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Language variation and the labeling of modification structures*

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Abstract: Japanese is known to allow various kinds of adnominal clausal modifiers. Although this is often assumed to be just the nature of the language, this paper shows that it is explained by the labeling mechanism of the language. It is known that English, for example, employs feature-sharing extensively for the labeling of {XP, YP} structures. This paper argues that Japanese, which lacks ϕ-feature agreement, appeals to weak heads for the purpose. More concretely, XP provides the label for {XP, α} if α is a weak head or search into α finds a weak head, and among the weak heads in Japanese are Case markers and predicate inflection. As adnominal clauses accompany prenominal inflection, NP provides the label for {{TP, inflection}, NP}. This makes it possible for the language to label complex NPs in which the embedded clause is neither a complement of N nor a relative clause.

Keywords: labeling, adnominal modifiers, {XP, YP} structure, ϕ-feature agreement, weak heads, attributive adjectives, relative clauses

1. Introduction

It has been known since Kuno (1973) that Japanese allows adnominal clausal modifiers such as those in (1).

(1) a. [sakana-ga yake-ru] nioi
fish-NOM burn-Pres. smell
'the smell of fish burning'
b. [dareka-ga doa-o sime-ru] oto
someone-NOM door-ACC close-Pres. sound
'the sound of someone closing the door'

This fact has attracted much attention as their apparent English counterparts in (2) are ungrammatical.

(2) a. *the smell [that fish burns]
b. *the sound [that someone closes the door]

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The properties of examples like (1) are discussed in detail, for example, in Matsumoto (1997) and Murasugi (2000). Matsumoto, Comrie and Sells (2017) consider the contrast between (1) and (2) from a typological perspective. The volume is a collection of papers on several languages and each paper examines whether a particular language belongs to the Japanese type or the English type.

The goal of this paper is to show that the possible forms of adnominal clausal modification are not chosen by a language, but are explained by the syntax of the language. In particular, I argue that whether a particular form is allowed is determined by the labeling mechanism employed by the language. I first go over the labeling mechanisms in English and Japanese in Sections 2 and 3. Section 2 introduces the labeling algorithm of Chomsky (2013, 2015). In Section 3, I outline the labeling mechanisms of Japanese that I proposed in Saito (2016, 2018). Then, I argue in Section 4 that the contrast between (1) and (2) follows from the labeling theory. That is, the examples in (1) are successfully labeled whereas those in (2) are not. The proposed analysis implies that a modification structure as in γ = {modifier, modified} is not automatically labeled by the modified because of adjunction structure, but needs to be labeled through the regular labeling mechanism. This raises the question how structures with adverbial and adjectival modifiers, for example, {AdvP, VP} and {AdjP, NP}, are labeled. I consider the latter case in Section 5. There, I introduce Baker's (2003) theory of adnominal modification and show that it can be readily restated in terms of labeling. Section 6 concludes the paper.

2. Chomsky's (2013, 2015) theory of labeling

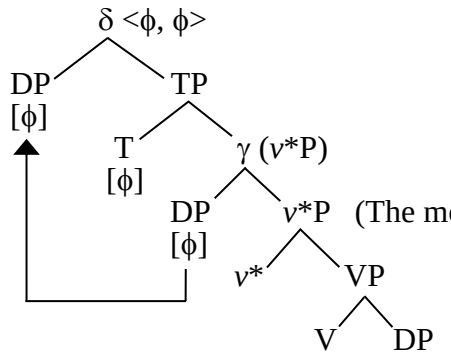
Merge is the only operation that builds syntactic structures. It combines two expressions α and β, and builds the constituent $\gamma = \{\alpha, \beta\}$. Chomsky (2013) assumes that the interpretive components require information on the nature (label) of γ. For example, when Merge combines a verbal element and a nominal element, the interpretive components need to know whether the formed constituent is a verb phrase or a noun phrase. Given this, Chomsky proposes the labeling algorithm that reads off the label of $\gamma = \{\alpha, \beta\}$ by search into γ. He considers the three cases of Merge in (3).

(3) a. γ = {H, XP} … H is the label of γ. (E.g., VP = {V, DP})
b. γ = {XP, YP}
c. $\gamma = \{H_1, H_2\}$

(3a) is the straightforward case. Search into γ finds a unique head H, and H can be assumed to be the label of γ. As a unique head cannot be identified as the label in the cases of (3b) and (3c), these structures are in principle ruled out.

However, the {XP, YP} structure in (3b) is widely observed in actual examples. Let us consider the structure of (4a) in (4b).

(4) a. The girl solved the problem.

b. 

(The movement of the subject must take place.)

