LABELING BY MUTUAL ANTI-LABELING

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1. Introduction

Chomsky (2013, 2015) proposes that Merge creates syntactic objects (SOs) without labels and that labels are determined by minimal search on the basis of the properties of the SOs. According to Chomsky, there is a labeling algorithm like (1) (H = a head).

(1) a. {H, XP} → H
    b. {XP, YP} → <F, F>, where F is a feature shared by X and Y through agreement.

Given that labels are heads (lexical items), (1a) is a straightforward case of labeling. When the SO {H, XP} is searched for a label, H is a possible candidate, whereas XP is not. Therefore, H is chosen as the label of {H, XP}. By contrast, a label cannot be determined for {XP, YP} in the same way since both XP and YP are phrases, not heads. If nothing happens, {XP, YP} has no label and such label-less SOs are excluded. However, Chomsky claims that there is a way to assign a label for {XP, YP} if agreement occurs between X and Y. If X and Y agree in terms of the feature F, X and Y come to share F. Minimal search detects this shared feature F and assigns the label <F, F> to {XP, YP}.

While the label is determined by a single head (namely, H) in (1a), it is determined by two heads (XP and YP) in (1b). In this paper, I will explore this type of labeling, namely, labeling by two heads, and propose another case of labeling by two heads. My proposal consists of two claims: (i) {XP, YP} can be labeled when both X and Y have anti-labeling properties in the sense of Saito (2016); (ii) when both X and Y have anti-labeling properties, the label of {XP, YP} is <α, α>, where α is made up of all features shared by X and Y. In section 2, I will motivate claim (i) in the context of crosslinguistic and language-internal variation regarding double sideward movement proposed by Takano (2020a). In section 3, I will discuss consequences of claim (ii) for empirical domains where the label of {XP, YP} created by double sideward movement plays an important role. In section 4, I will conclude the discussion.

2. Another Case of Labeling by Two Heads

2.1. Double Sideward Movement

Chomsky (2000 and subsequent work) proposes that the core operation in the syntax is Merge, which combines two SOs into one:

(2)   Merge(X, Y) → {X, Y}, where X, Y, and {X, Y} are SOs.

Chomsky further claims that there are two kinds of Merge, External Merge (EM) and Internal Merge (IM). EM applies to two independent SOs, whereas IM applies to two SOs one of which is contained in the other, as shown in (3).

(3) a.   EM: X, Y → Merge(X, Y) → {X, Y}
     b.   IM: Y = {... X ...} → Merge(X, Y) → {X, {… X …}}

The SO resulting from IM contains two copies of X. Thus, IM accounts for traditional movement. Note that in both cases of Merge, the new SO is created in the workspace.

While Chomsky accepts only the two applications of Merge shown in (3), Takano (2020a) proposes to extend the application of Merge so that it can apply to two SOs both of which are contained in another SO. This application of Merge is illustrated in (4).

(4) a.   Z = {… X … Y …}
        ↓ Merge(X, Y)
     b.   Z = {… X … Y …}
        {X, Y}

(4a) shows that Z contains X and Y. Suppose that Merge applies to X and Y, creating the new SO {X, Y}. (4b) shows that this new SO is created in the workspace. As a result of this application of Merge, both X and Y have moved from one structure to another (that is, from Z to {X, Y}). In other words, both X and Y have undergone sideward movement. Since the two SOs undergo sideward movement at the same time, Takano calls it "double sideward movement" (see Hornstein 2001 and Nunes 2001, among others, for discussion of standard sideward movement).

Takano (2020a) proposes that double sideward movement plays a crucial role in deriving multiple clefts (clefts with multiple focus phrases) in Japanese. (5) exemplifies Japanese multiple clefts (focus phrases are boldfaced).

(5)   Ken-ga   ageta no-wa   **Mari-ni   hon -o**   da.
      Ken-NOM gave C -TOP Mari -DAT book-ACC COP

      'It was to Mari a book that Ken gave.'

Takano adopts an analysis of Japanese single-focus clefts in which the focus is generated independently of the presuppositional clause and the presuppositional clause contains a null operator identified with the focus (Hoji 1987, Murasugi 1990). Pursuig the idea that the focus phrases in multiple clefts form a single constituent (Takano 2002), Takano proposes that the presuppositonal clause of the example in (5) is derived as shown in (6), where null operators are assumed to be just regular phrases without phonetic cotent.

