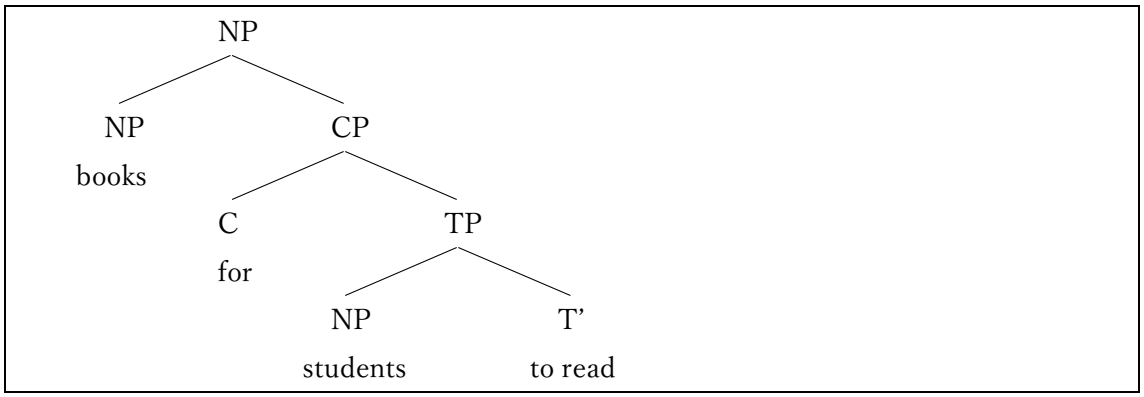


If you adopt this analysis, you realize that so-called TP relative clause are in fact CPs. This analysis is also plausible because other majority relative clauses are CPs. In structural uniformity's point of view, all relative clauses need to be CPs.

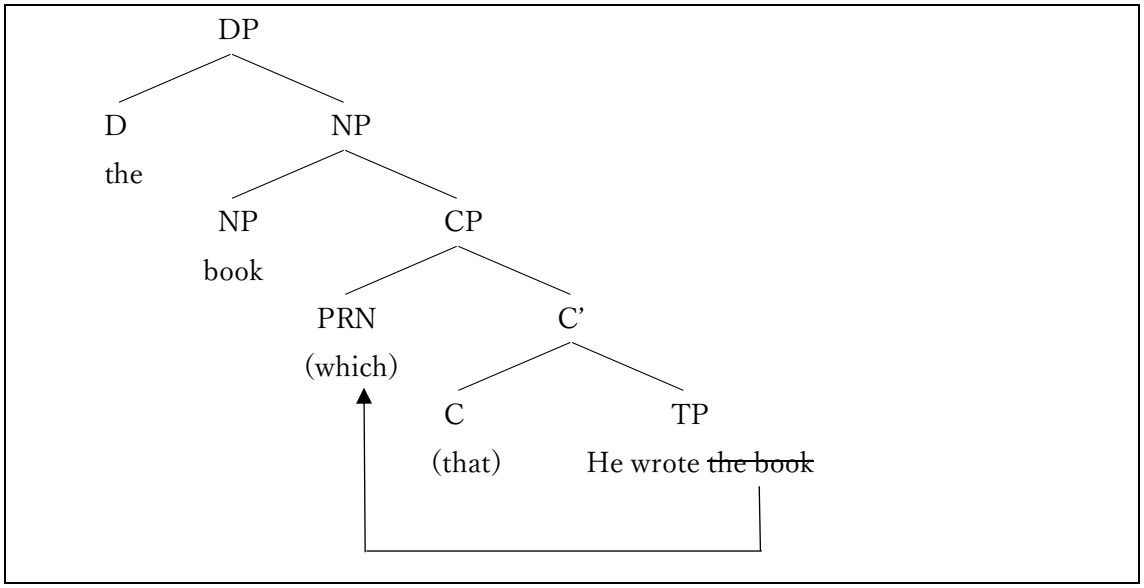
Based on these (15) to (19) examples and structural uniformity principle, Cinque (2013, 2020) claims that relative clause constructions are essentially **double-Headed**. According to him, all relative clause constructions in all human languages have both internal and external Heads.

If we accept his claim, the question remains why many languages including English show only one Head.

According to Cinque (2020), in many languages either internal or external Heads are phonologically deleted by matching internal and external Heads Exact mechanism of the way this deletion works is difficult to explain, but I show rough sketches of Cinque's (2020) idea.

26) (a) the book [CP which he wrote]
(b) the book [CP that he wrote]
(c) the book [CP [C **ø**] he wrote]

27)



According to Cinque (2020), ~~*the book*~~ inside TP is the internal Head of this relative clause construction. When this internal Head matches exactly with the external Head, which is the antecedent of this relative clause, the internal head is phonologically completely deleted. This complete deletion generates (26b) *the book that he wrote* and (26c) *the book he wrote*. When the internal Head and external Head do not exactly match, internal head is (phonologically) partially deleted and changes into relative pronoun *which*. So, if his claim is correct, English relative pronouns such as *which* and *who* are internal Heads. This leads us to conclude that English relative clause constructions with overt relative pronouns such as ***the book [which** he wrote]* are double-Headed constructions.

Cinque's (2020) claim may seem to be extraordinary at first sight. However, if you carefully consider the definition of relative clause constructions, you realize that this is not so. Relative clause are defined as "CPs which modify NPs (or DPs)". Simply put, a CP is a clause (i.e. a sentence). In this case, "modify" means that the CP describes the NP (or DP). If you try to describe NP by using a clause (i.e. a CP), you usually use the same NP once more or use similar NP. For example, if you want to describe a DP *the car* and you are allowed to use a sentence, you may say like below:

28) **The car**. John bought {**the car, it**}.

