Merge and Multidominance

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Abstract

Merge, a sole syntactic operation is attributed to the basic property. A syntactic element normally dominates another syntactic one uniquely. However, there exists another option of dominance, i.e. a syntactic element dominates more than two elements, called multidominance, which follows from three dimensionality. This paper argues that coordination, Partial Wh-questions, and Head Internal Relative Clauses can be analyzed using multidominance.

1 Introduction

This paper argues that the Faculty of Language possesses Merge as a sole operation in the core syntax and syntactic structures are three dimensional as proposed in Imai (2014b). This attributes the basic property (Chomsky 2016). These three-dimensional structures are rendered into two dimensional at the Phon where linearization is attested as we cannot speak or write words in a sentence simultaneously. Word order is trivial as a language will determine which element is placed in order at Phon.   Note that word order is not fixed at core syntax before Spell-Out. A syntactic object (SO) dominates another SO, which is called unidominance. However, SO can dominate more than two SOs, and this case is called multidominance. Notice that multidominance follows from three-dimensionality. The idea of multidominance is the same concept of the graft theory as argued in a series of papers by van Riemsdijk (2000, 2001, 2004, 2006). Imai (2013, 2014a, 2022) argues that Internal Head Relative Clauses can be explained in terms of the graft theory. It is said that language in general possesses a handful of simple operations that result in extremely rich expressions. It follows that the minimum rules apply to generate maximum expressions (rich sentences). Specifically, complexity derives from simplicity in not only linguistics but also other fields of science such as biology, physics, and chemistry among others. It suffices that the basic property is involved.

The organization of the present paper is as follows: Section 2 deals with syntactic Merge. We will argue multidominance in detail in section 3. Substantial examples of multidominance are observed in section 4. Section 5 concludes what we observe in this paper.

2 Syntactic Merge

A formalist analysis in the generative process of syntax is operated in terms of a fundamental rule, **Merge,** that generates, combines, and transforms syntactic trees.   The minimalist program has significantly changed in recent years after enhancement where operation **Merge** is described as a combinatorial binary set formation.   Cf. Marcholli, Chomsky and Berwick (2023).

Chomsky (2004) proposes a fundamental design of Merge as follows:

> NS is based on the free operation Merge. SMT entails that Merge of α, β is unconstrained, therefore either *external or internal.* Under external Merge, α and β are separate objects; under internal Merge, one is part of the other, and Merge yields the property of "displacement," which is ubiquitous in language and must be captured in some manner in any theory. It is hard to think of a simpler approach than allowing internal Merge (a grammatical transformation), an operation that is freely available. Accordingly, displacement is not an "imperfection" of language; its absence would be an imperfection. The extension condition requires that displacement from within α be to the edge of α, yielding a new Spec.   (Chomsky 2004:110)

It is assumed that Internal Merge leaves a "copy" in place as Chomsky put it.

There are two possibilities for Merge (α, β) → {α, β } where
(1) α is distinct from/outside of β → External Merge (EM)
(2) α is part of / contained inside β → Internal Merge (IM)
<div align="right">(Richards 2009)</div>

Both merges can apply freely conforming to Strong Minimalist Thesis (SMT)[1].

Roberts, Watumull, and Chomsky (2024) mention the Strong Minimalist Thesis as follows:

> This assumption, we submit, merits rethinking in light of progress in the Minimalist Program (Chomsky 1995). Recent work demonstrating the *simplicity* (Watumull et al. 2017) and *optimality* (Chomsky et al. 2017) of language increases the cogency of the following: "the basic principles of language are formulated in terms of notions drawn from the domain of (virtual) conceptual necessity", the domain defined by "general considerations of conceptual naturalness that have some independent plausibility, namely, simplicity, economy, symmetry, nonredundancy, and the like" (Chomsky

1995: 171, 1) that render linguistic computation optimal. To the extent that this *strong minimalist thesis* (SMT) is true, the essential – computational properties of language would derive from laws of nature –language- and even biology-independent principles that, once realized in the mind/brain, *do* entail particular properties as logically necessary. For instance, it is simply a fact of logic that the simplest (optimal) form of the recursive procedure generative of syntactic structures, *Merge,* has two and only two forms of application (i.e., "external" and "internal" in the sense of combining two separate objects or two where one is inside the other). Relatedly, *given* the nature of the structures Merge generates, minimal structural distance is *necessarily* the simplest computation for the structure dependence of rules. And so on and so forth (see Berwick et al. 2011; Chomsky 2013; Watumull 2015 for additional examples).