(6) a.　SO1 = [$_{VP}$ Mari-DAT book-ACC gave] (*Mari-DAT*, *book-ACC* = null operators)

　　↓ Merge(*Mari-DAT*, *book-ACC*) creating SO2 = {Mari-DAT, book-ACC} in the workspace

　b.　SO1 = [$_{VP}$ Mari-DAT book-ACC gave]

　　SO2 = {Mari-DAT, book-ACC}

　　↓ construction of SO1 up to CP

　c.　SO1' = [$_{CP}$ Ken-NOM Mari-DAT book-ACC gave C]

　　SO2 = {Mari-DAT, book-ACC}

　　↓ Merge(SO1', SO2)

　d.　[$_{CP}$ {Mari-DAT, book-ACC} Ken-NOM Mari-DAT book-ACC gave C]

In the step from (6a) to (6b), Merge applies to the two objects and creates {Mari-DAT, book-ACC} in the workspace, thus inducing double sideward movement. After the rest of the presuppositonal clause is formed, {Mari-DAT, book-ACC} gets merged with the presuppositional clause, forming the entire presuppositional clause in (6d).

In this way, the derivation of the presuppositional clause of multiple clefts crucially involves double sideward movement. Takano (2020a) shows that this analysis makes it possible to account for various peculiar properties of multiple clefts, including the lack of island effects and the presence and absence of cluasemate effects.

While achieving these results, this analysis leaves open a number of important questions. One has to do with cross-linguistic variation regarding the availability of double sideward movement. There are languages that do not permit multiple clefts as Japanese does. This fact implies that those languages do not permit double sideward movement. The question is why. Another question concerns the label of the SO {XP, YP} created by double sideward movement: how is this SO labeled? In the rest of this section, I will propose that the question about the availability of double sideward movement reduces to the question about the label, namely, that double sideward movement is possible only when the SO it creates can be labeled.

2.2. Cross-linguistic Variation: Japanese vs. English

It is clear that not all languages have multiple clefts of the Japanese type. Compare Japanese (7) and English (8).

(7)　Mari-ni　　ageta no-wa　　**Ken-ga　　hon -o**　　da.
　　Mari-DAT　gave　C -TOP　　Ken-NOM　book-ACC　COP

　　'It is Ken a book that gave to Mari.'

(8)　*It was **John a book** that gave to Mary.

In (7) the subject and the direct object appear in the focus position. This example is fully acceptable. By contrast, the English couterpart in (8) is completely unacceptable. Thus, multiple clefts are allowed quite freely in Japanese, but they are not in English.[1]

Why does English disallow multiple clefts? In the present context, the question reduces to why English disallows double sideward movement. What is the crucial factor that makes double sideward movement possible?

Double sideward movement creates the SO {XP, YP}. Then another question arises: what is the label of this SO? The question is reasonable, given Chomsky's (2013, 2015) claim that minimal search cannot determine a label for {XP, YP} unless there is agreement between X and Y. If SOs without labels are excluded, SOs created by double sideward movement should have labels if they are to be permitted. In fact, there are proposals regarding their labels. For example, Tada (2020) proposes a labeling mechanism that invokes dependent-Case features. He claims that {XP, YP} created by double sideward movement has the label <x, y>, where x and y are dependent-Case features of X and Y, respectively. He makes this proposal to derive linear order between XP and YP inside {XP, YP} from its label (note that no order can be assigned to {XP, YP} as it stands).

Takano (2020b) forwards another view, namely, that the SO in question has a "complex label" consisting of the properties of both X and Y. Following Takano's (2002) idea, Takano (2020b) pursues an approach in which the availability of multiple clefts is linked to the availability of scrambling. In so doing, he adopts Saito's (2016) theory of labeling and scrambling, according to which DPs, PPs and CPs can scramble in Japanese because Case-particles and P/C have "anti-labeling properties," where the anti-labeling property of X makes XP invisible for labeling. Suppose that DP scrambles and merges with TP, as in (9a). This

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[1] While the example in (8) is clearly disallowed, it is not the case that all multiple clefts are equally disallowed in English. The following examples are fully acceptable.

(i) a.   It was **at Knock a century ago** that the Virgin appeared to local peasants.
          (Delahunty (1981))
    b.   It was **last year at Fenway against the Tigers two times** that Roger Clemens pitched a no-hitter. (Kamio and Thomas (1994))

Note that these examples have adjuncts in the focus position. On the other hand, judgment seems to vary among speakers on examples like the following:

(ii) a. (*)It was **a book to John** that Mary gave.
    b. (*)It was **J. F. Kennedy, in Dallas** that Oswald assassinated in 1963.
    c. (*)It was **to his best friend, about his divorce from his wife** that John talked last night on the phone.

