A LABELING-BASED APPROACH TO OVERT/COVERT DISTINCTION: A CASE STUDY OF QUANTIFICATION AND SCRAMBLING IN JAPANESE AND ENGLISH*

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1. Introduction

Chomsky (2013, 2015) proposes that labels of syntactic objects are determined by a fundamental mechanism of minimal search, and that labeling is motivated by interfaces. Meanwhile, specific proposals on labeling have suggested that label identification mechanisms may vary across languages. For example, the label of a sentence is the feature set <ϕ, ϕ> in English (Chomsky 2013), while it is "TP" in Japanese (Saito 2016). The difference can be attributed, according to Saito, to morphosyntactic properties of the languages. English has ϕ-feature agreement, which makes the shared feature <ϕ, ϕ> the most prominent in a sentence, and hence, minimal search identifies it as the label of the sentence. Japanese, on the other hand, lacks ϕ-feature agreement (Fukui 1986, Kuroda 1988) but has suffixal particles, which, Saito proposes, is an anti-labeling device. Therefore, the subject noun phrase with a particle is invisible for labeling and thus TP provides the label of a sentence. This situation is suitable with the spirit of the minimalism, especially with Chomsky's (1995, 2001) Uniformity Principle in (1).

(1) **Uniformity Principle** (Chomsky (2001:2))[1]
In the absence of compelling evidence to the contrary, assume languages to be uniform, with variety restricted to easily detectable properties of utterances.

The difference of label identification procedures between English and Japanese results from "easily detectable properties of utterances;" that is, the existence of ϕ-feature agreement and the existence of suffixal particles. However, the different labels on a sentence between Japanese and English we have just seen above raises an important question. Is the difference just about the PF side, or about both LF interface and PF interface? Given Uniformity Principle, we expect

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[1] See also Boeckx (2011) and Berwick and Chomsky (2011).

that labels on the LF side are the same for the same semantic object both in English and in Japanese even when labels on the PF side are different between the two languages. If this is the case, the labels of a syntactic object in a single language can be different between PF and LF. As far as I am aware of, this question has not yet discussed much in the literature. Hence, in this paper, I explore the assumption in (2).

(2) Labels required for the PF interface and labels required for the LF interface can be different. (Oku 2018, 2020)

More specifically, comparing Japanese and English, I argue that labels of sentences with quantificational expressions are the same on the LF side in the two languages, whereas variations appear on the PF side with respect to the surface properties which affect label identification mechanism.

In order to endorse the assumption in (2), I take up two phenomena in Japanese and English discussed in the literature; the inverse correlation observed in scrambling/QR (Szabolcsi 1997, Bobaljik & Wurmbrand 2012), and overt/covert differences of wh-movement (Nishigauchi 1990, Watanabe 1992, Saito 2017, among others). Expanding Oku (2018, 2020), I propose a labeling-based account of the two phenomena above. More precisely, it is known since Kuroda (1965) that there are differences of morphosyntactic makeups of the words/phrases between Japanese and English as in (3). I argue that the differences in (3) crucially affect the labeling procedures in the languages. This provides a labeling-based explanation of the above-mentioned facts in a novel fashion.

(3) a. Quantificational expressions (universal quantifier, wh-words, etc.) in English have quantificational forces by themselves.
b. Indeterminate expressions (*dare* 'who', *nani* 'what', *dono* 'which', etc.) in Japanese can have quantificational force only when they are associated with a relevant particle.

The organization of the paper is as follows. In Section 2, I will introduce the inverse correlation of scrambling/QR exemplified in Japanese and English. Section 3 is a review of Saito (2016) on a labeling-based account of scrambling. In Section 4, I will give some notes, as a preliminary of the discussion in the following sections, on the timing of labeling and types of labeling on the PF side and on the LF side. Section 5 discusses Oku's (2018) proposal on labeling-based account of the inverse correlation, where I propose that so-called "covert" (LF) movement is available only when there is some phonological reason which blocks the corresponding overt movement. Specifically, the labeling failure on the PF side is one instance of phonological reasons which makes overt movement unavailable, resulting in the corresponding "covert" movement. Section 6 is a brief discussion on types of labels necessary on the LF side. Section 7 expands the analysis in Section 5 to wh-movement in Japanese and discusses overt/covert instantiations of wh-movement and labeling property of quantificational expressions in Japanese. Section 8 is the summary of the paper.

2. Inverse Correlation

Let us first quickly review the inverse correlation presented in Oku (2018). It has been known since May (1977, 1985) that inverse scope is easily available in English. Take a look at (4).

(4) A girl recommended every boy.
(5) a. There is x, x a girl such that for every y, y a boy, x recommended y. (∃ > ∀)
b. For every y, y a boy, there is x, x a girl such that x recommended y. (∀ > ∃)

Following May (1977, 1985), let us assume that "inverse scope reading" shown in (5b) is obtained by quantifier raising (QR): a quantifier phrase *every boy* in (4) "covertly" moves to the sentence-initial position to take scope over *a girl* as in (6).

(6) [[every boy]$_i$, [a girl recommended **t**$_i$]]

English, however, does not allow scrambling. That is, the movement depicted in (6) is not good in English if it is an overt movement even though it is good as a covert movement, i.e., QR.

Japanese, on the other hand, is a "scope rigid" language (e.g., Kuroda 1965, Kuno 1972, Hoji 1985, Lasnik and Saito 1992, Bobaljik and Wurmbrand 2012), where the inverse scope reading is hard to get. Consider (7).

(7) Onnanoko-ga hitori dono otokonoko-mo suisensita
girl -NOM one every boy -MO recommended

'A girl recommended every boy'

(8) a. There is x, x a girl such that for every y, y a boy, x recommended y. (∃>∀)
b. *For every y, y a boy, there is x, x a girl such that x recommended y. (*∀>∃)

(7) can be interpreted that a single specific girl recommended all the boys as shown in (8a) but the inverse scope reading as shown in (8b) is difficult to obtain. However, if the movement of a quantifier phrase *dono otokonoko-mo* 'every boy' is overt as in (9), the sentence is grammatical and the reading in (8b) is available.

(9) [[Dono otokonoko-mo]$_i$, [onnanoko-ga hitori **t**$_i$ suisensita]]

every boy -MO girl -NOM one recommended

lit. 'Every boy$_i$, a girl recommended **t**$_i$ '

These observations show that Japanese and English neatly exemplify the inverse correlation: when an overt movement is possible, the corresponding covert movement is not. When an overt

movement is not allowed, on the other hand, the corresponding covert movement is available.[2] The following sections, following Oku (2018), are devoted to explaining this inverse correlation by a labeling-based analysis. To achieve this, the next section introduces Saito's (2016) labeling-based account of Japanese scrambling.