An instance of EM is Merge (an, apple) → {an, apple} i.e an apple. An example of IM is Merge (WH, C) → {WH, C } i.e. What do you like <what>? Internal Merge thus differs from External Merge in that it chooses the item in the structure once Merged to move to Remerge it with another item in the new position to form a new structure.
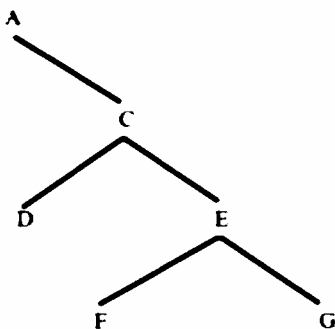
Trees of both EM and IM are illustrated as follows:

(3)a.   EM
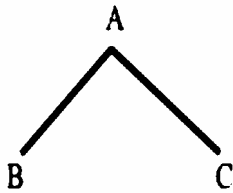
Merge (B, C) → {B, C }

b.   IM

Merge (G, C) → {G, C }

Note that a basic syntactic difference is derived from substitution and adjunction. We can say that there exist two merges, i.e. Set-Merge that is substitution and a symmetrical operation creating a binary unordered set, and Pair-Merge that is asymmetric and its output is an ordered pair. Let us illustrate these as follows:

(4) a. Set-Marge (=substitution)

　　　Merge (α, β) → {α, β} symmetric

　　b. Pair-Merge (=adjunction)

　　　Merge (α, β) → <α, β> asymmetric i.e. α adjoins β.

As is observed we have External Merge and Internal Merge. There is another type of Merge that constitutes multidominance called Parallel Merge (Citko 2005, 2020), Citko and Gracanin-Yuksek (2013, 2020a, b), or Graft as it is called (van Riemsdijk 2000, 2001, 2004, 2006), (Imai 2012, 2014a, 2022). Chomsky, N. T. D. Seely, R. C. Berwick, S. Fong, M.A.C. Huybrechts, H. Kitahara, A. McInnerney, and Y. Sugimoto (2023) mention multidominance. In this paper, Parallel Merge and Graft are in essence interchangeable. We will return to multidominance as it proceeds.

　　We will hold the following assumptions of the theory of grammar following Neelman (2023).

(5) The Categorial Assumption; Linguistic Categories are defined syntactically and semantically as FUNCTION and/or ARGUMENTS; (Neelman 2023)

(6) The Adjacency Assumption: Rules are pure FUNCTIONAL binary operations, limited to APPLICATION, and SUBSTITUTION, applying to strictly adjacent, phonologically-realized categories, which synchronously and monotonically compose logical form (lf) and concatenate phonological forms (pf). (Neelman 2023)

3 Multidominance

We have another type of Merge i.e. Parallel Merge/Graft besides EM and IM. Two syntactic objects dominate one item in a structure in Parallel Merge/ Graft. We will use Parallel Merge henceforth instead of Parallel Merge/ Graft. The following tree is the case of Parallel Merge illustrated in (7):

(7) Parallel Merge
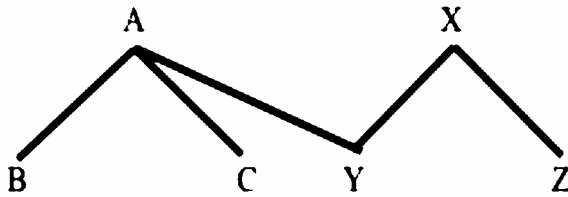
A dominates **C** and **Y** in (7) which is the instance of multidominance. It is assumed that the combination of 1) External Merge and External Merge, 2) External Merge and Internal Merge, and 3) External Merge and iterative Internal Merge occurs. This fact is attributed to the basic property hence, is salient in any natural language. Multidominance has been paid much attention recently. Cf. Barros and Vicente (2011), Chomsky, Seely, Berwick, Fong, Huybrechts, Kitahara, McInnerney and Sugimoto (2023), Citko (2005), Citko (2011), Citko and Gracanin-Yuksek (2013, 2020a, b), Imai (2013, 2014a) analyzed as Graft, van Riemsdijk (2000) and subsequent works on Graft, Zhang (2023) to mention a few. Three types of multidominance are illustrated in (8):
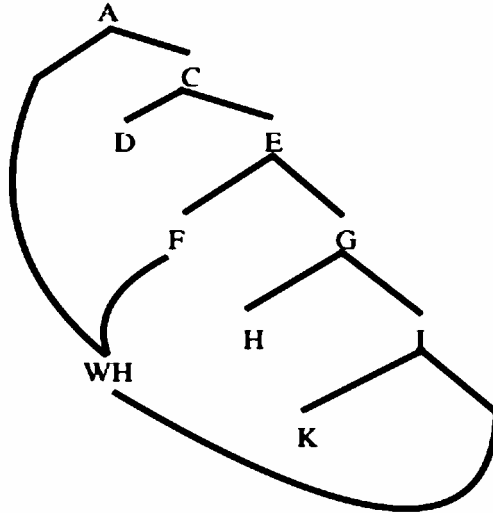
(8)a. External Merge and External Merge
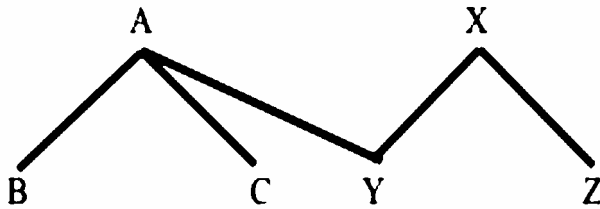
b. External Merge and Internal Merge
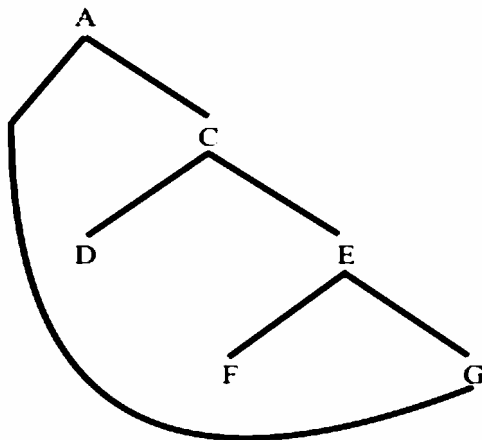
c．External Merge and Iterative Internal Merge