The structure is built bottom-up as {V, DP}, {*v**, VP}. These are instances of (3a). When the external argument is merged, γ = {DP, *v**P}, an instance of {XP, YP} structure, is constructed. But after T is merged, the DP moves out of γ and merges with TP. Chomsky then proposes that *v**P determines the label of γ as it is the only element that γ fully contains. The moved DP forms δ = {DP, TP} at the landing site. In this case, the head D of the DP and T share the same ϕ-features because of agreement. Chomsky proposes that δ is labeled as <ϕ, ϕ> in this case. Then, {XP, YP} structures are properly labeled in the two contexts in (5).

(5) The label of γ = {XP, YP} is (i) the label of YP if XP moves out of γ,
(ii) <F, F> if X and Y share a major feature F.

This theory explains possible forms of phrase structure, stipulated in X'-theory, and the properties of movement. Let us take the latter case for illustration. Phrasal movement always creates an {XP, YP} structure at the landing site. Therefore, (5) predicts that the movement of XP can only terminate in the specifier position of a head Y that shares a major feature with X. This is observed in examples of NP-movement in (6).

(6) a. [$_{\gamma}$ Mary is likely [$_{TP}$ to [$_{v*P}$ _ [$_{v*P}$ *v** [$_{VP}$ win the race]]]]].

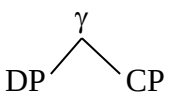
b. *(It) is likely [$_{TP}$ to [$_{\delta}$ Mary [$_{v*P}$ *v** [$_{VP}$ win the race]]]].
c. *(It) is likely [$_{\sigma}$ Mary [$_{TP}$ to [$_{v*P}$ _ [$_{v*P}$ *v** [$_{VP}$ win the race]]]]].

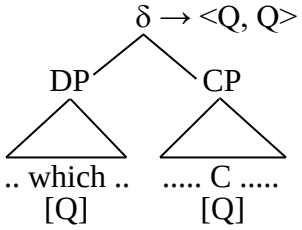
First, if the DP *Mary* stays in the θ-position as in (6b), the example is ruled out as δ = {DP, *v**P} fails to be labeled. In (6b), *Mary* moves to the embedded subject position. This example is also ruled out as there is no ϕ-feature sharing between *Mary* and *to*. Finally, (6a), in comparison with (6a, b), shows that *Mary* has to move to the matrix subject position. This is because *Mary* shares ϕ-features with the matrix T and γ = {DP, TP} can be labeled as <ϕ, ϕ>.

Chomsky points out that the prediction is borne out by wh-movement as well. The contrast in (7) shows that wh-movement must terminate in the specifier position of an interrogative CP.

(7) a. *Do you think [$_{\gamma}$ which book [$_{CP}$ that [$_{TP}$ John bought _]]]?
b. [$_{\delta}$ Which book [$_{CP}$ do [$_{TP}$ you think [$_{\sigma}$ _ [$_{CP}$ that [$_{TP}$ John bought _]]]]]]?

(7a) is ruled out as γ fails to be labeled as illustrated in (8a).

(8) a.


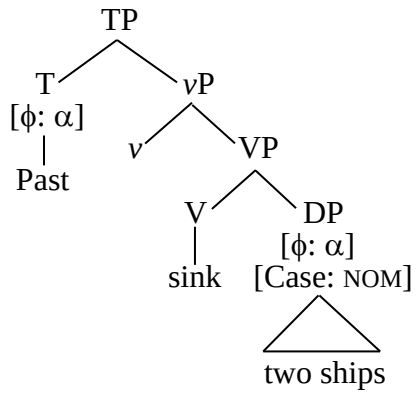
b.


The grammaticality of (7b) is also predicted. σ is labeled by CP because the wh-phrase moved out of σ, and the matrix δ is labeled <Q, Q> because the wh-phrase and the interrogative C share the Q(uestion) feature as illustrated in (8b).

Although the labeling theory of Chomsky (2013) replaces many syntactic principles of the pre-minimalist era, Chomsky (2015) proposes to extend its empirical coverage further. One of the proposals there is to explain the EPP. It should be clear from the discussion of (4) why an external argument must move to the edge of TP. But as is well-known, the subject position must be filled in passive and unaccusative sentences as well. (9) shows this for an unaccusative sentence.

(9) a. *Sank two ships.
b. Two ships sank _ .

(10) is the structure of the ungrammatical (9a).

(10)


As there are only {H, XP} structures in (10), no problem seems to arise with respect to labeling. Chomsky assumes that the structure is indeed allowed in pro-drop languages like Italian. The Italian counterpart of (9a) is grammatical, as shown in (11).

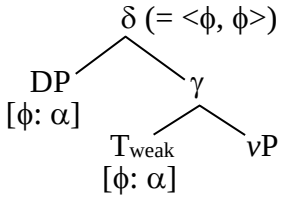
(11) Affondarono due navi. (See Burzio 1986, for example)
sank two ships
'Two ships sank.'