3. A Labeling-Based Account of [±scrambling]: Saito (2016)

Among the phrase structure building mechanisms that have been standardly assumed in generative grammar, the projection (i.e., the category of a phrase) was stipulated in the Phrase Structure (PS)-rule systems (e.g., Chomsky 1965) or in the X-bar theory (e.g., Chomsky 1970, 1981, 1986b); for instance, the phrase is a verb phrase (VP) because its head is a verb (V). Chomsky (2013, 2015), however, proposes that "projection" can be derived from a fundamental principle of "minimal search." When Merge creates a two-membered set, the label of the set is uniquely identified in the following ways. As shown in (10a), when one of the members is a head and the other is a phrase, minimal search identifies the head as the label of the set. When the two members are both phrases as in (10b), there are two ways to identify the label of the set.[3]

(10) a. {H, XP} ➔ H is the label
b. {XP, YP} ➔ two ways to identify the label:
(i) extraction of one member of the set or,
(ii) feature-sharing

As an illustration of (10b-(i)), when the predicate-internal subject DP is moved out of set α as shown in (11), the other member, *v*P, provides the label of set α. This is because minimal search into set α finds *v*P as a complete member in the set.

(11) $\{_{\alpha}$ DP, *v*P $\}$ ➔ *v*P is the label of α.

DP in set α, on the other hand, is one occurrence of the copy of DP (the other occurrence is outside of α) and thus DP in α cannot be identified as the label of the set by minimal search.

The second way shown in (10b-(ii)) goes as follows. When minimal search finds the same ϕ-feature both on DP and TP, these shared features provide the label of set β as in (12).

(12) $\{_{\beta}$ DP, TP$\}$ ➔ < ϕ, ϕ > is the label of β.
< ϕ > < ϕ >

[2] See Bobaljik and Wurmbrand (2012) for Scope Transparency Account of this inverse correlation, but see Oku (2018) for a critical comment on it.

[3] Chomsky (2015) distinguishes cases in which a head is strong or weak. See a brief discussion on this in Section 6 in this paper. Also, what would be the label of {H, H} is another important issue but I do not deal with such cases.

Saito (2016) then points out that while Chomsky's (2013) system works in explaining the labeling procedure in agreement languages, it immediately raises the question of how the labels are identified in situation (10b-(ii)) in Japanese which lacks ϕ-feature agreement (Fukui 1986, Kuroda 1988, etc). Saito argues that suffixal particles play a significant role in the labeling procedure in Japanese and proposes (13).

(13) Japanese suffixal particles are anti-labeling devices.

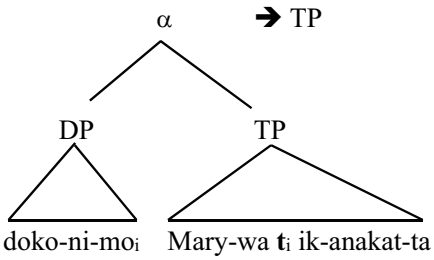
To illustrate the analysis, let us look at (14): [DP *doko-ni*-MO] 'anywhere' in (14a) is scrambled to adjoin to the sentence TP in (14b).

(14) a. [TP Mary-wa [DP doko -ni-mo] ik -anakat-ta]
Mary-TOP where-to-MO go-NEG -PAST
'Mary didn't go anywhere'

b. [α? [DP doko-ni-mo]$_i$ [TP Mary-wa **t**$_i$ ik-anakat-ta]]

How is the label of α identified in (14b) in which the members are both phrasal, i.e., DP and TP? Saito (2016) claims that particle *mo* on DP is an anti-labeling device and thus invisible for labeling; therefore α is identified as TP, as in (15).

(15)



This explains why scrambling is possible in Japanese. However, (15) sharply contrasts with the corresponding English cases. Scrambling of *anywhere* in (16a) is not possible in English because the label of α in (16b) cannot be uniquely identified.

(16) a. [TP Mary didn't go [AdvP anywhere]]
b. *[α? [AdvP anywhere]$_i$ [TP Mary didn't go **t**$_i$]

(16b) is uninterpretable at the interfaces. As a result, it is ungrammatical in English.

So far we have seen Saito's (2016) analysis of scrambling in Japanese and the lack of scrambling in English on the basis of labeling. Before our discussion of a labeling-based account of the inverse correlation in Section 5, let us have some brief notes on the "timing" of labeling and types of labels in the next section.

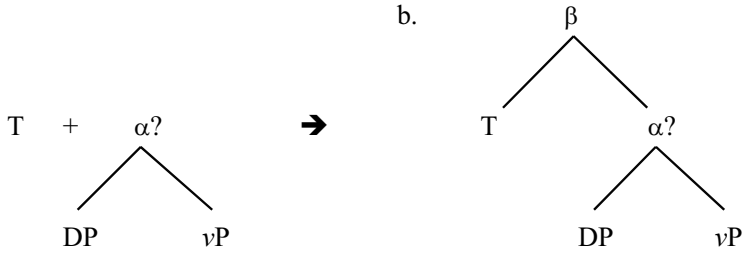
4. Notes on the labeling: its "timing" and types

First of all, in Chomsky (2013, 2015), labeling is not a kind of syntactic "operation" which adds something new to a syntactic object during the derivation. If it is, it is against No Tampering Condition (Chomsky 2005, 2008). Rather, a label of a syntactic object (i.e., a set) is identified by minimal search based on the properties of the members of the set. Now, one of the questions to be explored seriously is (17).

(17) When and where does minimal search work to identify the label of a syntactic object?

Consider first a specific derivation discussed in Chomsky (2013) as illustrated in (18). When DP and *v*P make a set by Merge, the label of set α is not yet identified as in (18a), but the set (as a syntactic object) still can be a member of a new set β by another Merge with T as in (18b).

(18) a. b.



In other words, the application of Merge itself is not affected by the label of the candidate members. This situation is not problematic under Chomsky's (2013, 2015) assumption that labels are motivated by the interfaces. It suffices that labels are identifiable by the time when the derivation reaches to the interfaces. In this respect, it is reasonable to assume (19) as in Bošković (2016) and Chomsky (2013).[4]

(19) The label is identified when the structure is sent to the interface.

Another reasonable possibility, under the interface-driven perspective on labeling, is that the label is identified at the interfaces. The implication of these two different timings of labeling is an issue to be explored carefully, and I will pursue the second possibility so that the type of labels can be different on the PF side and on the LF side.

In this connection, however, Chomsky (2015) assumes (20).

(20) Chomsky (2015: 6)
The same labeling is required at CI and for the process of externalization.

Notice that if the label is required for a syntactic object to be interpreted at interfaces, as is assumed throughout in Chomsky (2013, 2015), it is not very clear why "the same labeling is

[4] Note that Bošković argues that (19) applies when the set is {XP, YP}. When the set is {H, XP}, however, he claims that the label is immediately identified as H upon Merge.

required" as in (20) for the two distinct interpretive systems, the CI system and the process of externalization. Let me give a brief and informal discussion on what specific types of labels are required at the PF interface and at the LF interface.