(8c) is a case of traditional WH movement in which WH moves through intermediate CP-SPECs up to the topmost CP-SPEC, leaving its copy. There exists another type of WH that may appear in every CP-SPEC. This case is observed in the German variant of WH interrogatives as well as child utterances of English. An expletive WH, "was" (= what) appears in intermediate CP-SPECs up to the topmost CP-SPEC, and the real WH moves once to the nearest CP-SPEC from the original position where it appears. Consider the tree as follows:

(9) a. German "was" and WH ("was" means "what".)
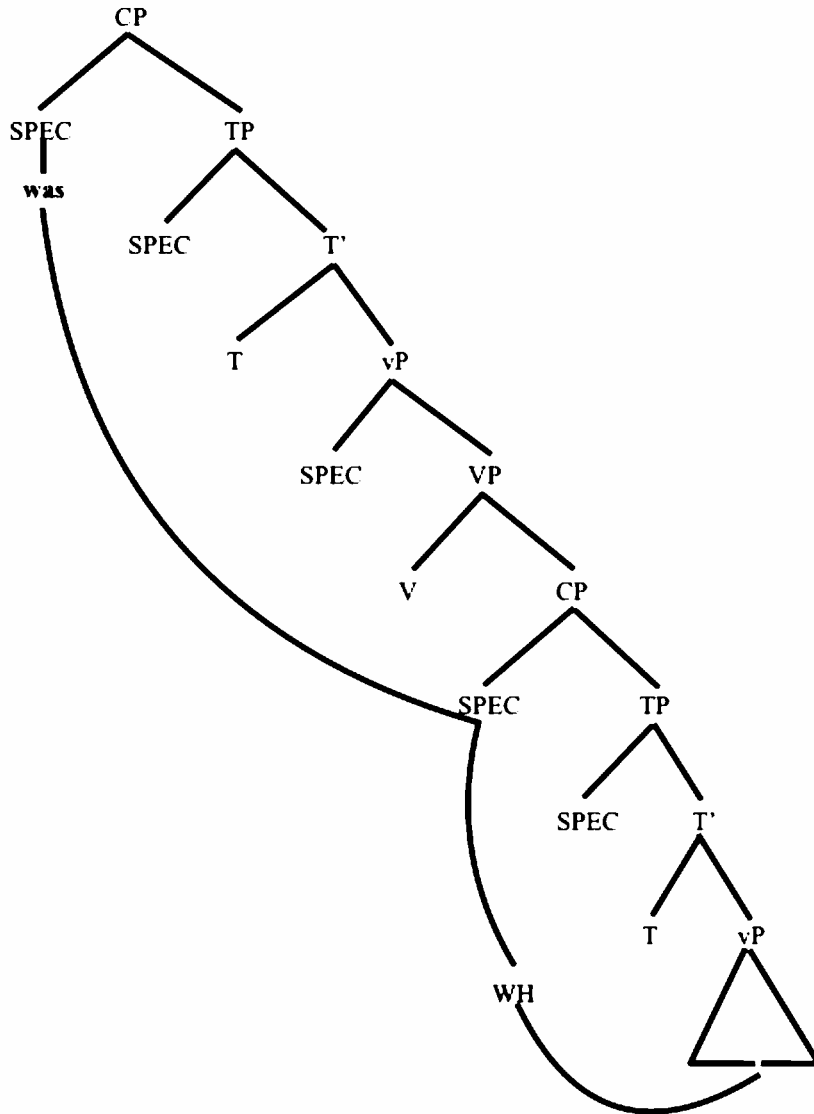
b. *Wen* glaubst Du   [*wen* sie getroffen hat]?

   Who think   you   who she met   has

   "Who do you think she met?"   (German; Wh-Copying)

c. *Was*   glaubte Miro′ [*welches Bild*   Picasso   t   gemalt   hatte]?

   What   think   Miro′   which Picture   Picasso   t   painted   had

  "Which Picture does Miro′ think that Picasso painted?" (German; Partial Wh-mvt)

d. Who do you think [sho's in the box?]   (Child English; WH-copying)

e. What do you think [who's in that can?]   (Child English; Partial Wh-mvt)

                                                                (9b-e; Grolla and Lidz 2018)

f. What do you think who did he love?

g. What do you think who loved Mr. Yellow?

(9f-g; L2 English;Wakabayashi and Okawara 2003)

In child English WH constructions, an expletive WH, "what" appears in the topmost CP-SPEC, and the real WH word appears in the lowest CP-SPEC. The tree is the same as (9) except that "was" in German is replaced with "what".