It seems that (iia) is degraded to many speakers. Nakajima (1994) reports that (iib, c) are acceptable, but there are speakers who do not share the judgment. Although it is an interesting and important question what makes (i) acceptable to all speakers and (ii) only acceptable to some speakers, it is beyond the scope of this paper, which focuses on the fact that (8) is unacceptable to all speakers.

gives rise to the SO in (9b).

(9) a.   DP [$_{\text{TP}}$ ... DP ...]
    b.   {DP, TP}

If nothing special happens, a label cannot be determined for {DP, TP} and the SO is excluded. This is why scrambling is impossible in English, for instance. On the other hand, D has an anti-labeling property in Japanese. Due to the anti-labeling property of D, the label of {DP, TP} is determined to be T. This makes scrambling possible in Japanese.

Takano (2020b) extends Saito's (2016) theory of scrambling to cover double sideward movement. Double sideward movement creates {XP, YP}. In English a label cannot be determined for this SO for the same reason that a label cannot be determined for the SO created by scrambling. It thus follows that double sideward movement is impossible in English. In Japanese, by contrast, when {XP, YP} is formed by double sideward movement, both X and Y have anti-labeling properties. Slightly modifying Saito's original proposal, Takano puts forth a relative interpretation of anti-labeling, along the lines of (10).

(10)   Anti-labeling is a property that makes the other head the label of the whole SO.

This has no effect on the account of the presence of scrambling in Japanese: for {DP, TP} in (9b), the anti-labeling property of D makes T, the other head, the label of this SO. However, it has an important consequence for double sideward movement. Suppose that X and Y in {XP, YP} have anti-labeling properties. Then the anti-labeling property of X makes Y the label of {XP, YP} and at the same time, the anti-labeling property of Y makes X the label of {XP, YP}. As a result, {XP, YP} created by double sideward movement has as its label the properties of both X and Y. This is a new case of labeling by two heads. In addition to agreement (Chomsky 2013, 2015), "mutual anti-labeling" provides a way to label {XP, YP} by means of the two heads X and Y.

{XP, YP} created by double sideward movement is labeled by X and Y in Japanese, but not in English. There is a crucial difference here between the two languages. In English when {XP, YP} is searched for a label, there is NO way to choose between X and Y. Therefore, the SO is immediately rendered label-less. By contrast, in Japanese when {XP, YP} is searched for a label, there IS a way to choose one over the other: the anti-labeling property of X makes it possible to choose Y as a label; at the same time, the anti-labeling property of Y makes it possible to choose X as a label. This situation, mutual anti-labeling, makes labeling by two heads possible.

Double sideward movement is permitted in Japanese because it creates {XP, YP} that has a label. A natural question to ask next is: what is the exact content of the label determined by mutual anti-labeling? We will return to this point in Section 3. Before that, we will discuss further consequences of this proposal for variation related to double sideward movement.

2.3 Variation Internal to Japanese

What is crucial in the analysis proposed above of the difference between English and Japanese with respect to the availability of double sideward movement is whether a given head has an anti-labeling property or not. Thus, when double sideward movement creates {XP, YP}, if both X and Y have anti-labeling properties, {XP, YP} is labeled and is therefore allowed. Note that anti-labeling is not a general property of Japanese but a property of particular heads. This makes predications internal to Japanese: double sideward movement forming {XP, YP} will be impossible even in Japanese unless both X and Y have anti-labeling properties.

There are two cases to consider. The first case is where both X and Y lack anti-labeling properties. This case will be excluded for exactly the same reason that double sideward movement is impossible in English, that is, because {XP, YP} has no label. The second case arises when only one, say X, has an anti-labeling property. This case is also predicted to be impossible, but for a different reason. Let us look at (11), which is a structure of the presuppositional clause.

(11)   [$_{CP}$ {XP, YP} [$_{TP}$ ... XP ... YP ...]]

This structure results from double sideward movement of XP and YP followed by merger of {XP, YP} and the presuppositional clause. If X has an anti-labeling property and Y does not, then {XP, YP} has the label Y. Since {XP, YP} has a label, no labeling problme arises here. However, a different problem arises. That {XP, YP} is labeled Y means that {XP, YP} is a YP containing XP. This YP, being a (focus) operator, has to bind a variable. There is a YP in TP, but this YP does not contain XP. Thus, the YP in the Spec of CP has no identical copy to bind. As a result, (11) yields vacuous quantification and is predicted to be ungrammatical.