(28) is similar to double-Headed relative clause constructions. In fact, if you try to describe a noun by using a sentence, it is almost inevitable to use the noun or similar noun once more. So, I conclude that double-Head analysis to relative clause constructions is a theorem.

3 WH-Movement Approaches to Relative Clause Constructions

The tree diagram in (27) is somehow reminiscent of wh-movement, which applies when you make wh-question phrases. Chomsky and Lasnik (1977) and many other researchers claim that wh-movement also applies when you make relative clauses.

Following their claim, we are going to build an English relative clause construction by wh-movement approach. First, we merge V *write* with a relative pronoun *which* to get VP *write which*. The V *write* gives a semantic role THEME to the c-commanded relative pronoun. (A constituent X c-commands a constituent Y and constituents contained in Y iff X and Y are sisters. Radford 2009) So, the relative pronoun *which* is understood as an entity which undergoes the result of some action. Then we merge T (tense) affix *–ed* with this VP to get T bar *–ed write which*. Then we merge this T-bar *–ed write which* with specifier *he* to get TP *he –ed write which*. Then we merge this TP with null C *ø* to get C-bar *ø he –ed write which.* This null C head *ø* has wh-feature which attracts wh-word to the edge of the CP. (Radford 2016) We have two options. We either move relative pronoun *which* to head **or** specifier of C position. Only heads can move to another head position. relative pronoun *which* is a maximal projection because this is treated as a complement. So, we move relative pronoun *which* to the specifier of C position. At the same time, the moved relative pronoun leaves a copy of itself at its original position. (This copy idea is from Chomsky 1995, 2005.) Thus far, we made a relative clause CP *which ø he –ed write which.*

Then we merge this CP *which ø he –ed write which* with the antecedent of the relative clause NP *book.* The relative clause CP acts as an adjunct. So, we get a larger NP *book which ø he –ed write which.* Then we merge this larger NP with a definite determiner *the*. When we pronounce this phrase, two things happen. First, we lower the tense affix *–ed* to the V position because we cannot pronounce tense affixes without verbs. (This idea of lowering tense affixes when you pronounce sentences can be traced back to Chomsky 1957.) Second, we silence the copy of the relative pronoun *which*. (This copy and deletion theory is from Chomsky 1995. See Chomsky 2005 and 2021 for Minimal Search theory.)

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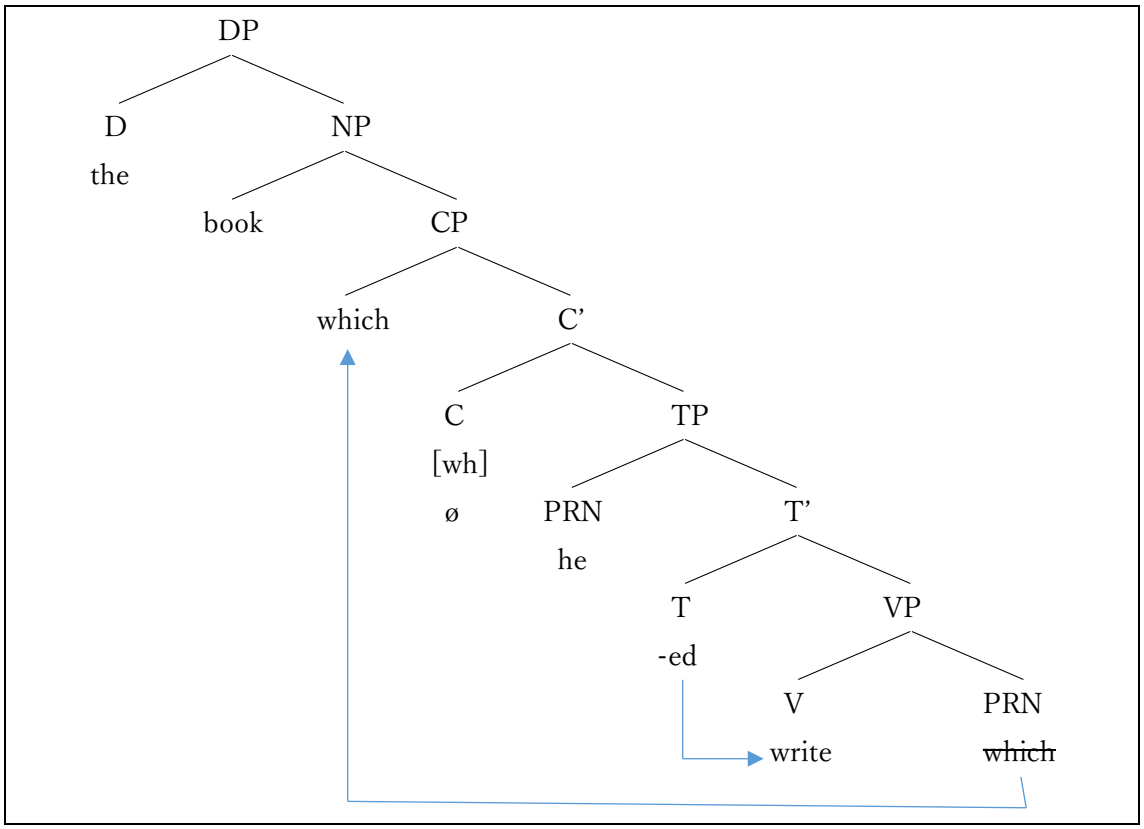


Wh-movement

The way we generated this relative clause construction with an overt relative pronoun can be applied to other relative constructions.