In both German "was" constructions and child English sentences, the expletive WH forms a chain in the topmost CP-SPEC to intermediate CP-SPECs in the multiple embedded sentences. Note that expletive WH interrogatives are observed in a dialect of German, Dutch, and quite many languages. Cf. van Riemsdijk (1983) for German, Barbiers, Koeneman and Lekakou (2008) for Dutch, Horvath (1997) for Hungarian. In English, not only children mistakenly use expletive WH constructions but also learners of English do so in the early stage of learning. Cf. McDaniel, Chiu, and Maxfield (1995), Grolla and Lids (2018), Gozalo (2015) for child English, Radford & Yokota (2006), Kumagai (2006), Umeda (2008), Al-Maani (2020) for adult SLA.

4 A Case Study 1: Right-Node Raising

Let us consider the following example:

(10) a. John likes and Tom hates apples.
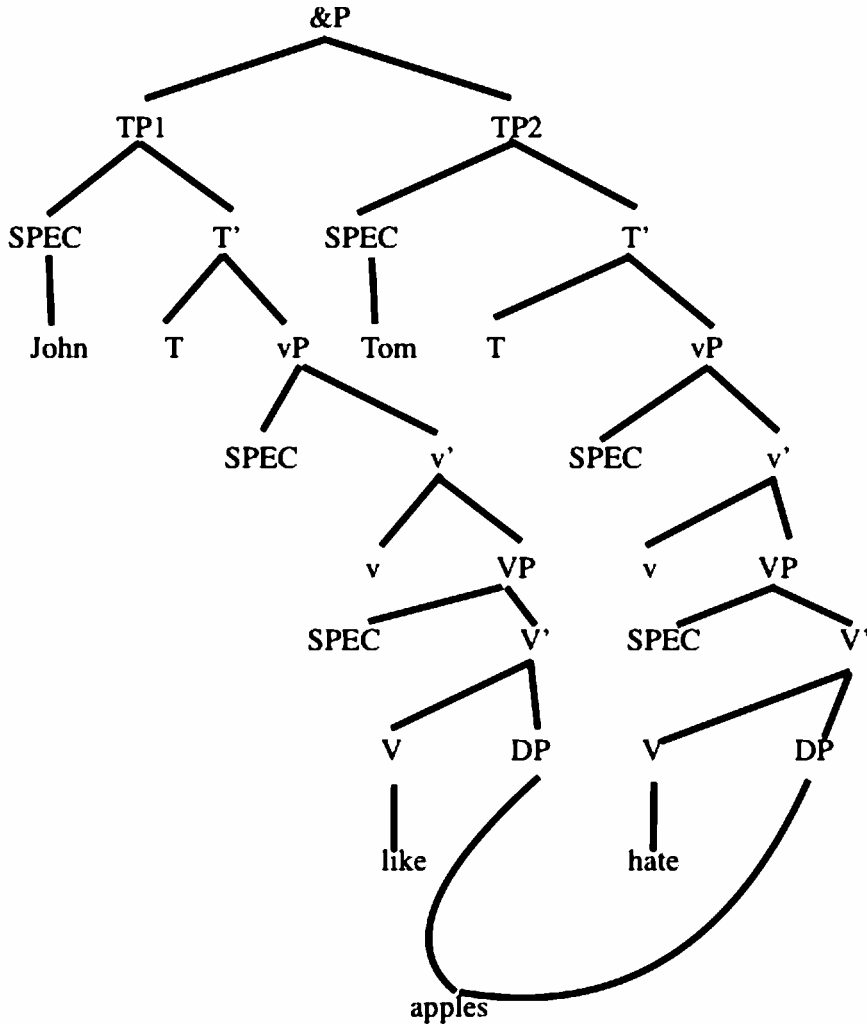 b. John likes apples and Tom hates apples.

It has been pointed out that (10a) is produced from (10b) as a result of Right-Node Raising (RNR). Barros and Vicente (2011) propose RNR as follows:

(11) An Eclectic Theory of Right Node Raising
 Both backward ellipses multidominance are possible sources for RNR.

Thus, we will analyze (10a) as the following:

(12)

&P
├── TP1
│   ├── SPEC — John
│   └── T'
│   ├── T
│   └── vP
│   ├── SPEC
│   └── v'
│   ├── v
│   └── VP
│   ├── SPEC
│   │   └── V — like
│   └── V' — DP
└── TP2
    ├── SPEC — Tom
    └── T'
        ├── T
        └── vP
            ├── SPEC
            └── v'
                ├── v
                └── VP
                    ├── SPEC
                    │   └── V — hate
                    └── V' — DP

apples

It follows that an RNR structure is verified in terms of multidominance.

Zhang (2023) discusses universally available coordinate constructions in the recent development of syntactic research.

5 A Case Study 2: Head Internal Relative Clauses in Japanese

This section explicates Head Internal Relative Clauses in Japanese which may well be explained in terms of multidominance[2].