How is the necessary binding satisfied in the grammatical cases? In those cases, due to mutual anti-labeling, {XP, YP} has a label made up of the properties of X and Y. Given that those properties include the operator features of X and Y, I take this to mean that {XP, YP} functions as a complex operator (an absorbed operator in the sense of Higginbotham and May (1981)). Thus, {XP, YP} in the Spec of CP, as a binary operator, binds both the XP and the YP in TP. We will return to this in section 3.1.

Returning to the two predictions, we can see that they are indeed borne out. Let us first observe that there are two types of clefts in Japanese. One is what we have seen so far, namely, clefts having Case-marked DPs or PPs in the focus position, exemplified in (12).

(12) a. Ken-ga   Mari-kara karita   no-wa   **hon -o**   da.
        Ken-NOM   Mari-from borrowed   C -TOP   book-ACC   COP

   'It is a book that Ken borrowed from Mari.'

b. Ken-ga   hon-o   karita   no-wa   **Mari-kara** da.
    Ken-NOM   hon-ACC   borrowed   C -TOP   Mari -from COP

'It is from Mari that Ken borrowed a book.'

Another type is seen in (13), where bare DPs appear in the focus position.

(13) a. Ken-ga   Mari-kara   karita   no-wa   **hon**   da.
         Ken-NOM   Mari-from   borrowed   C -TOP   book   COP

'It is a book that Ken borrowed from Mari.'

b. Ken-ga   hon -o   karita   no-wa   **Mari**   da.
    Ken-NOM   book-ACC   borrowed   C -TOP   Mari   COP

'It is Mari that Ken borrowed a book from.'

As shown in (12) and (13), single clefts permit the two types. However, multiple clefts behave differently: they are possible only when all focus elements are Case-marked DPs or PPs. This is shown in (14).

(14) a. Ken-ga   karita   no-wa   **Mari-kara hon -o**   da.
         Ken-NOM   borrowed   C -TOP   Mari -from book-ACC   COP

'It is from Mari a book that Ken borrowed.'

b. *Ken-ga   karita   no-wa   **Mari**   **hon**   da.
    Ken-NOM   borrowed   C -TOP   Mari   book   COP

'It is Mari a book that Ken borrowed from.'

c. *Ken-ga   karita   no-wa   **Mari**   **hon -o**   da.
    Ken-NOM   borrowed   C -TOP   Mari   book-ACC   COP

'It is Mari a book that Ken borrowed from.'

Recall that Case-particles and Ps have anti-labeling properties. Thus, in (14a) {XP, YP} in the focus position has a label due to mutual anti-labeling. By contrast, in (14b) both XP and YP in the focus position are bare DPs and thus lack anti-labeling properties. Since {XP, YP} has no label, (14b) is excluded. In (14c) only one of XP and YP, namely, the accusative object, has an anti-labeling property. This causes vacuous quantification and hence (14c) is excluded, too. Thus, the two predictions made by the present proposal are both borne out.

There is a potential problem, however. Consider (15).

(15) (??)Ken-ga   karita   no-wa   **Mari-kara hon**   da.
         Ken-NOM borrowed   C -TOP   Mari -from book   COP

'It is from Mari a book that Ken borrowed.'

This multiple cleft has a bare DP in the focus position, but it is acceptable.[2] This is a potential counterexample to the present analysis, which predicts (15) to be unacceptable. However, Hiraiwa and Ishihara (2012) and Tada (2020) suggest a possible account of (15). Note that the DP *hon* 'book' is adjacent to the copula. It is well known that in Japanese Case-markers can drop if they are adjacent to verbs. (16) shows this phenomenon.

(16) a. Ken-wa Mari-kara hon (-o) karita yo.
         Ken-TOP Mari-from book-Acc borrowed PRT

         'Ken borrowed a book from Mari.'

    b. Ken-wa hon*(-o) Mari-kara karita yo.
         Ken-TOP book -ACC Mari-from borrowed PRT

         'Ken borrowed a book from Mari.'

Given this, Hiraiwa and Ishihara and Tada suggest that in (15) the accusative object *hon* has undergone Case-marker drop (on the assumption that Case-markers are deleted at PF under adjacency with the copula). Then the example in (15) is not a counterexample to the present analysis: the object *hon* does have an accusative particle with an anti-labeling property in the syntax and therefore, {XP, YP} in the focus position can be labeled.