Chomsky, then, proposes that finite T in English is a weak head that cannot provide a label. The contrast between Italian and English is illustrated in (12).

(12) <Italian> γ (= TP) <English> γ (= ??)

Then, the only way in English to label a finite clause is by ϕ-feature sharing as shown in (13).

(13)



It follows then that a subject is required in English finite clauses.[1] Labeling by a head in (3a) is thus revised as in (14).

(14) γ = {H, XP} ... H is the label of γ if H is strong.

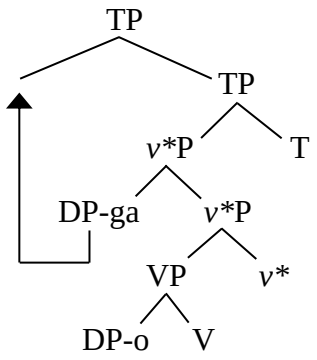
3. Labeling in a language without ϕ-feature agreement

Chomsky's (2013, 2015) labeling theory replaces many syntax-particular principles and has wide empirical coverage. At the same time, it raises an interesting problem for the analysis of languages that lack ϕ-feature agreement. The labeling of finite clauses in English is made possible by ϕ-feature sharing. Then, how are they labeled in languages like Japanese without ϕ-feature agreement? I outline the hypothesis in Saito (2016, 2018) that was proposed to answer this question.

Although Japanese lacks ϕ-feature agreement, the arguments are accompanied by suffixal Case markers as (15a) and its structure in (15b) show.

(15) a. Hanako-ga Taroo-o sikat-ta.
Hanako-NOM Taroo-ACC scold-Past
'Hanako scolded Taroo.'

b.



[1] Chomsky assumes that feature-sharing makes T strong and as a result, T serves as the label of γ in (13).

Here, a phrase with suffixal Case never projects. Thus, suffixal Case seems to be functioning as an "anti-labeling device." Thus, (16) is proposed in Saito (2016).[2]

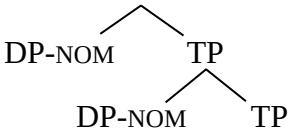
(16) Suffixal Case as an anti-labeling device: In $\gamma = \{\alpha\text{-Case}, \beta\}$, β provides the label for γ.

It is argued there that (16) not only allows finite clauses in Japanese to be labeled but also is in accord with many typological characteristics of the language. For example, it is widely known since Kuno (1973) that sentences with multiple subjects are observed in the language. (17) is one of his examples.

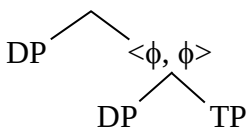
(17) Bunmeikoku-ga dansei-ga heikin-zyumyoo-ga mizika-i.
civilized.country-NOM male-NOM average-life.span-NOM short-Pres.
'It is in civilized countries that male's average life span is short.'

As illustrated in (18), (16) allows examples of this kind to be properly labeled.

(18) Japanese



vs. English

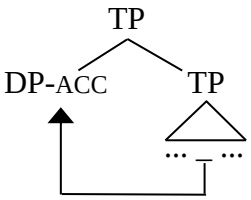


(16) also accounts for why object scrambling is possible in Japanese. (19) is an example.

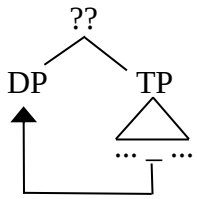
(19) Taroo-o Hanako-ga _ sikat-ta.
Taroo-ACC Hanako-NOM scold-Past
'Hanako scolded Taroo.'

As the scrambled object accompanies suffixal accusative Case, the structure is properly labeled as illustrated in (20).

(20) Japanese



vs. English



Scrambling applies also to adverbial phrases as shown in (21).

[2] It is assumed there that T is a strong head in Japanese. (i) is the proposed mechanism of the Case feature valuation.

(i) In {DP-Case, α}, the Case is valued by the label of α.

(21) a. Taroo-wa sizuka-ni kaet-ta.
Taroo-TOP quietness-Cop. leave-Past
'Taroo left quietly.'
b. Sizuka-ni Taroo-wa _ kaet-ta. (adverb scrambling)

The adverb in (21) consists of an abstract noun and the copula *-ni* in preverbal form. (22) lists the other forms of the copula.

(22) a. Kono heya-wa sizuka-da. (conclusive)
this room-TOP quietness-Cop.Pres.
'This room is quiet.'
b. sizuka-na heya (prenominal)
quietness-Cop.Pres. room
'a quiet room'

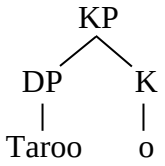
Saito (2016) hypothesizes that predicate inflection serves as an "anti-labeling device" just like suffixal Case. This is stated in (23).