Let us consider why the label is necessary for a syntactic object on the PF side. Since Chomsky and Halle (1968), arguments have been accumulated that phonological rules are sensitive to syntactic structure of the input object. For instance, the Compound Stress Rule and the Main Stress Rule are formulated in such a way that the syntactic category (i.e., label) of the input is a crucial condition for the rule application (Chomsky and Halle 1968, p. 15ff). This means that phonological interpretations are impossible if the label of the syntactic object is not identified.[5] According to this standard assumption of phonological rules in generative grammar, it is reasonable to conclude that the type of labels necessary for the PF interface is (or includes) traditional syntactic categories, such as N, V, A, etc. The next question to be considered is why the label is necessary for a syntactic object to be interpreted on the LF side and what type of label is relevant there.

Intuitively, traditional syntactic categories may be relevant to semantic interpretations as well. To take a simple case, in (21a) the entire set is semantically interpreted as an adjective (A), and in (21b) it is semantically interpreted as a noun (N) phrase.[6]

(21) a. "culture specific": [$_{A}$ [$_{N}$ culture] [$_{A}$ specific]]
b. "specific culture": [$_{N}$ [$_{A}$ specific] [$_{N}$ culture]]

If the label is not identified, the LF interface may not be able to interpret (21a) and (21b) since it is not clear which of the words, *culture* or *specific*, determines the entire nature of the complex; whether we are talking about some culture (N) or about some property (A).[7] If this is the case, we may say that the labels required for the LF interface are the same type as those required for the PF. In Section 6 and Section 7, however, I argue that there are some cases in which required label types are different between the PF side and the LF side. Having the discussion in this section in mind, let us introduce a labeling-based account of the inverse correlation proposed in Oku (2018, 2020) in the next section.

5. Labeling-Based Account of the Inverse Correlation

Let us first consider how the syntactic computation distinguishes "overt" movement from "covert" (LF) movement in the current minimalist design of syntactic computation. Let us assume with Chomsky (1995) that we do not have "LF" as an independent component. More specifically, following Bošković and Nunes (2007) among others, that so-call "covert" (LF) movement is an instance of internal Merge in which the inner (i.e., lower) copy of the "moved"

[5] See Takita (2020) for another possible reason why labeling is necessary for the PF side.

[6] I put aside an important question of how minimal search identifies the label of each complex here.

[7] Note that word order is irrelevant at LF.

element, not the higher copy, is externalized (e.g., pronounced). Look at (22), where a member α of set (22a) is (internally) Merged to the set to create (22b).

(22) a. {α, b}
b. {α, {α, b}}

When the outer α is externalized/pronounced and the inner α is not in (22b), the final PF output is an instance of "overt" movement. When the inner α is externalized/pronounced and the outer α is not, on the other hand, it is an instance of "covert" movement. Movement is "overt" in many cases (Chomsky 2013) but there are some cases where movement is "covert." Bošković and Nunes (2007) give ample examples of "covert" movement and propose that (at least) some cases of movement are "covert" because pronunciation of the outer copy leads to a problem on the PF side. Following Oku (2018), I assume the state of matter in (23):[8]

(23) **Externalization**
a. The outer copy is externalized/pronounced.
b. If something "phonological" prevents the realization of the outer copy, the inner copy is externalized/pronounced. ("LF movement")

In other words, (23a) is the unmarked case, and the inner copy is pronounced only when there is some specific condition to do so. I show two proposed conditions, one discussed in Bošković (2002) and the other in Tokizaki (2020a, 2020b).

Bošković (2002) shows that Romanian is a multiple wh-fronting language in which all wh-phrases must be moved to the front and pronounced there. For example, (24a) is the underlying structure in which the word order is SVO. At the surface structure, the object *ce* 'what' must move to the Spec of the sentence as shown in (24b-c).

(24) a. Cine precede ce? (underlying structure: SVO)
who precedes what

[8] Oku (2018) suggests that (23a) is a matter of a "simple-minded" parser. That is, the externalization system parses the structure left-to-right and externalizes α at the first encounter, and some sort of "performance economy" prevents the pronunciation of other occurrences of α which come later during the parsing: once you pronounce the first occurrence of α, you do not have to pronounce the other occurrences of the same α. Hence, you must not pronounce them since it would be against the performance economy unless some other condition requires to do so. The idea that (23a) is a matter of parser performance will be supported by the observations that sometimes the inner occurrence of the same copy is also pronounced, which is usually regarded as a *performance error*, as reported in Radford (2004).

(i) **Is** the clock *is* working? (children's "double Aux" error) (Radford 2004: 149)
(ii) It's a world record [**which** many of us thought *which* wasn't on the books at all]
(Athletics commentator, BBC2 TV) (Radford 2004: 157)

In both cases, in addition to the first occurrence of the "moved" element, the second occurrence is also pronounced mistakenly.

b. Cine ce precede? (surface structure)
who what precedes

c. *Cine precede ce? (*surface structure)
who precedes what

'Who precedes what?'

However, when the two wh-phrases are morphophonologically identical, the two instances of the wh-phrases cannot appear at the front as in (25b). Rather the second wh-phrase must be pronounced downstairs in the original theta-position as in (25c).

(25) a. Ce precede ce? (underlying structure: SVO)
what precedes what

b. *Ce ce precede? (*surface structure)
what what precedes

c. Ce precede ce? (surface structure)
what precedes what

'What precedes what?'

To account for this observation, Bošković (2002: 365) proposes (26) for Romanian.

(26) **PF Constraint**
*consecutive homophonous wh-phrases

Consider (27) for an illustration of the derivation in question. Although the object *ce* 'what' moves to Spec where the subject *ce* 'what' also appears, the phonological realization of both *ce*'s at Spec leads to a violation of PF Constraint (26). Hence, the inner copy of the object *ce* is realized as a kind of last report as shown in (27b).

(27) a. [$_{CP}$ [$_{Spec}$ ce$_i$ ce$_j$] [$_{C'}$ C [$_{TP}$ ce$_i$ [$_{T'}$ T [$_{VP}$ V ce$_j$]]]]] (syntactic structure)

b. [$_{CP}$ [$_{Spec}$ ce$_i$ ~~ce$_j$~~] [$_{C'}$ C [$_{TP}$ ~~ce$_i$~~ [$_{T'}$ T [$_{VP}$ V ce$_j$]]]]] (surface realization)

This is a clear instance of (23b): (26) which is something phonological prevents the outer copy realization and thus the inner copy is phonologically realized. This results in a case of "LF movement" of the object wh-phrase.[9]

[9] Note that Bošković argues that even when the object wh-phrase *ce* is pronounced in the downstairs theta-position as shown in (25c)/(27b), it actually moves (internally Merges) to Spec in syntactic computation as in (27a) because it licenses a parasitic gap, which is generally assumed to be evidence for wh-movement (Chomsky 1986b). Bošković also gives an example of the inner copy pronunciation of a wh-phrase in Romanian when the outer copy pronunciation is not compatible with the proper

Let us now turn to Tokizaki's (2020a, 2020b) observation regarding German (in)separable verbs in the verb second configuration (V2). I suggest that this also provides a case of (23b). Observe the contrast between (28) and (29), in which the **bold case** indicates the primary stress of the verb.

