

An FM & LA Approach to Relative Quantifier Scope Calculation

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1. Introduction

This paper explores relative scope phenomena on the basis of Rizzi's (1997, 2014a, 2014b) cartographic left peripheries and Chomsky's (2008, 2013, 2015) feature-inheritance, Free-Merge, and Labeling Algorithm. We attempt to reconsider Ueda's (2002, 2003, 2006, 2013) original *phase*-based approach (henceforth, the original PBA) to scope calculation and Ueda and Fujimaki's (2015) revised *phase*-based approach (the revised PBA). We call this new scope system *an FM & LA approach to relative scope calculation*. Ueda (2002, 2003, 2006, 2013) and Ueda and Fujimaki (2015) have observed that a *matching*-like operation between F_{quants} , which are interpretable features related to quantification, is restricted by a syntactic unit *phases* and is subject to the Phase Impenetrability Condition (Chomsky 2001) (henceforth PIC2001). Our new approach also maintains the basic ideas proposed by the original PBA, in which the inverse scope creates at Conceptual-Intentional interface component (henceforth, C-I interface) if two and more F_{quants} stay in the same Transfer domain at Transfer. More precisely, we assume that if there are two or more F_{quants} in the same Transfer domain, the F_{quants} can be rewritten as a binary absorbed F_{quant} and creates the inverse scope at the C-I interface in the sense of Ben-Shalom (1993) and Watanabe (2000). However, Ueda and Fujimaki (2015) point out that the original PBA is incompatible with Chomsky's (2008) *feature inheritance*. In order to solve the problem, we will show possible sentence derivations for Japanese with canonical word order

SOV, adopting Chomsky’s (2013, 2015) FM & LA model, Epstein, Kitahara, and Seely’s (2016) idea of *extended* Free-Merger, and Otsuka’s (2017) *Radical* Free Merger. Especially, we propose that Pair-Merger plays a significant role for Japanese, which is a non-agreement forced language, to derive a sentence structure. The derivation appropriately predicts the differences in scope taking between English and Japanese.

This paper is organized as follows. In section 2, we introduce the original PBA proposed by Ueda (2002, 2003, 2006, 2013). Section 3 shows a crucial problem on the original PBA. In section 4, after a short review of the current minimalist literature (Chomsky (2008, 2013, 2015)), I will propose a possible mechanism of sentence derivations for language without forced agreement like Japanese. Section 5 shows the proposed analysis of sentence building properly predicts a traditional issue on scopal difference between English and Japanese. Section 6 contains our concluding remarks.

2. The Original *Phase-Based Approach* (the original PBA)

2.1. *Basic Data*

One of the most typical scopal contrasts between English and Japanese is given in (1), which has been discussed as a parametric language variation of Quantifier Raising (henceforth QR) at LF (May 1977, 1985, 1989; Huang 1982; Aoun and Li 1993). It is widely assumed that English is one of the QR languages, but Japanese is not. Under the QR analyses, English sentences such as (1a) have an ambiguous reading, while Japanese counterparts such as (1b) have an unambiguous reading. Precisely speaking, there is no inverse scope reading in (1b).

- (1) a. English: ambiguous
 Someone loves everyone. ($\exists > \forall, \forall > \exists$)
 ‘There is someone, who loves everyone.’
 ‘Each person is loved by a different someone.’

b. Japanese: unambiguous

Dareka-ga daremo-o aisiteiru. ($\exists > \forall, * \forall > \exists$)
 someone-Nom everyone-Acc love
 ‘There is someone, who loves everyone.’
 ‘*Each person is loved by a different someone.’

Furthermore, on the basis of Kuroda’s (1972) observation as shown in (2), Hoji (1985) suggests that Japanese shows ambiguous scope when the object is scrambled over the subject. Scrambling seems to function as an overt QR in Japanese.

(2) Japanese scrambling case: ambiguous

Daremo-o_i dareka-ga t_i aisiteiru. ($\exists > \forall, \forall > \exists$)
 everyone-Acc someone-Nom love
 ‘There is someone, who loved everyone.’
 ‘Each person is loved by a different someone.’

A series of studies of Ueda (2002, 2003, 2006, 2013) has claimed that a crucial condition for creating inverse scope between two or more quantifiers relies on whether the QPs in question stay in the same Transfer domain or not at a point of Transfer and has proposed a *phase*-based scope system, named a *phase*-based approach (the original PBA, mentioned above). We will show how the original PBA works to relative scope computation in the subsequent sections.