(23) predicate inflection as an anti-labeling device: In $\gamma = \{\alpha\text{-Inflection}, \beta\}$, β provides the label of γ.

Given (23), the structure of (21b) is labeled as T, as in the case of object scrambling.

The analysis proposed in Saito (2016) raises the question why suffixal Case and predicate inflection have the "anti-labeling" property. This question is taken up in Saito (2018). I briefly go over the proposal there in the remainder of this section. I first consider suffixal Case.

Saito (2018) adopts the KP hypothesis proposed by Travis and Lamontagne (1992) and Fukuda (1993). According to this hypothesis, a Case-marked object has the structure in (24).

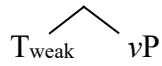
(24)


Then, it is proposed that K is a weak head and at the same time, a slight revision in the function of weak heads in labeling is suggested. Chomsky (2015) states that $\gamma = \{H, XP\}$ fails to be labeled if H is weak. The suggested revision is that XP provides the label for γ in this case. The proposal is stated more precisely in (25).

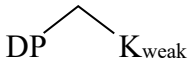
(25) Alternative: Search into $\gamma = \{\alpha, \beta\}$ for a label. If α is a weak head or search into α finds a weak head, then γ inherits the label of β.

This revision does not affect Chomsky's account for the EPP in English. γ is labeled by *v*P in (26a), but the structure is ruled out on independent grounds because *v*P should represent the predicate-argument structure with the exclusion of T.

(26) a. *γ (= *v*P)



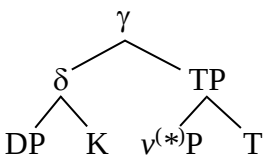
b. γ (= DP)



(25) also solves a potential problem of the original KP hypothesis. In (24), K takes a DP complement and projects a KP. However, a transitive verb selects a DP and not a KP. In (26b), on the other hand, γ is a DP because K is a weak head.

Most importantly for the purpose here, (25) explains the "anti-labeling property" of suffixal Case. Let us consider the structure of a finite clause in (27).

(27)



The label of γ = {DP, TP} is T.

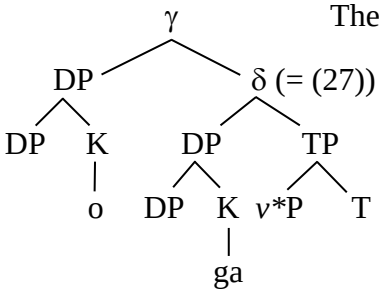
The label of δ = {DP, K} is D.

The label of δ = {DP, K} is D because K is a weak head. What about the label of γ = {δ, TP}? As search into δ finds a weak head K, γ inherits the label of TP. Thus, a finite clause is successfully labeled. This analysis extends to examples of multiple subjects and scrambling. Let us consider the example of scrambling in (19), repeated below as (28).

(28) Taroo-o Hanako-ga _ sikat-ta. (= (19))
Taroo-ACC Hanako-NOM scold-Past
'Hanako scolded Taroo.'

Its structure is shown in (29).

(29)



The label of γ = {DP, TP} is T.

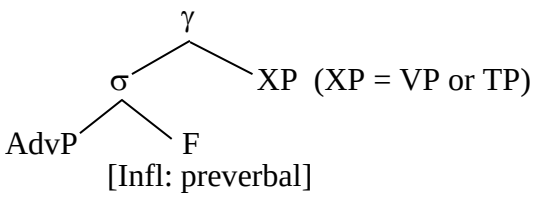
δ is identical to (27) and is a TP. The scrambled object is a DP because K is a weak head. For γ = {DP, δ}, search into DP finds a weak head K. Hence, γ inherits the label of δ, which is T.

Scrambling of adverbial phrases can be analyzed in the same way on the assumption that predicate inflection is a weak head. The relevant example (21) is repeated below as (30).

(30) a. Taroo-wa sizuka-ni kaet-ta. (= (21))
Taroo-TOP quietness-Cop. leave-Past
'Taroo left quietly.'
b. Sizuka-ni Taroo-wa _ kaet-ta. (adverb scrambling)

The structure of these examples is shown in (31).

(31)



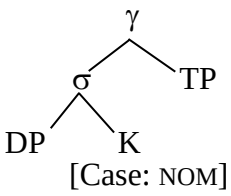
σ inherits the label of AdvP because F is a weak head. The label of γ is that of XP as search into σ finds a weak head F.

Finally, the weak heads K and F are valued as in (32).

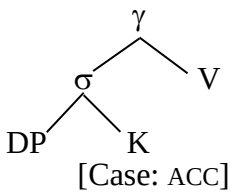
(32) In γ = {α, β}, an unvalued feature that is identified by search in α is valued by the label of β.