(28) German (in)separable verbs in V2
abfahren
a. *Anna **ab**fährt heute.
Anna **off**-go today

b. Anna fährt heute **ab**.
Anna go today **off**

'Anna leaves today'

(29) be**stel**len
a. Anna be**stellt** zwei Espresso.
Anna orders two espresso.

b. *Anna **stellt** zwei Espresso be.

'Anna orders two espresso'

When the tensed main verb appears in the V2 position, some prefixes must be separated as in (28) while others cannot as in (29). To explain the contrast, Tokizaki (2020a, 2020b) propose a prosodic constraint as in (30).

(30) **Prosodic Constraint on Externalization in German**
$[_{\phi}\ (_{\omega}W)\ _{\omega}S\ \ldots]$

The German phonological phrase ϕ, according to Tokizaki, prefers starting with the $[_{\phi}$ Weak – Strong …] prosody pattern and tries to avoid starting with $[_{\phi}$ Strong …] if possible. The phonological phrasing of (28) and the phonological phrasing of (29) are represented in (31) and (32), respectively.

(31) a. *($_{\phi 1}$ Anna) ($_{\phi 2}$ **ab**fährt heute).
Anna **off**-go today

b. ($_{\phi 1}$ Anna) ($_{\phi 2}$ fährt heute **ab**).

'Anna go today **off**'

(32) - be**stel**len
a. ($_{\phi 1}$ Anna) ($_{\phi 2}$ be**stellt** zwei Espresso).
Anna orders two espresso.

intonation contour of the language. Again, something phonological prevents the outer copy realization, ending up with the inner copy realization (i.e., "covert" movement). See also Stjepanović (2007) for other instances of inner copy realization (for phonological/prosodic reasons) in Serbo-Croatian.

b. *(ϕ1 Anna) (ϕ2 **stellt** zwei Espresso be).

'Anna orders two espresso'

Focusing on the second phonological phrase ϕ2 in each example, Tokizaki argues that since *ab-* in *abfähren* 'leave' has a primary stress, ϕ2 in (31a) starts with Strong, which is not preferred. If the prefix *ab-* is separated from the stem and left behind as in (31b) which is a possible option with separable verbs, phonological phrase ϕ2 starts with Weak and the prosodic pattern follows (30). Hence, (31b) is preferred. In the case of *bestellen* 'order,' on the other hand, the primary stress is on the stem *stellen*, not on the prefix *be*. Thus, (32a) follows the prosodic constraint in (30). If you leave the prefix *be-* behind as in (32b), however, phonological phrase ϕ2 starts with Strong which is not preferred. The contrast between (31) and (32) is explained this way.

Although Tokizaki's (2020a, 2020b) actual implementation of the explanation is different from what I am going to present below, this German contrast and Tokizaki's idea well match (23): the upper copy externalization is default and the lower copy is pronounced when something phonological prevents the upper copy pronunciation. Following the standard assumption (since den Besten 1983, among others) that the main verb in the V2 position in German moves from its original position in the SOV underlying structure to the left periphery, let us assume the structure of the *bestellen* case as in (33a) where both outer and inner copies of the verb exist in syntactic structure of the sentence.

(33) a. Anna be**stellt** zwei Espresso be**stellt**.

Anna orders two espresso orders

b. (ϕ1 Anna) (ϕ2 be**stellt** zwei Espresso ~~**bestellt**~~).

'Anna orders two espresso'

Following (23a), the unmarked case, the outer copy of *bestellt* 'ordres' is externalized and the inner copy is not pronounced, giving (33b). The phonological phrasing in (33b) conforms to prosodic constraint (30) and thus nothing phonological is wrong with this outcome. Hence, it is pronounced as the final output at the surface structure. On the other hand, in (34a), if we externalize the whole outer copy of *abfährt* 'off-go' as in (34b), the outcome violates German prosodic constraint (30).

(34) a. Anna **ab**fährt heute **ab**fährt.

Anna off-go today off-go

b. *(ϕ1 Anna) (ϕ2 **ab**fährt heute ~~**ab**fährt~~).

c. (ϕ1 Anna) (ϕ2 **~~ab~~**fährt heute **~~ab~~**fährt).

'Anna leaves today'

If we pronounce *ab* downstairs as in (34c) instead, the prosodic pattern follows (30). (34c) turns out to be a grammatical surface structure.

We have seen several examples of (23), repeated here as (35). Surface phonological constraints in Romanian (26) and German (30) are two examples of the condition which blocks the externalization/pronunciation of the outer copy, resulting in "covert" movement under the copy theory of movement.

(35) a. The outer copy is externalized/pronounced.
b. If something "phonological" prevents the realization of the outer copy, the inner copy is externalized/pronounced. ("LF movement")

The phonological conditions proposed by Bošković and Tokizaki are not about labeling, but now I would like propose (36), which is one of the key assumptions to explain the inverse correlation of scrambling/QR in Japanese and English.

(36) Labeling failure on the PF side is an instance of "something phonological that prevents the externalization/pronunciation" of X(P) at that position.

First, look at Japanese. Suppose that (37) is the syntactic structure after internal Merge of the object DP *dono otokonoko-mo* 'every boy MO' to TP. How is the structure transferred to the PF interface? What is the label of the entire complex α here?

(37) [$_\alpha$ [Dono otokonoko-mo]$_i$, [$_{TP}$ onnanoko-ga hitori [dono otokonoko-mo]$_i$ suisensita]]

every boy -MO girl -NOM one recommended

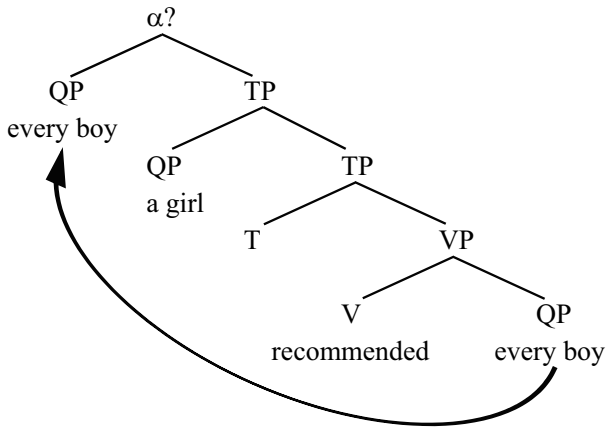
Since the moved phrase has a suffixal particle *-mo* which is an anti-labeling device (following Saito 2016), it is invisible for the minimal search which determines the label of α. Hence, α is identified as TP, the other member of the set. Now, on the PF side, assuming that phonological rules are syntactic-category sensitive (Chomsky and Halle 1968), the complex α in (37) can have phonological interpretation because its label is identifiable at the PF interface. Any syntactic-category based phonological rules can apply without any problem when the moved phrase is pronounced upstairs. Since nothing phonological prevents the externalization of the moved phrase upstairs, (37) turns out to be an instance of scrambling: the outer copy of *dono otokonoko-mo* 'every boy' is pronounced and the inner copy is not, following (35a). Notice that under this model, there is no chance that the outer copy is not pronounced and the inner copy is pronounced; there is no QR.