Let us first assume that relative clauses in Japanese are TPs, not CPs, then, it is a consequence of a matter of phases. RC in Japanese is best analyzed as TP in that there are no overt relative pronouns and no island violations such as a classical subjacency condition. The argument that the RCs in Japanese are TPs not CPs is taken up in the literature. Cf.

Kuroda (2005a, b); Murasugi (1994, 2000a, b). The same thing is said for structurally similar relative clauses in Korean. Cf. Jo (2002). Consequently, we posit that relativization in natural languages is minimally parametrized in such a way that the head selects either CP or TP as its complement in relative clauses. In addition to that, the head in relative clauses is parametrized as [Head Initial, Head Internal, Head Final] in languages.
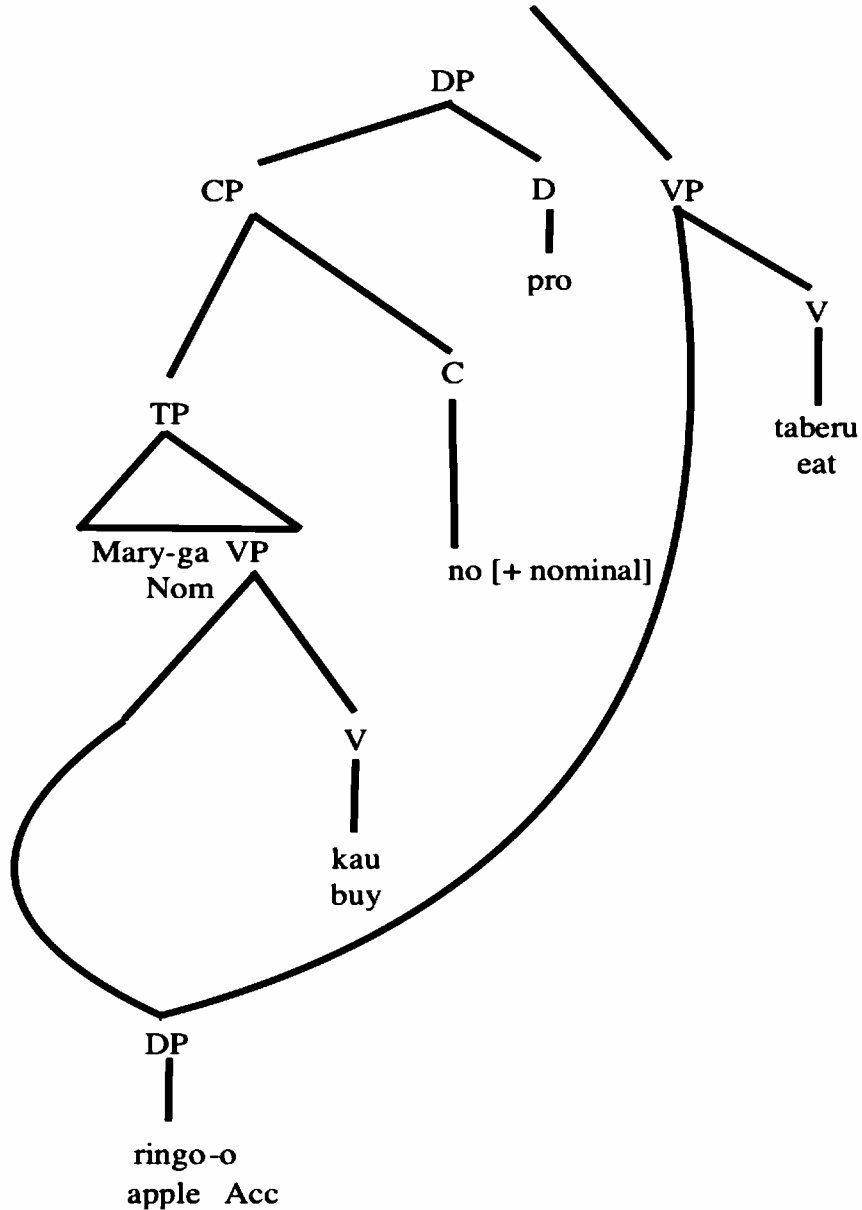
　　　We have to say at this moment that nouns in Japanese are different from, say, English or any other European language. It is proposed that the Japanese language lacks the overt determiner system, hence, the nominal projection may not include D. Fukui (2006), Fukui and Takano (2000), and Fukui and Sakai (2003) take this position.　In other positions, it is assumed that there are DPs in Japanese, where Cse is assigned to D of DP. Note also that nouns in Japanese lack inflections, but there exist overt Case markers as functional categories. Thus, it is possible to say that Case Category K projects KP as a maximal projection. We will not get into this argument here.

　　　Let us consider the following HIRC example:

(13) Tom-ga　[Mary-ga　　　ringo-o　　　katta]　　no]-o　　　tabe-ta
　　　Nom　　　Nom　　apple Acc　buy+Past NO Acc　eat+Past
　　　"Tom ate an apple which Mary bought."

Example (13) is a HIRC, which is one option for relativization. Note that the Head External and Head Final Relative Clauses are unmarked in Japanese. HIRC is however frequently used in both colloquial as well as written Japanese. For the sake of expository purposes, we take DP as an extended nominal phrase in Japanese. Then, we will have a HIRC structure as in (14) for (13).