Some examples are shown in (33).

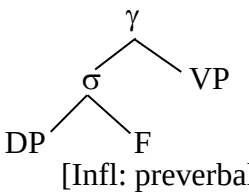
(33) a.



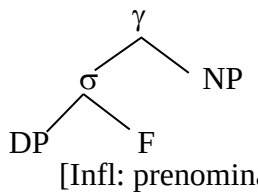
b.



c.



d.



4. Adnominal Clausal Modifiers

This section addresses the question raised at the outset of this paper, that is, why Japanese allows adnominal clausal modifiers such as those in (1), repeated below as (34).

(34) a. [sakana-ga yake-ru] nioi
fish-NOM burn-Pres. smell
'the smell of fish burning'

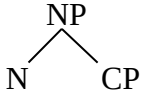
b. [dareka-ga doa-o sime-ru] oto
someone-NOM door-ACC close-Pres. sound
'the sound of someone closing the door'

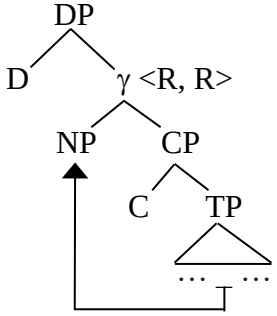
The conclusion is straightforward. I propose that this is because the adnominal clauses accompany prenominal inflection.

Let us start the discussion by considering how the English complex noun phrases in (35) are labeled.

(35) a. the claim that John was asleep
b. the claim that John made

The precise analysis for these examples is controversial. But the standard analysis for examples like (35a) is that they contain head-complement structure as in (36a).

(36) a. 

b. 

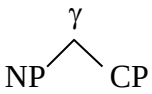
(Kayne 1994)

If so, there is no issue with labeling. For the relative clause in (35b), let us tentatively assume Kayne's (1994) analysis in (36b). The NP *claim* moves to Spec, CP as a relative operator. In this case, it can be assumed that the NP and the head C of the relative clause share the relative feature R, and consequently γ is labeled as <R, R>.

The English counterparts of (34) in (2) are repeated below as (37).

(37) a. *the smell [that fish burns]
b. *the sound [that someone closes the door]

The CPs in these examples are neither complements nor relative clauses. The structure of the examples, then, should be as in (38).

(38) 

This is an {XP, YP} structure with no feature sharing. (37a, b) are straightforwardly ruled out as examples of failure of labeling.

Then, why are the Japanese examples in (34) allowed? I show in the remainder of this section that the labeling mechanism outlined in Section 3 provides an answer. The distinction between the conclusive and prenominal forms of predicates is largely lost in modern Japanese. For example, the verb *ake-ru* 'open-Pres.' appears in the same form as the main clause predicate in (39a) and as the predicate of an adnominal clause in (39b).

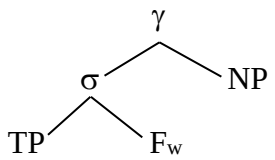
(39) a. Taroo-ga doa-o ake-ru. (conclusive)
Taroo-NOM door-ACC open-Pres.
'Taroo opens the door.'
b. [Taroo-ga doa-o ake-ru] oto (prenominal)
Taroo-NOM door-ACC open-Pres. sound
'the sound of Taroo opening the door'

However, as observed in (22), the distinction is retained with the present tense copula. And (40) shows that the conclusive form *da* appears in matrix clauses whereas the prenominal form *na* is required in adnominal clausal modifiers.

(40) a. Sono koosui-wa Taroo-ga kaori-ga kirai-da. (conclusive)
that perfume-TOP Taroo-NOM scent-NOM dislike-Cop.Pres.
'As for that perfume, Taroo dislikes its scent.'
b. [Taroo-ga kaori-ga kirai-na] koosui (prenominal)
Taroo-NOM scent-NOM dislike-Cop.Pres. perfume
'Lit. the perfume which Taroo dislikes its scent'

It can then be maintained that adnominal clauses generally accompany prenominal inflection. Given this, the structure of the examples in (34) will be as in (41).

(41)



[Infl: prenominal]

As F is a weak head, σ inherits the label of TP. γ = {σ, NP} inherits the label of NP because search into σ finds the weak head F. Thus, the examples are properly labeled.

As noted at the outset of this paper, Matsumoto, Comrie and Sells (2017) assume that there are two types of languages; the Japanese type allows adnominal clausal modifiers like (34) and the English type does not. But if the analysis just presented for Japanese is on the right track, it is not clear whether classification of languages in this manner has any significance. The issue instead is whether the counterpart of (34) in the language is properly labeled. Among the languages considered there, Korean, examined by Kim and Sells (2017), is the clearest case of a "Japanese-type" language. A couple of their examples are shown in (42).