This analysis of (15) predicts that if *hon* is not adjacent to the copula, it must have an accusative particle since in that case, Case-marker drop cannot occur. This is indeed correct, as shown by (17).

(17) Ken-ga karita no-wa hon*(-o) **Mari-kara** da.
     Ken-NOM borrowed C -Top book -ACC Mari-from COP

     'It is a book from Mari that Ken borrowed.'

2.4. Crosslinguistic Variation: Japanese vs. Turkish

We have seen that English allows neither scrambling nor multiple clefts, and that Japanese allows both scrambling and multiple clefts. Turkish represents a third pattern: it allows scrambling but not multiple clefts. İnce (2012) observes that the Turkish multiple cleft in (18) is impossible.[3]

(18) *Ahmet-in al -dığ -I **Hasan(-dan)** kitap.
     Ahmet-GEN borrow-REL-3SG Hasan (-ABL) book

     'It's a book from Hasan that Ahmet borrowed.'

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[2] Hiraiwa and Ishihara (2012) and Tada (2020) judge examples like this to be marginal. I find them to be fairly acceptable or only slightly degraded.

[3] I thank Yuta Sakamoto for bringing İnce's (2012) work to my attention.

At first sight, this is mysterious, given that Turkish has scrambling.

Importantly, however, Turkish allows only a bare DP in the focus position of single clefts (İnce 2012):

(19) a. Hasan-ø   Suzan-a   kitab-ı   ver -di -ø
         Hasan-NOM Suzan-DAT   book-ACC   give-PST-3SG

   'Hasan gave Suzan the book.'

   b. Suzan-a   kitab-ı   ver -en   **Hasan**-dı.
       Susan-DAT   book-ACC give-C   Hasan -PST

   'It was Hasan who gave the book to Susan.'

   c. Hasan-in   Suzan-a   ver -diğ-i   **kitab(*-ı)**   -tı.
       Hasan-GEN Susan-DAT give-C -POSS.3SG   book (-ACC)-PST

      'It was the book that Hasan gave to Susan.'

   d. Hasan-in   kitab-ı   ver -diğ-i   **Suzan(*-a)**   -dı.
       Hasan-GEN   book-ACC give-C -POSS.3SG   Susan (-DAT)-PST

   'It was Susan who Hasan gave the book (to).'

The example in (19a) is a noncleft sentence and those in (19b-c) are clefts formed from it. The clefts are grammatical only when they have bare DPs in the focus position. For some language-internal reasons, Turkish allows only the type of clefts given in (13).

This means that in Turkish clefts focus elements cannot have an anti-labeling property. Then it follows straightforwardly that {XP, YP} created by double sideward movement has no label. Thus, Turkish multiple clefts are excluded, just like English (8) and Japanese (14b).

3. The Label and Nature of {XP, YP}

So far I have shown how the SO {XP, YP} created by double sideward movement can be labeled and discussed consequences of this proposal for crosslinguistic and language-internal variation regarding double sideward movement. I have claimed that {XP, YP} can be labeled by mutual anti-labeling (that is, if both X and Y have anti-labeling properties) and that when this happens, the label of {XP, YP} consists of the properties of X and Y. However, I have left open the question: what exactly is the content of this label? In this section I will explore this issue.

Chomsky (2013) proposes that {XP, YP} can be labeled if X and Y agree. According to Chomsky, if X and Y agree, they share a feature as a result of agreement and this shared feature becomes the label of {XP, YP}. Chomsky (2015) claims that the relevant label is the

pair <F, F>, where F is the shared feature in question.

Labeling by agreement is an instance of labeling by two heads: the label is determined by the properties of the two heads. In the case of labeling by agreement, the content of α in the label <α, α> of {XP, YP} is an agreement feature shared by X and Y. As proposed in the previous section, mutual anti-labeling provides another case of labeling by two heads. Essentially following Chomsky's view that the label determined by two heads is a shared feature, I propose (20) regarding the content of the label determined by mutual anti-labeling.

(20)   If X and Y have anti-labeling properties, then the label of {XP, YP} is <α, α>, where α consists of all features shared by X and Y.

Thus, shared features play a key role in labeling by two heads. In the case of labeling by agreement, the content of α in <α, α> is the agreement feature shared by the two heads. In the case of labeling by mutual anti-labeling, the content of α is all features shared by the two heads.

Given this proposal, it follows that the content of α in the label <α, α> of {XP, YP} created by double sideward movement can contain all and only features shared by X and Y. Therefore, it is predicted that {XP, YP} will show the properties that are shared by X and Y but not the properties that are not shared. In other words, the nature of {XP, YP} will vary depending on what features are shared by X and Y. In the remainder of this section, I will explore this prediction.