(14)

DP

CP   D
                pro
TP   C
Mary-ga VP   no [+ nominal]
Nom
VP
V
kau
buy

VP
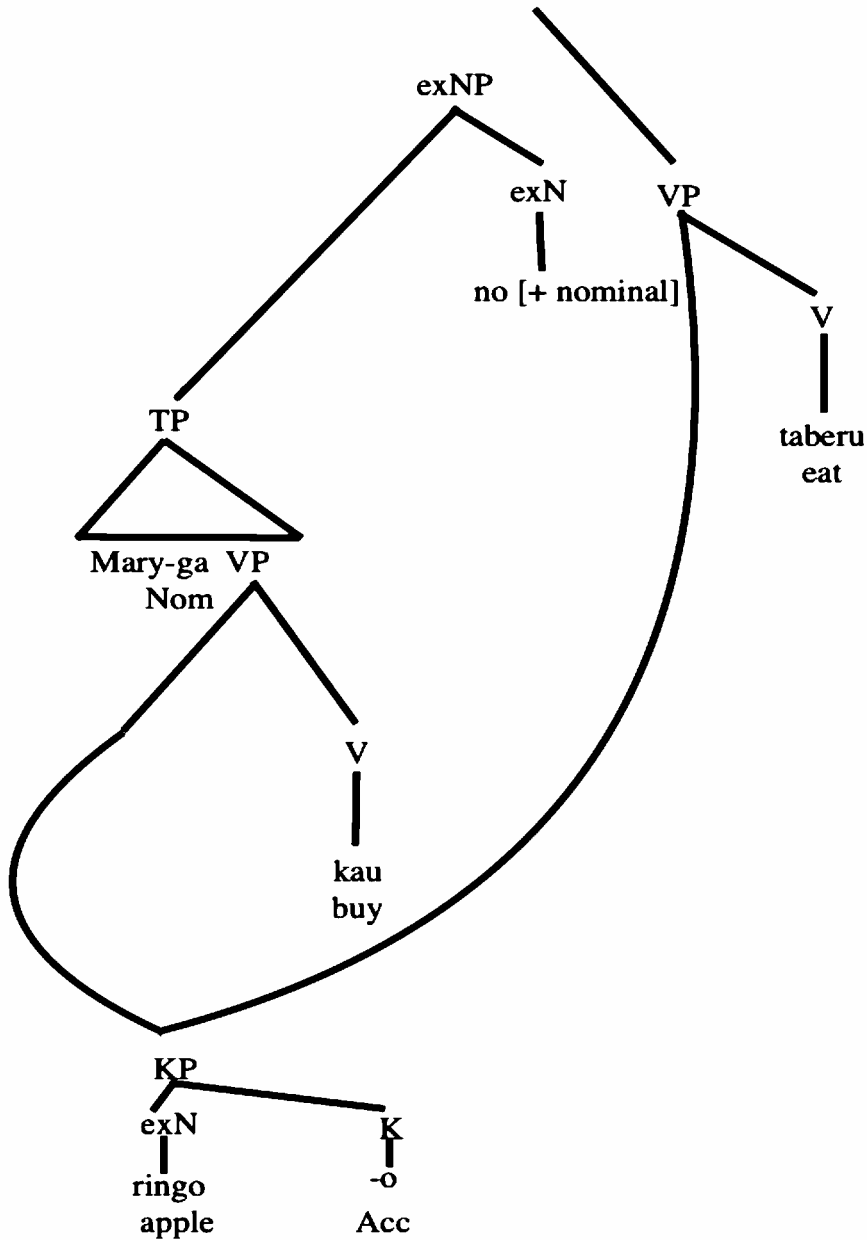V
taberu
eat

DP
ringo-o
apple Acc

If we take the position of the proposal that relative clauses in Japanese are TPs, not CPs, and there are DPs, then, we will get the tree as in (15) as a multidominace tree. Note that (15) follows from the idea discussed in Imai (2013) that haplology superimposes one projection on the other one. See Imai (2013) for further details. In addition, Imai (2023) discusses superimposition of categories.