(42) a. [sayngsen-i tha-nun] naymsay
fish-NOM burn-Adn.Pres. smell
'the smell of fish burning'
b. [chayk-ul pha-n] ton
book-ACC sell-Adn.Past money
'the money from selling books'

Kim and Sells (2017) also note that T in Korean assumes various forms, depending in part on whether it belongs to a main clause or an adnominal clause. Their chart is shown in (43).

(43) Forms of Tense in Korean (Kim and Sells 2017)

	Future	Present	Past
main clause, active	-ul kes-i/-keyss	-n/nun	-ass/ess
main clause, stative	-ul kes-i/-keyss	Ø	-ass/ess
adnominal, active	-ul	-nun	-un
adnominal, stative	-ul	-un	-ass/ess-ten

It seems then that finite clauses in Korean accompany predicate inflection just as in Japanese but only more clearly. If the predicate inflection is a weak head, then the examples in (42) are expected to be grammatical with proper labeling.

Further, it is probably misleading to say that English does not allow the counterparts of (34). Although the examples in (37) are ungrammatical, those in (44) are perfectly fine.

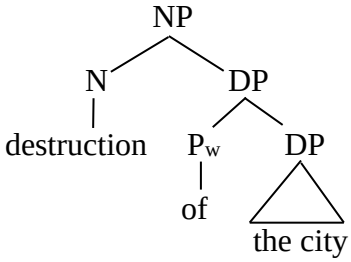
(44) a. the bad smell of fish burning
b. the big sound of someone closing the door

The analysis proposed in this paper implies that these examples, in contrast with those in (37), are successfully labeled. Although it is beyond the scope of this paper to present their precise analysis, it seems possible that *of* in these examples is a weak head and this allows them to be labeled. This *of* may well be the same *of* as that of "*of*-insertion" in (45).

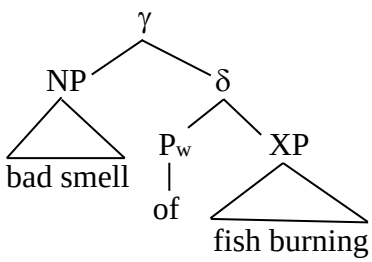
(45) the destruction of the city

It makes sense to assume that the *of* in (45) is a weak head. The head noun *destruction* selects a DP object, and if *of* is a weak head, its complement is indeed construed as a DP, as illustrated in (46a).

(46) a.



b.



If the same *of* appears in (44), the structure of (44a), for example, is as in (46b). σ inherits the label of XP because P is a weak head. The label of γ is the label of NP as search into σ finds the weak head P. Here, the weak head P serves the same function as prenominal inflection in Japanese. If this analysis is correct, a weak head helps label a noun phrase with clausal modifiers in English as well.

I argued in this section that the possible form of adnominal clausal modifiers is not determined by a language. For each language, an example is grammatical only if it can be properly labeled and is ungrammatical if it cannot be labeled. The analysis proposed in this section implies that γ = {modifier, modified} is not automatically labeled because it is an adjunction structure, but must be labeled through the regular mechanism. This is so because otherwise the ungrammatical examples in (37) cannot be explained in terms of labeling. This raises the question how γ in (47a) and σ in (47b), for example, are labeled. γ is a noun phrase modified by an adjective phrase and σ is a verb phrase modified by an adverb phrase.

(47) a. [$_{DP}$ the [$_{\gamma}$ [$_{AP}$ very smart] [$_{NP}$ young girl]]]
b. Mary [$_{\sigma}$ [$_{AdvP}$ quickly] [$_{VP}$ solved the problem]].

In the following section, I consider the former case and introduce the analysis of Baker (2003), which in effect provides an answer.

5. Baker (2003) on adjectives and relative clauses

Baker (2003) first extends Miyagawa (1987) and Murasugi's (1990) analyses of Japanese adjectives, and argues that the language lacks attributive adjectives. Then, he proposes that attributive adjectives are licensed by ϕ-feature agreement with the modified noun, and that this makes it impossible for languages without ϕ-feature agreement to have attributive adjectives. In this section, I introduce this analysis and show that it can readily be restated in terms of labeling. I show in addition that the analysis of Japanese adnominal clauses in the preceding section serves to make Baker's analysis complete.

(47a) and (47b) are examples of attributive adjective and predicative adjective respectively.

(47) a. the wise old man
b. The old man is too wise (to make such a mistake).

(48) shows that there are predicative adjectives in Japanese, but it has been unclear whether the language has attributive adjectives.

(48) Sono tosiyori-wa totemo kasiko-i … predicate adjective
that old.person-TOP very wise-Pres.
'That old person is very wise.'

When an adjective modifies a noun, it accompanies tense just as predicative adjectives. This is shown in (49).