By using null relative operators instead of overt relative pronouns such as *who* and *which,* we can generate relative clause constructions without (overt) relative pronouns. For example, *the book [OP-REL he wrote]*.

We can also generate phrases with overt complementizers like *the book [**that** he wrote]*. In this case, we use overt complementizer *that* instead of a null complementizer. So-called relative pronoun *that* is in fact a complementizer, which is essentially the same as *that* in the following sentence: *I know [**that** he is guilty]*.

We find occasional examples of [wh- that TP] type relatives in older English. This fact supports the claim that *which* and *who* are relative pronouns but *that* is a complementizer.

30) he can do no better than shew hym the vttermoste of hys malysyous mynde [*which that*

he beryth toward hym]. (*Merry Tales* 25 [Quoted by Rissanen 1999: 296])

This example is from Early Modern English, which was spoken from about 1500 to 1700. In this example, both relative pronoun and complementizer are overt.

4 Antecedent raising approach to relative clause constructions

Thus far, we saw how wh-monement approach works. However, some cases of relative clause constructions have been reported that cannot be made by this approach.

31) The *portrait of himself* [which John has painted] is extremely flattering. (Radford 2016: 419)

Chomsky (1981) formulated constraints on uses of anaphors (such as *himself*), pronominal (such as him) and R-expressions (such as *John*). According to him, an anaphor must be c-commanded by an appropriate constituent (like he or John) in closest TP. (This rule is called principle C.) In this example, *himself* is an anaphor but it is not c-commanded by any appropriate constituent.

If principle C is violated, the sentence itself becomes ungrammatical or the anaphor cannot refer to the antecedent. In theory, (30) is ungrammatical or the anaphor *himself* cannot refer to *John*. However, according to Radford (2016) and other researchers, sentences like (31) are grammatical and the anaphor *himself* can refer to *John*, which does not c-command *himself*.

Before we move on to other examples which are not compatible with wh-movement approach, we check how idiom expressions are made in generative grammar.

The English language has structures called idioms. Each idiom phrase has a meaning which is unpredictable from its component words (Radford 2004). Examples of idioms are as below:

32) (a) All hell broke loose.
(b) He made headway.

All hell breaks loose means "suddenly there is pandemonium" (Concise Oxford English Dictionary 12th edition). *Make headway* means "to make progress towards achieving

something" (Longman Dictionary of Contemporary English 6th edition). According to Radford (2004), each word in idioms must originate in only one order. For example, in (32a), V head *make* requires NP *headway* as its complement. This V merges with NP and we get V-bar *make headway.* So, "make" and "headway" in idiom phrase "make headway" can only occur in this order: we cannot replace original words with synonyms or reverse word orders. In similar fashion, in (32b) *All hell broke loose,* V *break* requires adjective *loose* as its complement. This V merges with A to generate a unitary constituent: V-bar *break loose*. This V-bar then requires QP *all hell* as its specifier. This QP and V-bar merges to generate VP *All hell break loose.*

We keep in mind the way we generate idioms and check the following examples.

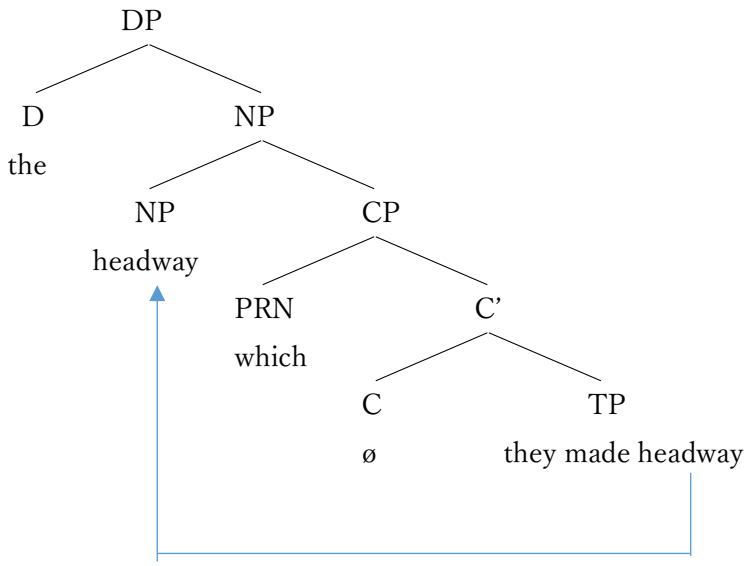
33) (a) The headway [which they have made] is impressive. (Radford 2016: 406)
(b) The string [which Mary pulled] got him the job.

We make (33a) example in the following way. We merge V *make* with relative pronoun *which* to get VP *make which*. We merge T *have* with the resulting VP *make which* to get T-bar *have make which*. Then, we merge specifier *they* with this T bar and get a whole TP *they have made which*. We merge null C head *ø* with this resulting TP. This C has wh-feature and attracts minimal maximal wh-projection. Relative pronoun which is such a projection. So, null C head attracts the relative pronoun *which* to its edge. Relative pronoun *which*'s landing site is specifier of C position.