Let us look at the corresponding English example in (38). Suppose that the object QP *every*

boy internally Merges with TP as shown in (38b).[10, 11]

(38) a. A girl recommended every boy.

b.



What would the label of α in (38b) be? There is no relevant agreement between T and the moved QP *every boy* and the moved QP does not have an anti-labeling device such as suffixal particles, either. Therefore, the label of α cannot be identified and thus the outer copy of QP *every boy* cannot be pronounced. Now, assuming (36) that the labeling failure on the PF side is an example of something phonological that blocks the pronunciation of the outer copy of the moved element, the inner copy is pronounced. That is, in (38b), a copy of QP *every boy* can be syntactically upstairs, taking scope over the subject QP *a girl*, but cannot be pronounced up there. Hence, the inner copy at the object position is pronounced; an instance of LF "covert" movement. In this way, the inverse correlation of scrambling/QR observed in Japanese and English (Szabolcsi 1997, and Bobaljik and Wurmbrand 2012) receives a labeling-based account.

One interesting consequence of this model is that we have a natural account for a long standing observation that there is no "covert" (LF) scrambling. Look at (39).

(39) *Otagai$_i$ -no sensei-ga [Taroo-to Hanako]$_i$-o sikatta
each other$_i$-GEN teach -NOM [Taro-and Hanako]$_i$-ACC scolded

lit. 'Each other's teacher scolded Taro and Hanako.'

(39) is out because the reciprocal anaphor *otagai* 'each other' is not c-commanded by the relevant antecedent *Taroo to Hanako* 'Taro and Hanako.' It is also known that the sentence becomes good when the object DP scrambles to the sentence initial position. Now, consider (40), where the object DP internally Merges to TP.

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[10] Note that the application of Merge itself, a set formation operation, should not be constrained in syntax.

[11] The subject QP *a girl* also moves "covertly" to be interpreted as a quantificational phrase, but I put aside that part of the derivation for the ease of exposition.

(40) [[T-to H]$_i$-o [$_{TP}$ otagai$_i$ -no sensei-ga [T-to H]$_i$ -o sikatta]]

[T and H]$_i$-ACC each other$_i$-GEN teach -NOM [Taro-and Hanako]$_i$-ACC scolded

Here, the outer copy of *Taroo to Hanako* c-commands the reciprocal *otagai* 'each other,' satisfying Binding Condition A (Chomsky 1981), and the outer copy must be pronounced, according to (35a). If the inner copy can be pronounced and the outer copy can stay silent when (40) is transferred to PF, the surface structure in (39) must be good, satisfying Binding Condition A, contrary to fact. Given (35), once XP moves, it has to be pronounced at the landing site unless some phonological condition prevents it. Therefore, with the syntactic structure in (40), there is no chance that the outer copy remains silent and the inner copy is pronounced. This explains why there is no LF "covert" scrambling in Japanese.

In this section, we have seen a labeling-based account of the scrambling/QR inverse correlation, focusing on the labeling for the PF interface. Assuming that labeling failure on the PF side leads to a phonologically uninterpretable syntactic object and given natural assumptions in (35) under the copy theory of movement, the inverse correlation follows. Now, let us ask what is happening on the LF side of the scrambling/QR examples we have seen. Specifically, is the labeling of α in (38b), for instance, uniquely identifiable on the LF side in English? In this connection, Oku (2018, 2020) propose that types of labels can be different between the PF interface and the LF interface and thus even when the labeling of α fails on the PF side as in (38b), it does not on the LF side in English. Let us take up this issue in the next section.

6. Types of Labels for the PF interface and the LF interface

We have assumed, following Chomsky (2013, 2015), that labels are motivated for the interface interpretations. If this is the case, it is reasonable to assume that types of labels required at the interfaces can be different on the PF side and on the LF side. Further, according to Uniformity Principle (Chomsky 2001), it is desirable to have the same labels at the LF interface for the same types of semantic elements across languages. In this regard, it seems quite unnatural, for instance, to have "<ϕ, ϕ>" in English (Chomsky 2013) but "TP" in Japanese (Saito 2016) as the label for a sentence (i.e., proposition) at the LF interface. Chomsky (2015), however, argues that T is weak in English and thus has to agree with the subject DP. By having the shared feature <ϕ, ϕ>, T becomes strong and eventually the label of the sentence. Therefore, according to Chomsky (2015), the label of the sentence is TP in English as well. As a result, the label of a sentence is TP both in Japanese and English but through different labeling procedures. The label of the sentence is TP because of the subject-predicate agreement in English, whereas it is TP because the subject has an anti-labeling device in Japanese. Below I argue that there is another type of label required at the LF interface which is identical for both English and Japanese. More precisely, I demonstrate that a sentence with a quantifier can be represented in the same way in both Japanese and English at LF and hence the label necessary for the LF interface is the same. This in turn leads to a natural answer to the question why QR does not have any labeling problem at LF even though scrambling leads to a labeling failure at PF in

English.

Let us consider (38a), repeated here as (41).

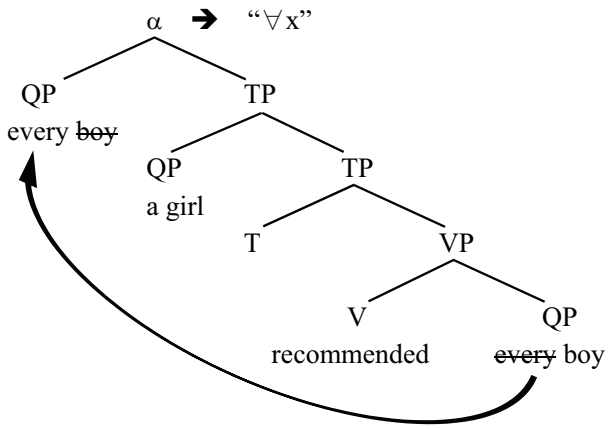
(41) A girl recommended every boy.

Let us focus on the inverse scope interpretation of (41) in which the universally quantified object *every boy* takes scope over the subject. Semantically, (41) is not a proposition having a noun phrase *every boy* as one of its arguments. Rather, it is a proposition in which the universal quantifier is a kind of higher order predicate taking the proposition as its argument (which contains a bound variable) as shown in (42).[12]

(42) [$_{\alpha}$ $\forall$x [a girl recommended x, x, a boy]]

In other words, it is the universal quantifier that determines the interpretive type of this whole sentence in the same sense that a verb determines the interpretive type of the phrase which it is the head of. I would like to assume therefore that the universal quantifier is the most prominent in this sense in (42). Consider the syntactic structure in (43) in which the object *every boy* internally Merges to TP.

(43)



Argument QPs are morphosyntacitcally arguments of the sentence; appearing in argument positions (subject, object, etc.) and inducing verbal agreements, for instance. As we have seen in Section 5, the upstairs QP *every boy* causes the {XP, YP} labeling problem in the same way as ordinary DP arguments on the PF side as shown in (44a).