3.1. Operator Features

One case that bears out this prediction is variable binding achieved by double sideward movement, discussed in section 2.3. The relevant situation is repeated in (21).

(21)   [CP {XP, YP} [TP ... XP ... YP ...]

The question is how XP and YP in the Spec of CP can bind their copies in TP. Under the current proposal, mutual anti-labeling results in {XP, YP} having the label <α, α>, where α consists of all features shared by X and Y. Given that both XP and YP function as focus operators, they share an operator feature and therefore α includes an operator feature. This means that {XP, YP} functions as an operator, more specifically, a complex operator (an absorbed operator à la Higginbotham and May 1981) having the operator properties of both X and Y. Thus, {XP, YP} in the Spec of CP, as a binary operator, binds both the copy of XP and the copy of YP in TP. In this way, the necessary variable binding is established.

If X and Y in {XP, YP} share the feature F, the label of {XP, YP} includes F and as a result, {XP, YP} shows the property of F. The case in (21) shows this, with F a focus operator feature. Suppose now that X is replaced with X', which differs from X only in that X' does not have F. In that case, the label of {X'P, YP} will not include F and therefore, {X'P, YP} will not show the property of F. This prediction is also borne out in (21) by the

simple fact that in multiple clefts all phrases in the focus position necessarily recevieve focus interpretation. Suppose that in (21) only XP is interpreted as a focus. This means that only X has a focus operator feature. Since X and Y do not share a focus operator feature, α in the label <α, α> of {XP, YP} will not include a focus operator feature, which means that {XP, YP} will not behave as a (binary) operator. Since XP in {XP, YP} cannot bind XP in TP, the strucrure will be excluded due to the lack of variable binding.

3.2. Nominal Features

Let us move on to another case bearing on the predictions of the present proposal. Consider (22) first.

(22) a. Ken-ga   Mari-ni   [Masao-ga   kubininatta to] tutaeta.
     Ken-NOM   Mari-DAT   Masao-NOM   was.fired   C   told

   'Ken told Mari that Masao had been fired.'

   b. Ken-ga   Mari-ni   [Masao-ga   kubininatta koto]-o   tutaeta.
      Ken-NOM   Mari-DAT   Masao-NOM   was.fired   fact -ACC told

   'Ken told Mari (the fact) that Masao had been fired.'

(22a) and (22b) differ only in the choice of C of the embedded clause. (22a) has the regular C *to*, whereas (22b) has the nominal element *koto* (literally meaning "fact" or "thing"), which is why the embedded clause has an accusative Case marker.

Now compare (23a) and (23b), which are cleft sentences formed based on (22a) and (22b), respectively.

(23) a. *Ken-ga   Mari-ni   tutaeta no-wa **[Masao-ga   kubininatta to]** da.
       Ken-NOM   Mari-DAT told   C -TOP Masao -NOM was.fired   C   COP

   'It was that Masao had been fired that Ken told Mari.'

   b. Ken-ga   Mari-ni   tutaeta no-wa **[Masao-ga   kubininatta koto]-o**
      Ken-NOM   Mari-DAT told   C -TOP   Masao -NOM was.fired   fact -ACC
      da.
      COP

   'It was (the fact) that Masao had been fired that Ken told Mari.'

These clefts have in their focus positions the embedded clauses of the examples in (22a, b). Although (23b) is acceptable, (23a) is degraded. This fact itself is not surprising, given that English clefts also disallow non-nominal clauses in their focus positions:

(24)   *It is [that Mary is smart] that John believes.

Note that non-nominal clauses can scramble, as in (25).

(25)   [Masao-ga   kubininatta to] Ken-ga   Mari-ni   tutaeta.
         Masao-NOM   was.fired   C   Ken-NOM   Mari-DAT   told

        'Ken told Mari that Masao had been fired.'

Thus, it is not movement of non-nominal clauses that is barred, but there is a categorial restriction on the phrase that appears in the focus position of the cleft, along the lines of (26).

(26)   The phrase in the focus position of the cleft must be nominal.

    Let us now consider the examples in (27), which are multiple cleft sentences based on (22a).