Thus far, we have got a relative clause CP *[which they have made which].* We merge the resulting CP with NP *headway* as the next step. However, this is against the way we make idioms. NP *headway* originates in a position which precedes V *make*. NP *headway* need to be generated as complement of V *make* in order to allow idiom reading. (33ab) violate this rule but accepts idiom reading. This is puzzling.

Donati and Cecchetto (2011) solve this problem in a quite straightforward way. They propose Antecedent Raising analysis of relative clauses. According to them, antecedents are generated inside relative clauses and 'raised' to the antecedent positions.

34)



Antecedent Raising

According to Donati and Cecchetto (2011), NP *headway* is generated as complement of V *make*. After we have made relative clause CP *which ø they made headway*, this NP *headway* is 'raised' to the antecedent position.

Their claim has some advantage. If we adopt antecedent raising approach, we follow the rule by which idioms are made. In the tree diagram (34) *made headway* is generated as a unitary constituent. After that, we raise NP *headway* out of the CP (or TP).

If we adopt antecedent raising approach, we do not violate principle C of binding conditions. We make TP *John has painted (a) portrait of himself*. After that, we 'raise' NP (or DP) *(a) portrait of himself* out of this TP to the antecedent position. The resulting phrase is as follows:

35) the [NP portrait of himself [CP which [C ø [TP john has painted ~~(a) portrait of himself~~]]]]

Antecedent Raising

In essence, they claim that internal Heads move to external Heads' positions.

5 We need to refine antecedent raising approach.

Donati and Cecchetto's (2011) original analysis has problems. First of all, what attract the movement of the antecedent?

Constituents usually move when they are attracted by higher heads. For example, WH-question words such as *when* and *where* moves when they are attracted by null C which has wh-feature which attracts a Question Phrase (QP). For example, in CP *ø you saw what*, QP what moves to the specifier of C position because this null C has wh- feature and T feature. These features of null C attract QP *what* and T affix *-ed* to the edge of CP. The resulting sentence is CP *What did you ~~-ed~~ see ~~what.~~*

When you make yes-no question sentences, you move constituents in T head position to C head position. *You are clever* is changed to *Are you ~~are~~ clever?* in a yes-no question. *He speaks English* is changed to *Does he ~~-s~~ speak English*? in a yes no question. In English, null Cs in yes-no questions have T features and they attract nearest constituents in T positions. (Radford 2009)

When movement occurs, moved elements are attracted by some higher constituents. However, in antecedent raising analysis what attracts the movement of antecedents?

If we suppose NP in antecedent position is originally null and it has NP feature and it attracts NP to the edge of NP, we violate Impenetrability Condition.

36) **Impenetrability Condition**

> A constituent c-commanded by a complementiser C is impenetrable to (so cannot agree with, or case-marked by, or be attracted by etc.) any constituent c-commanding the CP headed by C. (Radford 2016: 356)

37) [NP ø [CP which [C ø [TP John has painted ~~(a) portrait of himself~~]]]]

Antecedent Raising

Impenetrability Condition (36) says that null NP in antecedent position cannot attract the movement of the internal Head NP *headway* to the null NP's edge. This movement is across the C, so (36) bans this. How do we get around this problem?

Radford (2016) separates movement into two cycles. According to him, relative pronoun *which* is a relative determiner when used in antecedent raising approach. We merge this relative determiner *which* with NP *portrait of himself* to get DP *which portrait of himself*. We

make TP *John has made which portrait of himself*. The anaphor himself is c-commanded by John.

We merge this TP with null C *ø* to get CP *ø John has made which portrait of himself.* This null C *ø* has wh-feature, which attracts *which portrait of himself* to the edge of CP. This movement is wh-movement. Thus far, we made (37).

38) [CP which portrait of himself [C ø] [TP John has painted ~~which portrait of himself~~]]

Wh-movement

According to Radford (2016), we merge this CP with a null NP. We suppose this null NP has NP feature which attracts closest NP c-commanded by the null NP to the edge of this null NP. In this case, we move *portrait of himself* out of specifier of CP to specifier of NP. According to him, this movement is antecedent raising.

39) [NP portrait of himself [N ø] [CP which ~~portrait of himself~~ [C ø] [TP John has painted

Antecedent Raising

~~which portrait of himself~~]]]

However, whether you can extract NP out of DP is under question.

6 We do not need antecedent raising.

Here, I make a tentative claim. We do not need antecedent raising approaches. My claim is based on several reasons.

First, the claim that there are two different mechanisms to make restrictive relative clause constructions is not plausible. Radford (2016) says some restrictive relative clauses are made by antecedent raising and others are made by wh-movement. This is because there are some relative clause constructions which antecedent raising approach cannot make.

40) (a) Pat pulled the string [which got Chris the job] (Radford 2016: 436)

(b) I saw the picture of myself yesterday [that John liked] (Radford 2016: 435)

(c) John noticed *a ma*n and Mary spotted *a woman* [**who** it seems were behaving suspiciously] (Radford 2019: 48)

According to Radford (2016, 2019), these examples cannot be made by antecedent raising. If we made (40a) by antecedent raising, we would disturb word order of the idiom structure. If we made (40b) example by antecedent raising, we would violate principle C of binding conditions. In (40b) relative clause is extraposed. A word *yesterday* intervenes between the antecedent and the relative clause. In this case, antecedent raised NP *picture of myself* need to jump over *yesterday*. This seems to be too far. In (40c), relative pronoun *who* has split antecedents (*a man/ a woman*). Antecedent raising approach cannot make such constructions. In this cases, Wh-movement generates relative clause constructions.