(44) a. (43) at PF: α = ?
b. (43) at LF: α = "∀x"

On the LF side, however, QPs are semantically a predicate. I claim therefore that QPs (when they take the widest scope) can be the most prominent element of the sentence, playing a crucial

[12] Here and below, I put side the interpretation of the subject *a girl* as existentially quantified for ease of the exposition.

role for labeling at the LF interface. As shown in (43), let us assume that the restriction part *boy* of the QP *every boy* is deleted and the quantifier part *every* alone stays upstairs at the LF interface. In the object position, on the other hand, *every* is deleted and *boy* stays at LF. The universal quantifier *every* in the outer copy of *every boy* is the most salient and the minimal search on α at the LF interface identifies *every* as the label of α in (43). This is informally described as in (44b) where the label of α is "∀x".

Under this analysis, the label of α in (43) on the LF side can be identified by minimal search and thus QR does not lead to any labeling problem at LF.[13] To be more precise, when the universally quantified object QP takes the scope over the whole sentence proposition as in (42)/(43), the universal quantifier is semantically most prominent. Thus, minimal search on α on the LF side finds the universal quantifier as the label of α. This is why QR ("covert" movement) of the object over subject does not lead to any labeling problem, even though scrambling ("overt" movement) of the object does in English. The corresponding Japanese example (37), repeated here as (45), can be analyzed in the same way as far as the labeling on the LF side is concerned.

(45) $[_{\alpha}$[Dono otokonoko-mo]$_i$, $[_{TP}$ onnanoko-ga hitori [dono otokonoko-mo]$_i$ suisensita]]

every boy -MO girl -NOM one recommended

The labeling procedure of α in (45) in Japanese and the labeling procedure of α in (43) in English can be the same on the LF side, although they are different on the PF side as we have discussed above.

In this section, we have seen that while labeling procedures on the PF side are different between Japanese and English, labeling for quantificational phrases on the LF side is the same in Japanese and English. This analysis, together with the assumption on Externalization (35), provides a labeling-based account of the inverse correlation of scrambling/QR in Japanese and English.

7. Wh-movement and labeling property of quantificational expressions in Japanese

Finally, this section discusses the labeling-based analysis of wh-movement in Japanese. It has been known since Kuroda (1965) that Japanese indeterminate words such as *nani* 'what' and *dare* 'who,' etc. must be licensed by particles such as *ka*, *no* or *mo* to be interpreted as question wh-words or quantificational words. For instance, an indeterminate *dare* 'who' without any associating particle can be interpreted neither as a question wh-word nor as a quantificational word as shown in (46a). Depending on types of particles, indeterminate *dare* can be interpreted as a question word *who* in (46b), as an existentially quantified word *someone*

[13] Note that "∀x" as the label for (43) on the LF side is just an informal notational convention I adopt here, and the more formal description must be in order, but the point is that the entire semantic type of a sentence with a widest scope quantifier phrase is determined by the quantifier.

in (46c), and as a universally quantified word *everyone* in (46d), and so on.

(46) a. *Dare-ga kita
who-NOM came

b. Dare-ga kita **no**?
who-NOM came **Prt**

'Who came?'

c. Dare-**ka**-ga kita
who-**Prt**-NOM came

'Someone came'

d. Dare-**mo**-ga kita
who-**Prt**-NOM came

'Everyone came'

Further, Japanese is a wh-in-situ language where a wh-phrase (more accurately, an indeterminate phrase associated with a question particle) does not have to move overtly from its original position. However, as Nishigauchi (1990) and Watanabe (1992), among others, point out, Japanese in-situ wh-phrases show a wh-island effect. Consider (47).

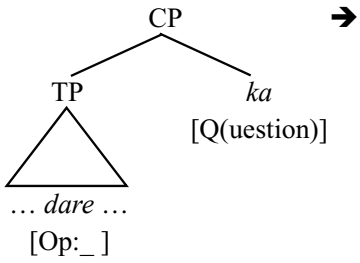
(47) a. [[Hanakao-ga sono toki [[**dare**-ga kuru] to] itta] **ka**] osiete kudasai
Hanako -NOM that time **who**-NOM come COMP said **Q** teach please

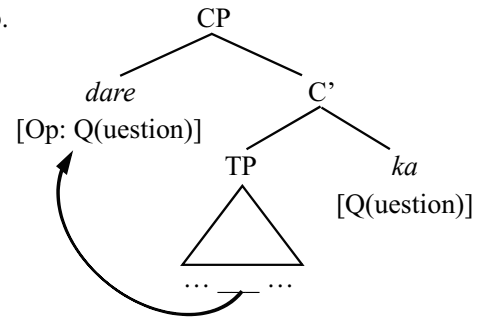
'Please tell me who Hanako said then was coming'

b. [[Hanakao-ga sono toki [[**dare**-ga kuru] **ka**] tazuneta] **ka**] osiete kudasai
Hanako -NOM that time **who** -NOM come **Q** asked **Q** teach please

A: 'Please tell me if Hanako asked then who was coming'
B: ??'Please tell me who Hanako asked then if she/he is coming' (Saito 2017:2)

For instance, if unselective binding by the Q-particle *ka* can license *dare* 'who' in (47b), the interpretation of *dare* can be ambiguous; namely, *dare* is either bound by the inner *ka* giving the interpretation in (47b-A), or bound by the outer *ka* giving the interpretation in (47b-B). However, it is very difficult to obtain the interpretation of (47b-B). A long distance association, which is possible between *dare* 'who' and *ka* 'Q' in (47a), is blocked by the intervening *ka* 'Q' in the embedded clause as in (47b); a typical wh-island effect. To explain this, Saito (2017) proposes that Japanese indeterminate pronouns such as *dare*, *nani*, *dono* (without an appropriate question particle) has a quantification force unvalued as in (48a), and that they must move to Spec of CP position, following Bošković's (2007) idea, at which it c-commands and thus probes the quantificational value from the associating particle *ka* [Q] as in (48b).

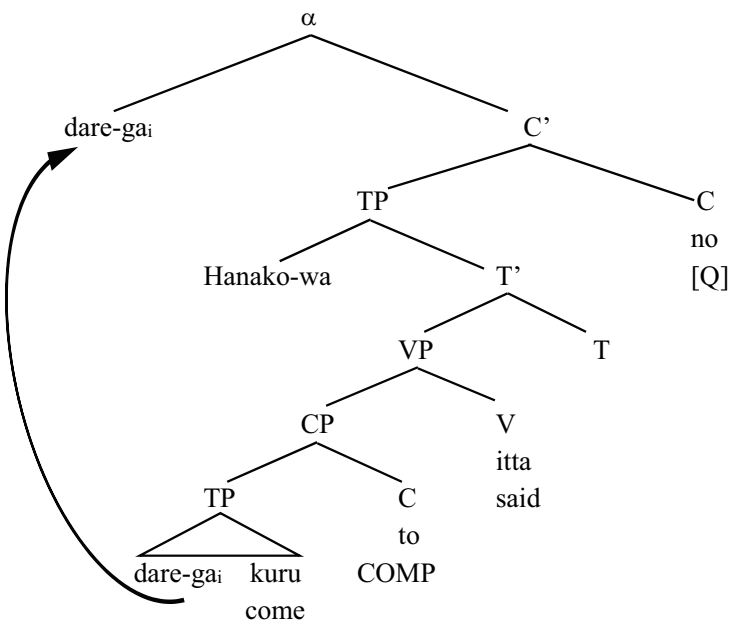
(48) a. 