(27) a. *Ken-ga   tutaeta no-wa **Mari-ni**   **[Masao-ga   kubininatta to]** da.
            Ken-NOM   told   C -Top Mari -DAT Masao -NOM was.fired   C   COP

          'It was Mari [that Masao had been fired] that Ken told.'

      b. *Ken-ga   tutaeta no-wa **[Masao-ga   kubininatta to] Mari-ni**   da.
            Ken-NOM   told   C -TOP   Masao -NOM was.fired   C   Mari -DAT COP

          'It was [that Masao had been fired] Mari that Ken told.'

These examples have two phrases in the focus position, one nominal (*Mari-ni* 'Mari-DAT') and the other non-nominal (the embedded clause), and they are degraded, just like (23a). If the non-nominal clause is replaced by a nominal clause, the examples become acceptable:

(28) a. Ken-ga   tutaeta no-wa **Mari-ni**   **[Masao-ga   kubininatta koto]-o**
            Ken-NOM   told   C -TOP Mari -DAT Masao -NOM was.fired   fact -ACC
            da.
            COP

          'It was Mari [(the fact) that Masao had been fired] that Ken told.'

      b. Ken-ga   tutaeta no-wa **[Masao-ga   kubininatta koto]-o**   **Mari-ni**
            Ken-NOM   told   C -TOP Masao -NOM was.fired   fact -ACC Mari -DAT
            da.
            COP

          'It was [(the fact) that Masao had been fired] Mari that Ken told.'

    The contrast between (27) and (28) parallels the contrast between (23a) and (23b). The fact suggests that the examples in (27) are degraded due to (26). Given that whether {XP, YP} is nominal depends on its label, it in turn means that {XP, YP} is nominal only when both X and Y are nominal. This is exactly what we expect under the present proposal. Under the present proposal, {XP, YP} with the label <α, α> is nominal only if α contains a nominal

feature. In (28) α contains a nominal feature since X and Y share this feature. By contrast, in (27) α does not contain a nominal feature since X and Y do not share it. Thus, the content of α depends on what features are shared by X and Y.

3.3 Quantificational Features

The claim that α in the label <α, α> of {XP, YP} formed by double sideward movement consists of shared features receives additional support from facts about quantifier scope. Agbayani, Golston and Ishii (2015) make the interesting observation that multiple scrambling shows effects different from what we expect if each phrase scrambles independently. The examples in (29) show well-known patterns of quantifier scope in Japanese.

(29) a. Dareka -ga   dono sensei -ni-mo Ken-o   syookaisita.
      Someone-NOM   every teacher-to-also Ken-ACC   introduced

   'Someone introduced Ken to every teacher.'
   someone > every teacher, *every teacher > someone

    b. Dono sensei -ni-mo dareka -ga   Ken-o   syookaisita.
       every teacher-to-also someone-Nom Ken-Acc   introduced

   'Someone introduced Ken to every teacher.'
   someone > every teacher, every teacher > someone

In (29a) the subject and the indirect objects are quantifiers. In this case, only the surface scope is possible. Thus, while the subject QP can take scope over the object QP, the opposite scope relation is impossible. However, if scrambling takes place, moving the object QP to a higher position than the subject QP, the example becomes ambiguous. Thus, in (29b) both the surface scope and the inverse scope are possible. This fact shows that scrambling has the effect of making new scope relations.

Agbayani, Golston and Ishii (2015) observe that this effect of scrambling cannot be seen if two phrases are scrambled. Consider (30).

(30) Dono sensei -ni-mo   Ken-o   dareka -ga   syookaisita.
      every teacher-to-also   Ken-ACC   someone-NOM introduced

   'Someone introduced Ken to every teacher.'
   someone > every teacher, *every teacher > someone

This example differs minimally from the one in (29b) in that in addition to the indirect object, the direct object is also scrambled. According to Agbayani, Golston and Ishii, the example patterns with (29a) and not with (29b): it does not allow the scrambled indirect object to take

scope over the subject.[4]

The same effects can be seen with multiple clefts. Thus, (31) is ambiguous, just like (29b), whereas (32) is not, patterning with (30).