These examples made Radford conclude that relative clause constructions are made by both wh-movement and antecedent raising (Radford 2016, 2019). However, this claim is counterintuitive. If relative clauses are made by these different approaches, this seems to be against the spirit of **structural uniformity principle** (20), which I repeat here as (41).

41) **Structural Uniformity Principle**

All constituents of the same type belong to the same category.
(Radford 2016: 396)

This principle is put forward for language acquisition issues. If relative clause constructions are made by two mechanisms, it is difficult for children to learn relative clause constructions. If relative clause constructions are made by only one mechanism, that is theoretically more plausible.

Second, and third reasons are closely related. The following is my second reason for discarding antecedent raising approaches. J.R. Ross (1967) wrote PhD theses, the title of which is *Constrains on Variables in Syntax*. According to Radford (1981), Ross studied on many phrases and found that some phrases do not accept any extractions out of the phrases. Ross called these phrases **islands**. Radford (1981) says that Ross reported that **relative clauses are islands**. In other words, you cannot extract any constituents out of relative clause CPs.

In spite of Ross's claim, antecedent raising approach extracts NPs (or DPs) out of relative clauses. This is my second reason for discarding antecedent raising approaches.

Ross (1967) also claims that 'Noun Complement Clauses are islands'(Radford 1981: 218). This is reminiscent of Impenetrability Condition (36), which I repeat here as (42) for convenience.

42) **Impenetrability Condition**

A constituent c-commanded by a complementiser C is impenetrable to (so cannot agree with, or case-marked by, or be attracted by etc.) any constituent c-commanding the CP headed by C. (Radford 2016: 356)

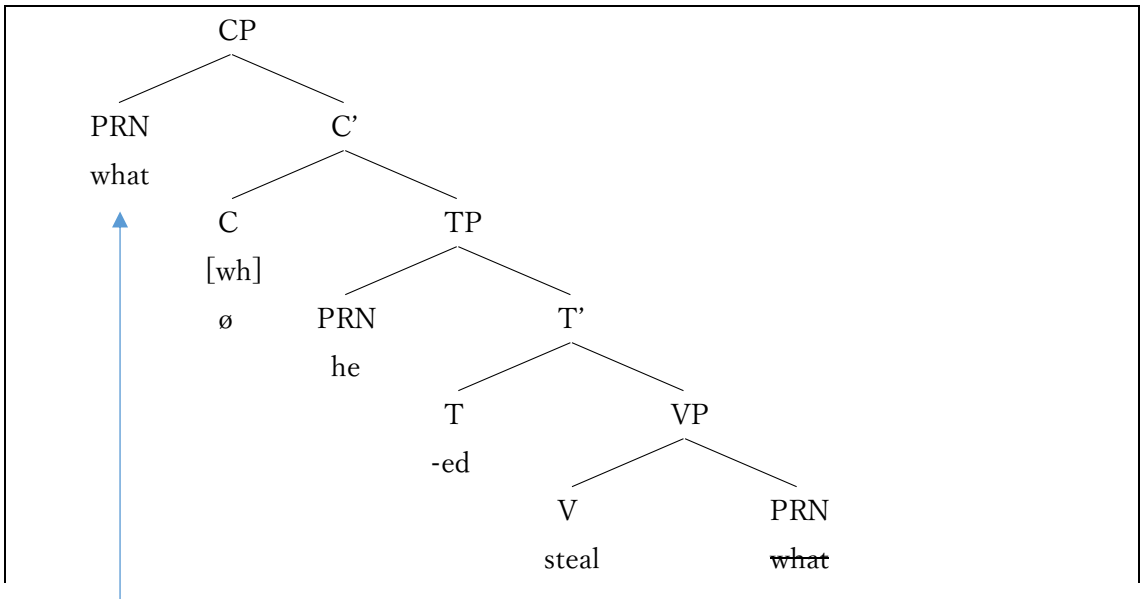
You may wonder why this condition and islands exist. Chomsky (1998, 2001) put forwarded an insightful idea. Radford (2009) explained and refined them. Impenetrability condition and some islands exist because we build sentences by phases. According to them, our working memory is so small that we do not retain a full sentence in memory when we are making it. We make a part of a sentence and when that part is complete, we send it to the phonological component. This part is called 'a phase.' Then we move on to the next phase. I quote Radford. Syntactic structures are built up one phase at a time,' (Radford 2009: 379)

For example, we make example (43) following Chomsky's phase theory.

43) What do you think (that) he stole?

V *steal* is merged with wh-question pronoun *what* to form VP *steal what*. The resulting VP is merged with T (Tense affix) *-ed* to form T-bar *-ed steal what*. We merge *he* as specifier with this T-bar to get a whole TP *he -steal what*. This TP is merged with null C head *ø* to form C-bar *ø he -ed steal what*. This null C ø has wh-feature which attracts wh-question pronoun *what* to the edge of CP. The landing site of this *what* is specifier of CP.

44) a



I quote Chomsky's words. 'Suppose, then we take CP and vP to be phases' (Chomsky 2001: 12). We do not use vP analysis here, so we can forget about it. What he means is that CP is a phase. When we merge C head *ø* (or *that*) with TP, the domain of C, which means the complement of C (i.e. TP), is sent to the phonological component 'to be assigned appropriate phonetic representation' (Radford 2009: 380). When TP has been sent to phonological component, the TP is inaccessible for further syntactic operations. This means we cannot extract constituents out of TP or constituents inside TP cannot agree with constituents outside the relevant TP. This leads to Impenetrability Condition (42) and island conditions on Noun Complement Clauses.