➔ b. 

Saito argues that wh-expressions "need to covertly move to obtain quantificational force from particles" (Saito 2017:23). Note that this is an instance of "covert" movement, and Oku (2020) argues that Saito's explanation provides another piece of evidence for the labeling based account proposed in this paper. To see this, look at (49a) and its syntactic structure after the movement of *dare* 'who' to Spec of the matrix CP as in (49b).

(49) a. [[Hanakao-wa [[**dare**-ga kuru] to] itta] **no**]
Hanako -TOP **who**-NOM come COMP said **Q**

'Who did Hanako say was coming'

b. 

Let us first consider how the label of the entire complex α is identified at LF. Since *dare* 'who' at the matrix Spec has the proper local association with the matrix question particle C *no*, it is interpreted as a question wh-expression 'who.' Now, as in the case of universal quantifier discussed in Section 6, the wh-expression is semantically a kind of predicate taking a proposition as its argument which has a variable bound by the wh operator as shown in (50).

(50) $[_{\alpha}\ wh_x\ [\quad \ldots\ x\ \ldots\ ]]$

Expanding the analysis developed in the preceding section, I assume that the wh-operator is the most prominent in (49a) at LF and functions as the label of the sentence. Hence, on the LF side, the labeling of (49b) is properly carried out.

How about the labeling of (49b) on the PF side? At the PF interface, since the moved wh-expression *dare-ga* 'who-NOM' has a suffixal particle *ga* which is an anti-labeling device, the outer copy must be pronounced, according to our proposal in (23), repeated here as (51): Once you move, you have to be pronounced at the landing site unless there is some phonological reason not to do so.

(51) a. The outer copy is externalized/pronounced.
b. If something "phonological" prevents the realization of the outer copy, the inner copy is externalized/pronounced. ("LF movement")

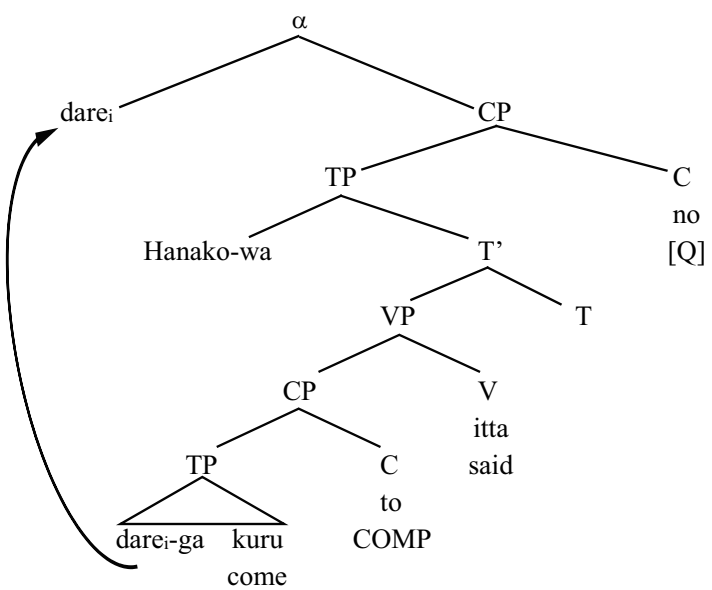
The sentence is externalized as in (52), which is grammatical as desired.

(52) [Dare-ga$_i$ [Hanakao-wa [[**t**$_i$ kuru] to] itta] no]
who -NOM Hanako -TOP come COMP said Q

'Who did Hanako say was coming'

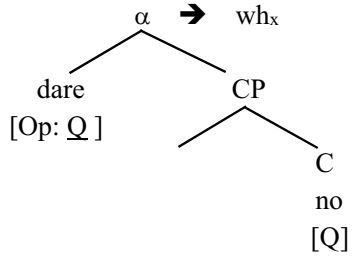
Then how can we obtain the surface form where the wh-expression *dare-ga* stays in-situ as in (49a), which is also grammatical, while *dare-ga* must be moved to Spec of the matrix CP at the same time to be interpreted? In fact, Oku (2020) takes up this issue and proposes the following analysis. Suppose that we have an option in which the wh-expression moves to Spec of CP, leaving the suffixal particle behind, the nominative *-ga* specifically in this instance as in (53).

(53)



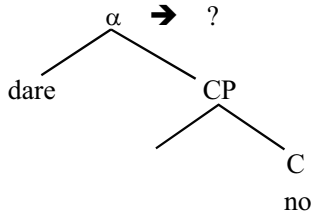
On the LF side, since the nominative particle *ga* has nothing to do with the quantificational force of the wh-expression, *dare* upstairs in (53) is properly valued by probing the Q-value of the question particle *no* in the matrix CP in the same way as in (49b). Therefore, *dare* in the landing site turns to be a wh-operator as in (54). It is semantically the most prominent in this structure since it determines the entire semantic nature of α as argued above. Hence, it is identified as the label of α at the LF interface.

(54) at LF



On the PF side, however, there is no nominative particle *-ga* attached to *dare* upstairs in (53), and thus the label of α cannot be identified at the PF interface if we try to externalize/pronounce *dare* in Spec of the matrix CP.

(55) at PF



Hence, following (51b), the outer *dare* is not externalized/pronounced and the inner *dare* in the embedded subject position is externalized/pronounced. The sentence, as a result, is phonologically realized as (49a) even though *dare* itself has moved to Spec of the matrix CP. Therefore, the LF movement nature of Japanese wh-expressions naturally follows.

At this point, one may wonder if we have <Q, Q> as the label of α (55) at PF as well after the wh-expression *dare* is valued as Q in Spec of CP. This is because there both *dare* and *no* have the Q feature shared in the same fashion as the labeling of English wh-questions discussed in Chomsky (2013). Note, however, that this <Q, Q> is not good enough as the label of α on the PF side in Japanese because the sentence is seriously degraded as shown in (56a). The contrast is clear with the grammatical counterpart of English in (56b). See Saito (1983) and Kuroda (1988) for discussion that moved elements without a particle are degraded in Japanese.

(56) a. ??[Dare$_i$ [Hanakao-wa [[**t**$_i$ kuru] to] itta] no]
who Hanako -TOP come COMP said Q

lit. 'Who did Hanako say was coming'

b. Who did Hanako say was coming?