(31) Dareka -ga   Ken-o   syookaisita no-wa **dono sensei -ni-mo** da.
      someone-NOM Ken-ACC   introduced C -TOP   every teacher-to-also COP

     'It was to every teacher that someone introduced Ken.'
     someone > every teacher, every teacher > someone

(32) Dareka -ga   syookaisita no-wa **dono sensei -ni-mo Ken-o**   da.
      someone-NOM   introduced C -TOP   every teacher-to-also Ken-ACC COP

     'It was to every teacher Ken that someone introduced.'
     someone > every teacher, *every teacher > someone

Interestingly, if *Ken-o* 'Ken-ACC' in (32) is replaced by a quantifier, the "every teacher > someone" reading becomes possible:[5]

(33) Dareka -ga   syookaisita no-wa **dono sensei -ni-mo**
      someone-NOM   introduced C -TOP   every teacher-to-also
      sannin-no   gakusei-o   da.
      three -GEN student -ACC COP

     'It was to every teacher three students that someone introduced.'
     someone > every teacher, every teacher > someone

How can we make sense of the contrast between (32) and (33)? In (32) the focus position has {XP, YP}, where X is quantificational but Y is not. Since X and Y do not share the quantificational feature, it is not part of α in the label <α, α> of {XP, YP}. This means that {XP, YP} is not interpreted as a quantifier. Since XP = "every teacher" is contained in the non-quantificational phrase {XP, YP}, XP does not take scope beyond {XP, YP}. This

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[4] I have one qualification. I agree with Agbayani, Golston and Ishii on the judgment on (30) only if I read the sentence with the two scrambled phrases forming a single prosodic unit. If I read it with the two scrambled phrases forming different prosodic units, I find the "every teacher > someone" reading possible. This phenomenon does not arise with multiple clefts, as we will see immediately.

[5] Note that the example in (i), where no movement has occurred, does not allow the "every teacher > someone" reading.

(i) Dareka -ga   dono sensei -ni-mo sannin-no   gakusei-o   syookaisita.
     Someone-NOM   every teacher-to-also three -GEN student -ACC introduced

     'Someone introduced three students to every teacher.'
     someone > every teacher, *every teacher > someone

Thus, the availability of the "every teacher > someone" reading in (33) is due to cleft movement.

accounts for the lack of the "every teacher > someone" reading in (32). The situation is different in (33). In (33) both X and Y in {XP, YP} are quantificational. Since X and Y share the quantificational feature, α in the label <α, α> of {XP, YP} includes this feature. As a result, {XP, YP} is interpreted as quantificational. Therefore, both XP and YP can take scope from the position of {XP, YP}. This makes the "every teacher > someone" reading possible in (33).

Here too, the nature of {XP, YP} varies depending on what features are shared by X and Y. {XP, YP} is quantificational if X and Y share a quantificational feature, but it is non-quantificational if they do not. This follows from our proposal that the labeling of {XP, YP} by mutual anti-labeling results in the label <α, α>, where α consists of all features shared by X and Y. [6]

4. Conclusion

In this paper I have explored the issue of labeling by two heads. I have claimed that there are two cases of labeling by two heads: one is labeling by agreement (Chomsky's proposal) and the other is labeling by anti-labeling (the present proposal). The specific claims that I have made regarding labeling by anti-labeling are summarized in (34).

(34) a. The SO {XP, YP} is labeled if X and Y have anti-labeling properties.
   b. If X and Y have anti-labeling properties, the label of {XP, YP} is <α, α>, where α consists of all features shared by X and Y.

I have shown that this proposal has desirable consequences for issues related to variation regarding double sideward movement and the nature of the SO {XP, YP} created by double

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[6] We have restricted attention to cases where the focus of multiple clefts consists of two phrases. However, there is no limit on the number of phrases that appear in the focus position. Thus, we can form multiple clefts like those in (i).

(i) a. Kinoo   ageta no-wa **Ken-ga**   **Mari-ni**   **hon -o**   da.
       yesterday gave   C -TOP Ken-NOM   Mari -DAT   book-ACC   COP

   It was Ken to Mari a book that gave yesterday.

   b. Ageta no-wa **Ken-ga**   **kinoo**   **Mari-ni**   **hon -o**   da.
      gave   C -TOP Ken-NOM   yesterday Mari -DAT book-ACC   COP

   It was Ken to Mari a book yeserday that gave.

The example in (ia) has three phrases in the focus position. The three phrases form the single SO {ZP, {XP, YP}}, where X, Y and Z all have anti-labeling properties. The SO {XP, YP} is labeled by mutual anti-labeling, as before, with the label <α, α>. Note that α includes the anti-labeling property shared by X and Y. Therfore, the SO {ZP, {XP, YP}} is also labeled by mutual anti-labeling, with the resulting label <β, β>, where β consists of all features shared by Z and α, namely, by Z, X and Y. In the same way, the SO {WP, {ZP, {XP, YP}}}, if X, Y, Z and W all have anti-labeling properties, will have the label <γ, γ>, where γ is all features shared by X, Y, Z and W.

sideward movement.

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