(15)
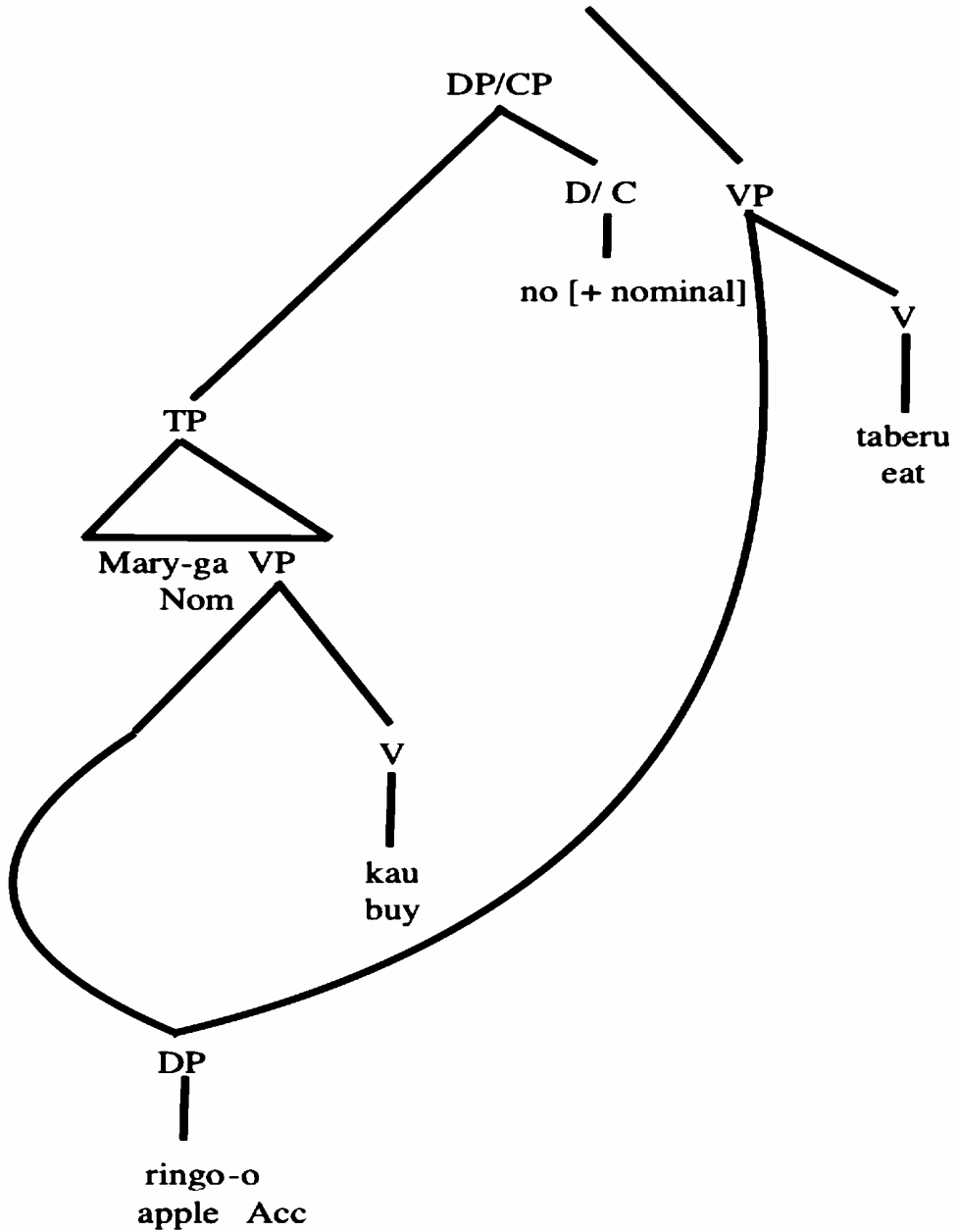
Suppose that Japanese does not have DPs, and KPs (Functional Category for Case), which are overtly pronounced. It is proposed that nouns are considered to be extended NPs in Japanese[4]. The tree in this view is illustrated in (16).

(16)

exNP

exN   VP

no [+ nominal]

V

taberu
eat

TP

Mary-ga VP
Nom

V

kau
buy

KP

exN   K

ringo   -o
apple   Acc

(exN, exNP = extended N, extended NP; K = Case)

It is hard to determine which analysis is tenable for nominal expressions in HIRC in Japanese, thus, we will leave it open for further research. We can only say that HIRC in Japanese is explained in terms of multidominance.

It is proposed that multidominance structures are three-dimensional. Syntactic structures are three-dimensional. Imai (2013) proposes three-dimensional syntactic structures,

replacing conventional two-dimensional flat structures. For further discussion, see Imai (2013). Cf Baker (2001), Chomsky (2004a), Klosek (2011), and van Riemsdijk (2004, 2006) for similar discussion on the three-dimensionality of syntactic structures.

If numeral expressions are involved in HIRCs in Japanese, it shows an interesting consequence in that the split numeral phrase is a multidominated structure as illustrated in (17).

(17)

a. Tom-wa/ga　[Mary-ga　　　ringo-o　　3 ko　　　　　katta　　no]-o
   Top/Nom　　　　Nom　apple Acc　3 Classifier　buy + Past NO Acc
   1 ko　　　　　tabeta
   1 Classifier　eat + PAST
   "Tom ate one apple out of three apples which Mary bought."