The discussion here gives an interesting consequence for the analysis of scrambling of wh-phrases in Japanese. Takahashi (1993) claims that some cases of scrambling of wh-phrase in Japanese count as an instance of wh-movement observed in English type languages. Now, in terms of the labeling-based account, we can reinterpret the nature of scrambling of wh-phrases discussed in Takahashi (1993) in the following way. Japanese long-distance wh-movement as in (52) is a type of wh-movement on the LF side, whereas on the PF side, it still carries a general property of scrambling: a suffixal particle is necessary to provide an interpretable label at PF in the same way as any other instance of scrambling of non-wh-phrases. We can say therefore that the movement observed in (52) is an instance of scrambling on the PF side and an instance of wh-movement on the LF side with respect to labeling. This line of reasoning, if on the right track, can be another piece of evidence for the claim in this paper: labels required for interfaces can be different between PF and LF.[14]

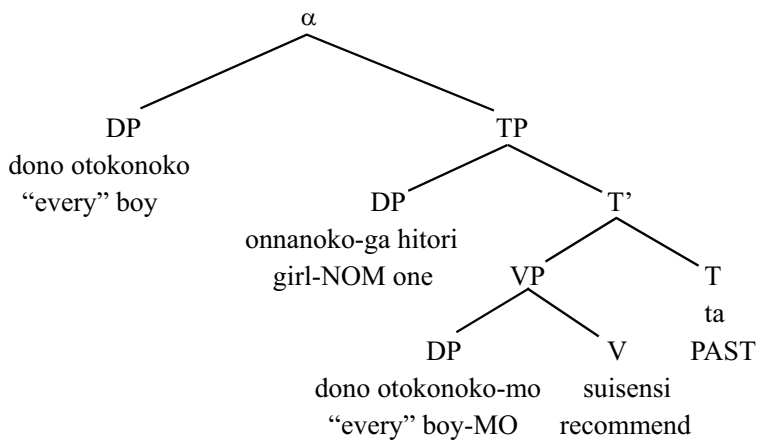
Given the analysis of the labeling of wh-questions in Japanese, let us come back to universal quantifiers in Japanese. Consider what if a universally quantified DP in Japanese moves without the suffixal particle? Look at (7), repeated here as (57).

(57) Onnanoko-ga hitori dono otokonoko-mo suisensita (= (7))
girl -NOM one every boy -MO recommended

'A girl recommended every boy'

Recall that the inverse scope reading, $\forall > \exists$, is difficult to get in (57). Now, consider the following structure in (58) where the object DP is internally Merged to the sentence, leaving the particle *mo* behind.

(58)

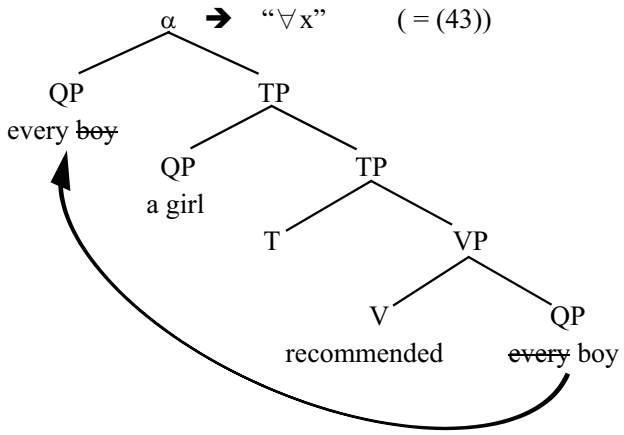


The moved DP has no suffixal particle at the landing site, and therefore, at PF, the label of α cannot be identified; the DP cannot be pronounced up there. Hence, no overt movement is

[14] It is an interesting line of research to investigate why <Q, Q> is a good label in English but not in Japanese on the PF side, which I leave to future research.

possible. Now, how about the LF side? Recall that in English, the universally quantified object DP can function as the higher order predicate taking the whole sentence as its argument. We take this to make the universal quantifier the most prominent element in the structure at LF and it is identified as the label of α as in (43), repeated here as (59), in English.

(59)



The universally quantified QP *every boy* cannot be pronounced upstairs in (59), but QR of the phrase is possible. The ∀ > ∃ reading is available with *A girl recommended every boy* in English. Does the same story apply in Japanese in (58)? If it does, QR must be available in Japanese as well, contrary to what we have argued. Notice, however, that the outer copy of *dono otokonoko* 'every boy' without the relevant suffixal particle *-mo* shown in (58) does not have any universal quantification force. For instance, *dono otokonoko* without *-mo* as in (60) does not have any quantificational force and it is semantically incomplete. Japanese indeterminate words/phrases must have some quantificational particle associated to get proper semantic interpretation.

(60) *Hanako-ga dono otokonoko-o suisensita
Hanako-NOM which boy -ACC recommended

In (58), therefore, the outer *dono otokonoko* cannot be pronounced because the label of α is not identified on the PF side, and it cannot stay at the landing site on the LF side either since it is not a quantificational expression and thus cannot function as the label of α: no QR is possible.

On a final note, it is worth mentioning that a question remains as to what makes this difference between Japanese and English. I suggest that the difference is attributed to the difference of the morphological makeup of the words in question. There is a crucial difference between English *every* (*boy*) and Japanese *dono* (*otokonoko*), for instance. Namely, while English universal quantifier *every* has the universal operator function all by itself, Japanese indeterminate *dono* acquires the universal operator function only when it is associated with the particle *mo*. Just like Saito's (2017) analysis of *dare-ga* associated with the question particle *no* as we discussed above, *dono* cannot have the universal quantificational value if it is not associated with the particle *mo* in the required local relation.

8. Summary

In this paper, I explored the following two ideas, comparing Japanese and English.

(60) a. Labels can be of different types between the PF interface and the LF interface. (Oku 2018, 2020)

b. The differences between Japanese and English is attributed to morphological makeups of the words and phrases in question (*a la* Uniformity Principle (Chomsky 2001)).

I assume, for one thing, that Japanese has suffixal particles which are anti-labeling devices (Saito 2016), and also that Japanese indeterminate words (*dare*, *nani*, *dono* , etc.) can function as a quantifier at the LF interface only with an appropriate quantificational particle (*-mo*, *-ka*, *-no*, etc.) (Kuroda 1965 and Saito 2017, among others). English quantificational words such as *every*, *some*, *wh*-words, etc. on the other hand, have quantificational force as they are.

In order to support these assumptions, I first discussed the inverse correlation of scrambling and QR in Japanese and English. The correlation can be properly accounted for given the natural assumptions in (23), repeated here as (61).

(61) **Externalization**

a. The outer copy is externalized/pronounced.

b. If something "phonological" prevents the realization of the outer copy, the inner copy is externalized/pronounced. ("LF movement")

Secondly, the nature of "covert" wh-movement in Japanese (Nishigauchi 1990, Watanabe 1992, Saito 2017) receives a natural explanation. I proposed that a wh-question with indeterminate words/phrases in Japanese can have a label without a case particle in Spec of the sentence on the LF side but that it cannot on the PF side when it does not have a suffixal case particle at the landing site. Further, Takahashi's (1993) observation of the dual nature of "overt" wh-movement in Japanese is reinterpreted in terms of labeling. It is an instance of scrambling with respect to the labeling on the PF side, while it is an instance of wh-movement with respect to the labeling on the LF side. These accounts, if on the right track, endorse the ideas in (60).

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