(49) a. kasiko-i tosiyori
wise-Pres. old.person
'the old person who is wise'
b. kasiko-katta tosiyori
wise-Past old.person
'the old person who used to be wise'
c. *kasiko tosiyori
wise old.person

The presence of tense in (49a-b) suggests that the modifiers are TPs, that is, relative clauses. Baker takes the ungrammaticality of (49c) with an adjectival stem as evidence that Japanese lacks attributive adjectives. It has been widely assumed that examples like (49c) are ruled out because an adjectival stem is a bound morpheme. This is an accurate description, but the absence of adjectives that are free morphemes suggests that Japanese indeed cannot have attributive adjectives.

Baker (2003), then, proposes (50) to explain why Japanese lacks attributive adjectives.

(50) a. Modifiers can be adjoined to N^x only if they agree with N^x in ϕ-features.
b. Merge (X, Y) is allowed only if X checks a feature of Y or vice versa.

Let us consider (50a) as (50b) is its generalized version. It states that a modifier of a noun is licensed only if it agrees in ϕ-features with the noun. Baker points out that this kind of agreement is observed in many ϕ-feature agreement languages. He provides the following examples from Spanish:

(51) a. este libro; estas mesas
this (M.SG) book (M.SG) these (F.PL) tables (F.PL)
b. el libro rojo; las mesas rohas
the (M.SG) book (M.SG) red (M.SG) the (F.PL) tables (F.PL) red (F.PL)

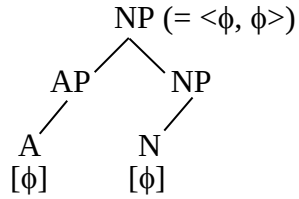
He assumes that there is agreement of this kind in English too, although it is covert. He also shows that the head of a relative clause agrees with the modified noun in Kinande.

(52) Maria anz-ire eri-tunda ery-o Kambale a-gul-a.
Mary like-ASP CL5-fruit CL5-that Kambale 3sS/T-buy-FV
'Mary likes the fruit that Kambale bought.'

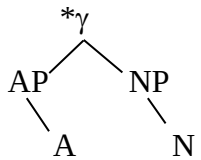
In this example, the noun *tunde* and the complementizer *o* both appear with the Class 5 prefix.

(50a) predicts that attributive adjectives cannot be licensed in Japanese because the language lacks ϕ-feature agreement. In this context, Baker (2003) lists Slave and Ika as languages that pattern with Japanese. They too lack both ϕ-feature agreement and attributive adjectives. Although Baker (2003) was published ten years prior to Chomsky's (2013) proposal of the labeling theory, (50a) can readily be restated in terms of labeling. This is illustrated in (53).

(53) a. English



b. Japanese



In ϕ-feature agreement languages, γ = {AP, NP} is labeled as <ϕ, ϕ> as shown in (53a). On the other hand, γ = {AP, NP} cannot be labeled in the absence of ϕ-feature agreement.

Although Baker (2003) successfully explains the lack of attributive adjectives in Japanese, there is one problem to be resolved. As is clear from his Kinande example, he assumes that a complex NP with a relative clause needs to be licensed by ϕ-feature agreement. However, relative clauses are apparently observed in Japanese. (54b) is the Japanese counterpart of (54a).

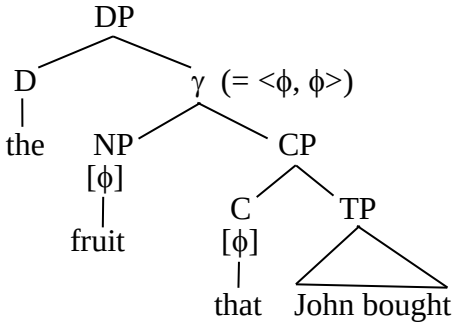
(54) a. the tasty fruit that John bought
b. [Taroo-ga kat-ta] oisi-i kudamono
Taroo-NOM buy-Past tasty-Pres. fruit

Then, how are relative clauses licensed without ϕ-feature agreement? The analysis proposed in Section 4 provides an answer to this question. Relative clauses in Japanese, like other adnominal clauses, accompany prenominal inflection. In (55), the copula of the relative clause is in prenominal form.

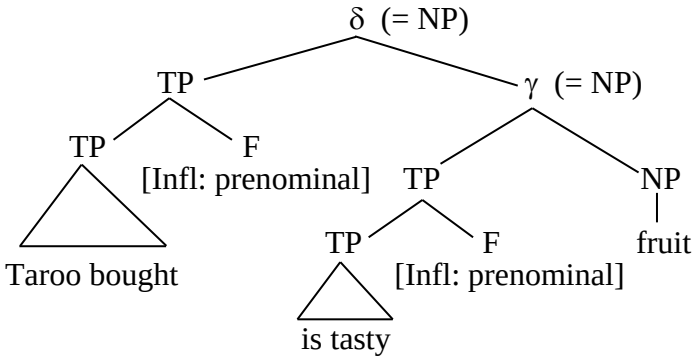
(55) [Hanako-ga suki-na] tabemono
Hanako-NOM like-Cop.Pres. food
'the food that Hanako likes'

Then, the complex NPs in (54a) and (54b) are labeled as in (56) and (57) respectively.