b.
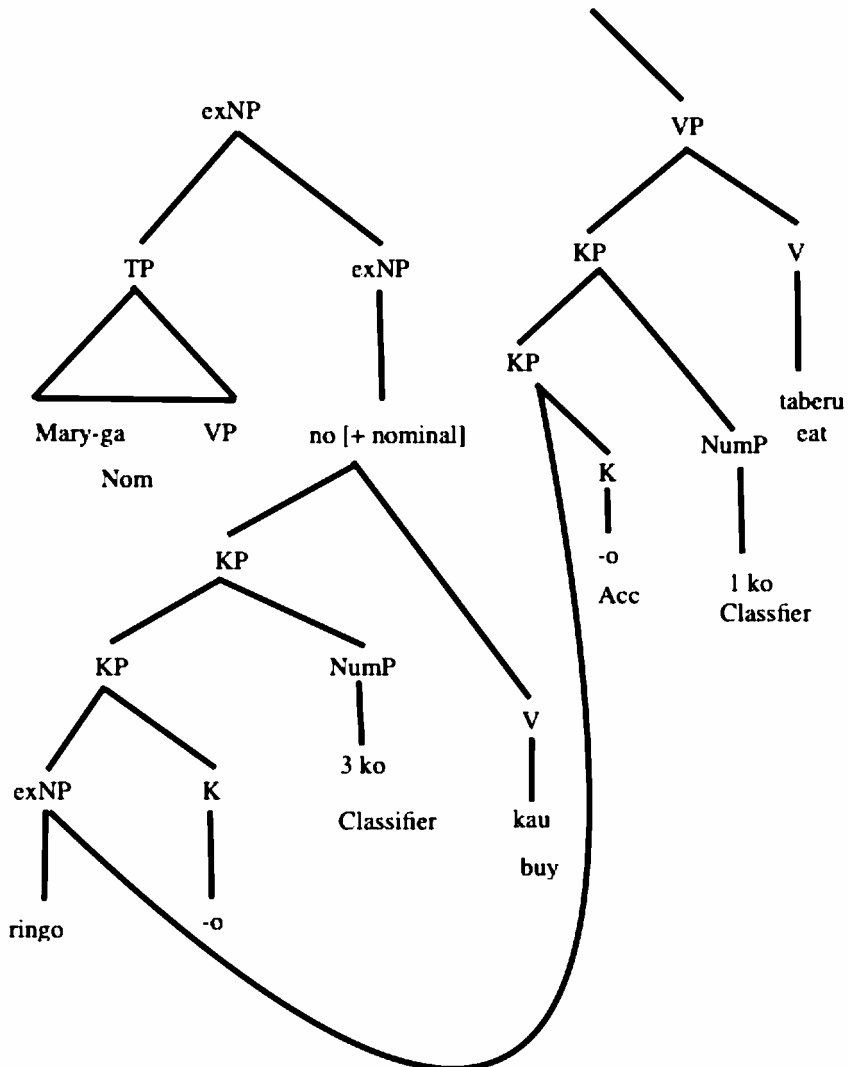
Nominal expressions in Japanese always have classifiers while English uses similar expressions when one counts uncountable nouns like paper, coffee, wine, etc. Nouns in Japanese differ from those in English in that nouns are underspecified in Japanese, lacking the [number] feature. Thus, nouns in Japanese are said to be uncountable, thus requiring classifiers when counting. Unexpectedly, we cannot make a Head External Relative Clause of (17a) which leads to ungrammatical.

(18) *Tom-wa/ga [Mary-ga   katta   ringo   3ko] -o 1 ko
     Top/ Nom   Nom   buy + Past apple 3 Classifier Acc 1 Classifier
     tabeta.
     eat + PAST

This fact shows that sentences like (17a) are the only options in Japanese. Ultimately Head Internal Relative Clauses are required and well analyzed in terms of multidominance.

6 Conclusion

We have shown in this paper that multidominance accounts for various syntactic phenomena and plays an important role in syntax. What we have understood is that Head Internal Relative Clauses and those with classifiers can be accounted for in multidominance.

Notes

[1] For the Strong Minimalist Thesis and Merge, see Chomsky (2017, 2019, 2022, 2023), Chomsky, N. T. D. Seely, R. C. Berwick, S. Fong, M.A.C. Huybrechts, H. Kitahara, A. Mclnnerney and Y. Sugimoto (2023), Freiden (2021), Marcolli, M., R. C. Berwick and N. Chomsky (2023), Marcolli, M., N. Chomsky and R. C. Berwick (2023). Freiden (2021) explains the SMT in fairly detail.

[2] Head Internal Relative Clauses can be also explained in terms of Graft. Cf Imai (2013), (2014a) for further detail. As I said earlier in this paper, multidominance and Grafts are interchangeably used.

[3] Head Internal Relative Clauses are observed in a wide variety of languages across different language families; Old and Modern Japanese, Korean, Tongus languages in the Atlantic family such as Udihe, Tibeto-Burman languages such as Meithei, Tenyidie, Austronesian languages such as Riau Indonesian, Tukang Besi, etc. (Hiraiwa (2003). See also Aldrige (2002, 2003), Grousu and Landman (1998), Jo (2002), Keenan and Comrie (1977), Kim (2005). See Imai (2013, 2014a, 2022), Kuroda (1992a, b), Shimoyama (1999), Yoshida and Sano (2001), Watanabe (2004) for the HIRC in Japanese.

[4] Treatment of Case is problematic in any model in the past generative grammar in that at which level of representation the Case is assigned. In a widely accepted view, the Case assignment is executed at S-structure in the Principles-and-Parameters model. In the Minimalist Program, Case is assumed to be assigned at Spell-Out.

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