You may wonder why question pronoun *what* is extracted from the TP. The answer is as follows. At the same time C head *ø* (or *that*) merges with TP, the wh-feature of C attracts *what* to the specifier position of CP. C head send only its domain (its complement—namely, TP) to the phonological and semantic components. Specifier of C position is not yet sent to phonological and semantic components. According to Chomsky (2001: 12), when the TP is 'handed over' to the phonological component, the copy of *what* is phonologically deleted.

Chomsky (2001) put forward Phase Impenetrability Condition (45).

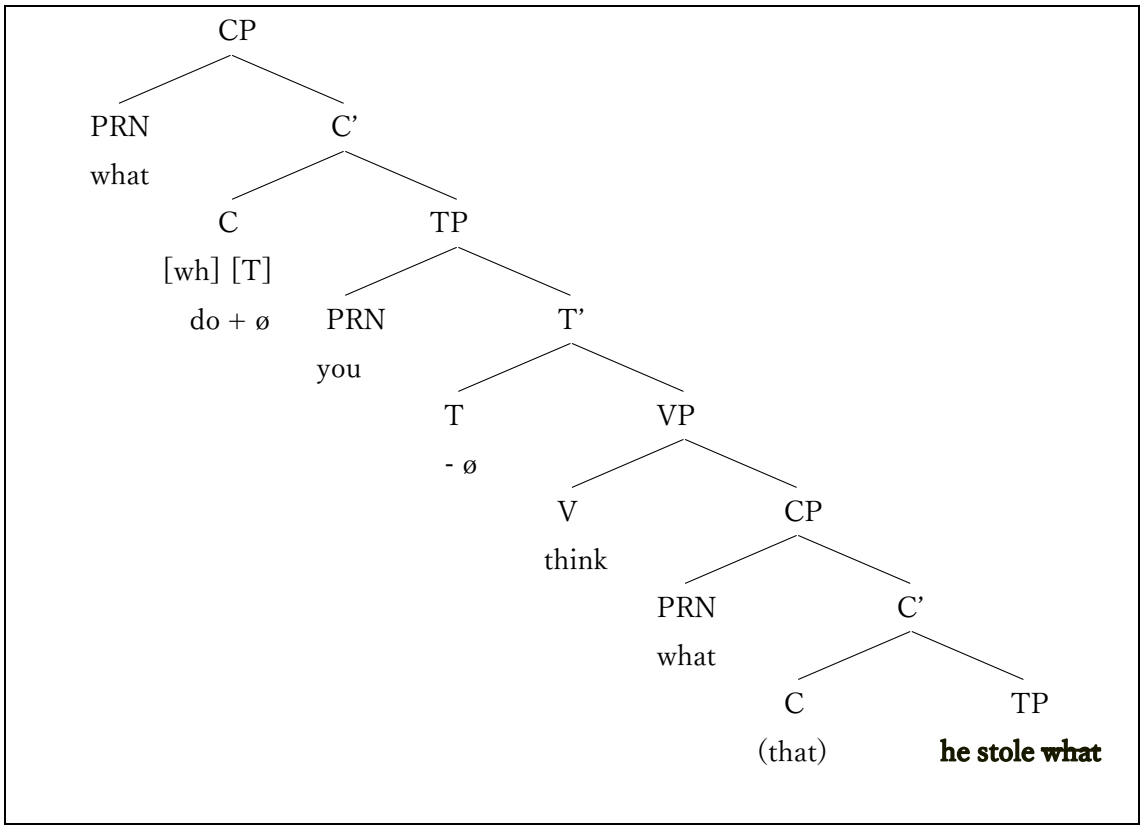
45) **The Phase-Impenetrability Condition (PIC)**

> The domain of H is not accessible to operations outside HP; only H and its edge are accessible to such operations. (Chomsky 2001: 13)

The Phase-Impenetrability condition is similar to Impenetrability Condition (42). In fact, Impenetrability Condition is based on Phase Impenetrability Condition. PIC tells us that we can use specifier of C and C itself in the next phase.

We move on. The CP *what ø he -ed steal what* is merged with V think to form VP *think what ø he -ed steal what.* We merge T - ø with the resulting VP to get T-bar - *ø think what ø he -ed steal what.* We merge a pronoun you with this T-bar to get a full TP you - *ø think what ø he -ed steal what.* This TP is merged with null C ø, which has both T-feature and wh-feature. At the same time this C merges with the TP, these features of C attract a constituents in T position and wh-pronoun *what* to the edge of CP. The resulting sentence is *What do you think (that) he stole.* This is the same as the sentence (43).

46) a



The important point is that the higher C ø, which has both T feature and wh-feature, cannot attracts constituents inside lower TP. Lower TP, which is indicated by **bold** font, has been already sent to the phonological component. So, we cannot extract T *-ed* out of it. This lower TP is 'frozen'. However, *what* is in specifier of CP, which is outside the TP. So, *what* can be moved to the specifier of higher CP position.

This is a rough picture of Chomsky's phase theory. Once TP is sent to the phonological component, the constituents inside the TP cannot move nor transfer any information outside the TP. In other words, constituents in the edge of C may be able to transfer its information to constituents which is in the next phases. This idea leads to my fourth reason for discarding antecedent raising approaches.