(56)



(57)



γ = {NP, CP} in (56) is labeled <ϕ, ϕ> because of the agreement between N and C. γ = {TP, NP} in (57), on the other hand, inherits the label of NP because search into TP finds a weak head F. δ = {TP, γ} is labeled by NP for the same reason.

Thus, the analysis proposed in Section 4 explains why Japanese allows relative clauses despite the lack of ϕ-feature agreement and makes Baker's (2003) analysis complete. The analysis in (57) implies that Japanese relative clauses are licensed in the same way as the adnominal clauses in (34), repeated below in (58).

(58) a. [sakana-ga yake-ru] nioi
fish-NOM burn-Pres. smell
'the smell of fish burning'
b. [dareka-ga doa-o sime-ru] oto
someone-NOM door-ACC close-Pres. sound
'the sound of someone closing the door'

It is worth pointing out here that both Matsumoto (1997) and Murasugi (2000), which investigate examples like (58) in detail, argue that relative clauses in Japanese are just

like adnominal clauses in (58) and they are special only in that they contain a pro that corresponds to the modified noun phrase. The analysis in (57) supports this claim.

I argued in this section that γ = {modifier, NP} in general needs to be labeled through the regular labeling mechanism. Before concluding this section, I would like to point out that this requires a slight revision in the labeling algorithm in (14), repeated below as (59).

(59) γ = {H, XP} ... H is the label of γ if H is strong.

Let us consider (60).

(60) [$_{\gamma}$ [$_{Adj}$ wise] [$_{\delta}$ [$_{Adj}$ old] [$_{N}$ man]]]

Given Chomsky's (1995) bare phrase structure theory, δ has the form {A, N} and γ is {A, XP}. Given Baker's (2003) analysis, both should be licensed through ϕ-feature agreement. Here, γ is problematic because A will be its label according to (59). As far as I know, in all the examples of (59) discussed in the literature, H selects XP. Then, (59) can be revised as in (61).

(61) γ = {H, XP} … H is the label of γ if H is a strong head and selects XP.

As *wise* does not select δ in (60), (61) does not apply in this case and consequently, γ has to be labeled by ϕ-feature sharing as desired.

6. Conclusion

I argued in this paper that the contrast between Japanese and English in (62) and (63) should be explained in terms of labeling.

(62) a. [sakana-ga yake-ru] nioi
fish-NOM burn-Pres. smell
'the smell of fish burning'
b. [dareka-ga doa-o sime-ru] oto
someone-NOM door-ACC close-Pres. sound
'the sound of someone closing the door'

(63) a. *the smell [that fish burns]
b. *the sound [that someone closes the door]

I outlined the labeling theory of Chomsky (2013, 2015) in Section 2 and its application to Japanese in Saito (2016, 2018) in Section 3. Then, I showed in Section 4 that the contrast obtains because English labels {XP, YP} structures mainly by feature-sharing whereas Japanese extensively employs weak heads for this purpose. The prenominal inflection as a weak head makes it possible for the examples in (62) to be labeled. The analysis implies that whether examples like (62) and (63) are allowed is not determined by a language but depends on the labeling mechanism of the language. Feature-sharing and weak heads are universally available as means to label {XP, YP} structures. What a language determines is how and where to use them.

The account for the ungrammaticality of (63) in terms of labeling implies that a modification structure as γ = {modifier, modified} must be labeled through the regular

labeling mechanism. This raises the question how NPs modified by adjectives and VPs modified by adverbs, for example, are labeled. In Section 5, I introduced Baker's (2003) proposal that {AP, NP} structures are licensed by ϕ-feature agreement and showed that it can be restated in terms of labeling. Baker's analysis accounts for the lack of attributive adjectives in Japanese but left unexplained how Japanese relative clauses are licensed. I argued that they are licensed in the same way as the adnominal clausal modifiers in (62), that is, by prenominal inflection as a weak head. There are a couple of possibilities for the labeling of γ = {AdvP, XP}. If adverbial phrases occupy the specifier position of a designated head as argued in Cinque (1999), γ may be labeled by feature-sharing. Or the labeling of γ may be accomplished by weak heads like *-ly* in (64).

(64) a. John quietly left the room.
b. Quietly John left the room.

I leave the choice for future research.

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