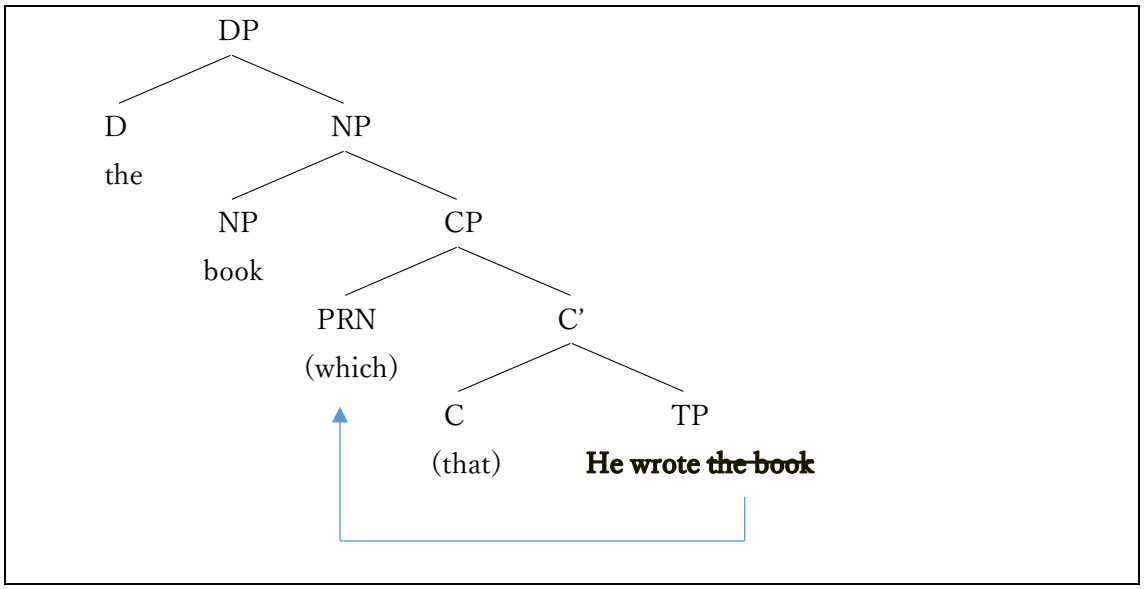
We see above Cinque's (2020) claim that internal heads are changed into relative pronouns. I repeat the tree diagram (27) as (48) just for convenience.

47) (a) the book [CP which he wrote]

(b) the book [CP that he wrote]

(c) the book [CP [C ø] he wrote]

48) a



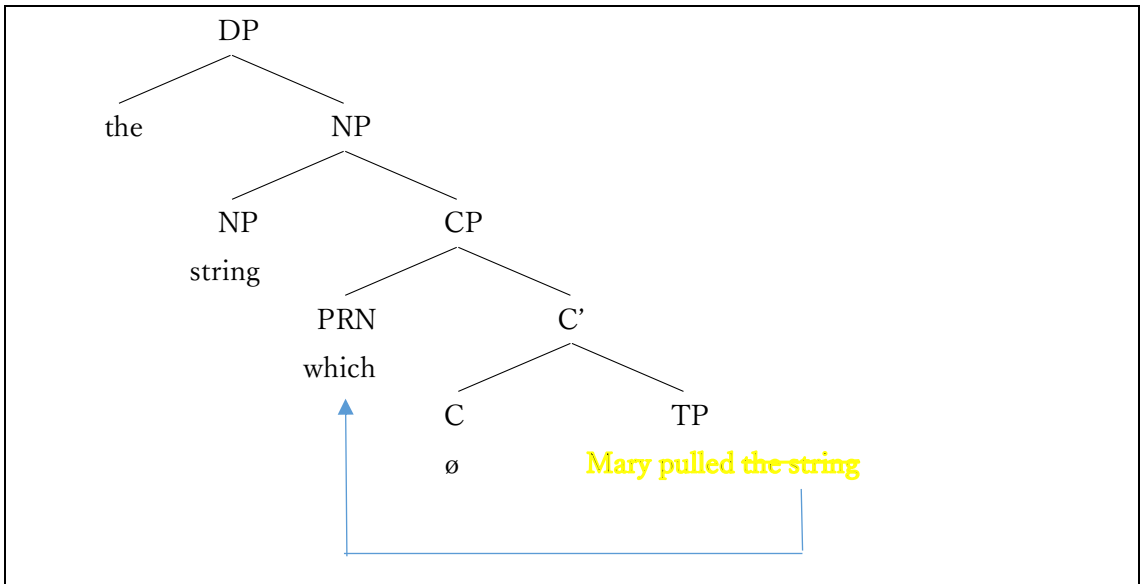
I used bold font to indicate a CP phase. The complement of C is TP. This is called the domain of C. When C merges with TP, two things happen. First, C attracts relative pronoun to its specifier. Relative pronoun *which* was originally *the book* in TP, so wh-feature may be no use here. We suppose that this C has something like an internal head feature. C attracts an internal head to its specifier. Or, DP the book in its original position changes to *which* when C merges with TP. I have no idea here. However, the result is that relative pronoun *which* or relative operator is in specifier of C position.

Specifier of C is outside the domain of C, which is TP. Specifier of C can send information to the constituent outside the TP c-commanded by the C.

If we adopt Cinque's (2020) analysis, we can resolve issues about relativized idioms.

49) The string [which Mary pulled] got him the job. (=33b)

50) A

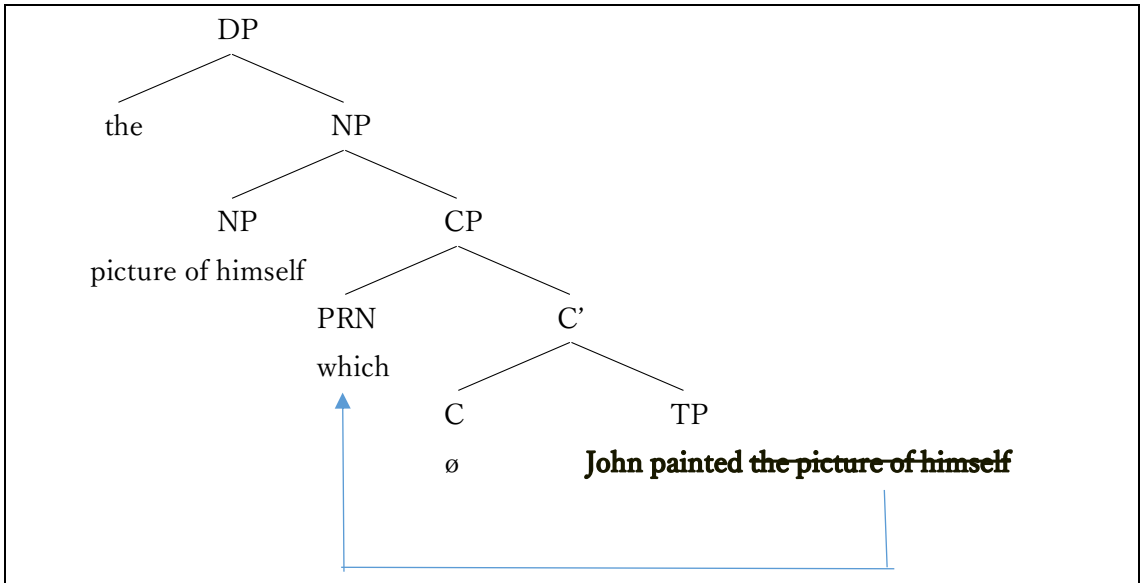


DP *the string* generated as the complement of V *pull* changes into a relative pronoun *which*. This relative pronoun is moved to the specifier of C position, which is outside of the lower TP. Lower TP is sent to the phonological and semantic component for processing, so constituents inside it cannot transfer information to the constituents outside the TP. However, relative pronoun, the origin of which is DP *the string*, can transfer information to a constituent in the next phase because the relative pronoun which is in specifier of C position. This relative pronoun, I suppose, send its information to the antecedent NP *string* when it is merged.

We also resolve the issue of principle C violation in relative clause constructions. Sentences like *the picture of himself John painted is hanging on the wall* is grammatical and anaphor *himself* can refer to *John* in spite of the fact that the anaphor himself is not c-commanded by John.

I claim that if we adopt cinque's (2020) claim that internal Heads change into relative pronouns or relative operators, we can get over the issue of principle C violations.

51) a



Relative pronoun *which* is originally generated as DP *the picture of himself*. *Himself* in this DP is c-commanded by *John*. This DP changes into the relative pronoun *which* (Cinque 2020). This relative pronoun is in specifier of C position, so it is outside the CP domain. (CP domain is TP, which is c-commanded by C.) The relative pronoun inherits the information about anaphor *himself* and its antecedent. As the next step, relative pronoun which may send information to NP *portrait of himself* when this NP is merged with relative CP. This claim is rather tentative. When generated, *himself* in higher position is not c-commanded by any appropriate antecedents. However, Cinque (2020) cites several examples which showed that antecedent and anaphor relationship sometimes violates the principle C of binding conditions. In these cases, he claims that context plays a big role. I adopt his claim. The highest *himself* can find information about its antecedent in relative pronoun *which*, which is outside the CP domain and active for interpretation.

The above is my third reason for discarding antecedent raising approaches. If You adopt my claim, you do not extract any constituents out of relative clauses. This means that you follow Ross's claim that relative clauses are islands. You cannot extract constituents out of islands.

My fourth reason for discarding antecedent raising approach is also related to islands and phases. I do not have idea whether Ross claimed DPs are islands. However, according to

Radford (1981), Ross claimed that Complex NPs are islands. In 1960's, when Ross made this important work, DPs were analyzed as NPs. Determiner are treated as specifiers of NPs. If what Ross meant in his work as NPs are DPs in today's terminology, we can modify Ross's claim. We may be able to say that DPs are islands. Whether all DPs are islands or not is under question. However, following examples show DPs do not allow free extractions out of them.

52) (a) I failed the exam.
(b) The exam, I failed.
(c) *Exam, I failed the _.

Example (52b) is an example of topicalization. This shows that DP can move as a whole. (52c) shows that we cannot extract NP out of DP. Chomsky (2001) says as follows. 'Like TP, NP cannot be extracted, stranding its functional head' (Chomsky 2001: 14). TP is unable to be extracted because it is the domain of C and CP is a phase. NP is unable to be extracted probably because DP is a phase and its domain is NP. It is 'frozen' when we reach DP phase. Chomsky (ibid.) also claims 'the general typology should include among phases nominal categories' (Chomsky ibid.).

What I would like to say is that DP is a phase. You cannot separate Determiner head from NP once you merge them. However, if we follow Radford's (2016) analysis of antecedent raising, you have to separate relative determiner which and NP after they have merged. This may be against the sprits of phase theories.

In conclusion, I claim that I discard antecedent raising approaches. English relative clause constructions are made by only one mechanism—namely, wh-movement.

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