2.2. Assumptions in the original PBA

Our technical assumptions in the original PBA are briefly summarized (3)-(6) below. First, our original PBA crucially assumes Chomsky’s (2001) PIC:

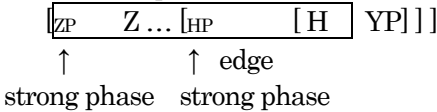
(3) The Phase Impenetrability Condition (Chomsky 2001)

The domain of H is not accessible to operations at ZP, but only H and its edge.

$[_{ZP} Z \dots [_{HP} [H \text{ YP}]]]$ (where ZP and HP are strong phases)

The PIC is a syntactic condition, which restricts the size of ‘working space’ of syntactic operations and the timing of Transfer. (3) means that YP, which is a complement of a phase HP, is not accessible to operations at the next higher phase ZP, because the complement YP is spelled out after the head Z, projecting the next phase ZP, merges with HP. (4) is a schematic structure of the visible domain at the ZP-phase level.

(4) The boxed portion indicates the visible domain at the ZP-phase



Second, unlike Chomsky (2000), Chomsky (2001, 2004) delays the timing of Transfer under the PIC until the merge of the next higher phase head Z. We assume that when the higher phase head Z merges with its complement XP, the complement of the lower phase YP is transferred, following that Ph1 is interpreted/evaluated at Ph2 (Chomsky 2001: 14).

Third, Ueda (2002) introduces a notion *deactivated NPs*, given in (5), and assumes (6) with respect to the timing of the application of F_{quant} -matching operation we proposed.

(5) *Deactivated NPs* are NPs all of whose uninterpretable features are checked and marked for deletion.

(6) The F_{quant} -matching operation applies to deactivated NPs as far as the PIC2001 permits.

Fourth, unlike English Nominative subjects, Japanese *ga*-marked subjects are licensed by the head of C (cf. Takezawa’s (1987) INFL-license analysis)¹. Ueda (2002, 2003, 2006) has argued for the A¹-status of Japanese *ga*-marked subjects in terms of the parallel behavior between preverbal and postverbal subjects in

Greek/Catalan (Alexiadou and Anagnostopoulou 1998) and *ga-kara* ‘GA-from’ alternating subject constructions in Japanese.² We summarize the results of the discussion on the subject properties in English, Japanese, and Greek/Catalan as in Table 1.

languages domains	domain property	English	Japanese (Ueda 2002, 2003, 2006, 2013)	Greek/Catalan (A&A 1998)
C	A'		<i>ga</i> -subject	preverbal subject
T	A	Nominative subject		-----
v	A		<i>kara</i> -subject	postverbal subject

Table 1: Subject Positions in English, Japanese, and Greek/Catalan
(Ueda 2003: 529)

Ga-marked subjects in Japanese and preverbal subjects in Greek/Catalan both show A'-properties in terms of the following three points: (i) word order relations between subjects and certain conjunctions, (ii) bound variable readings for personal pronouns, (iii) scope ambiguity, while *kara* ‘from’-marked subjects in Japanese and postverbal subjects in Greek/Catalan show A-properties.

Finally, Ueda (2002, 2003, 2006) assumes that there is no object shift at least in English and Japanese. Specifically, object NPs are licensed and become deactivated NPs in situ. When scrambling, I assume some feature for scrambling bears on the scrambled objects. So, the scrambled objects cannot be a deactivated NP within vP -phase level and have to raise to the edge of the vP in order to participate in further derivation.

2.3. The original PBA

Let us go back to the scopal contrast observed in (1), repeated here as (7). This has been treated as one of the most typical examples of scopal contrasts between the QR-language (English) and the non-QR language (Japanese). The original PBA attempts to explain the scopal contrasts in (7) without relying on whether a language has QR or not (Ueda's 2002, 2003, 2006, 2013). (8a) and (8b) are the schematic structures of (7a) and (7b), respectively.

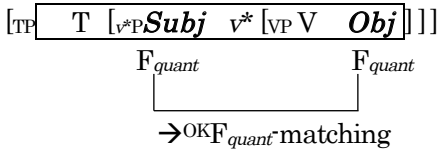
(7) a. English: ambiguous

Someone loves everyone. ($\exists > \forall, \forall > \exists$)

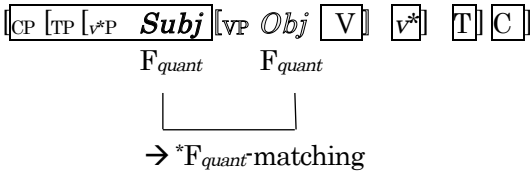
b. Japanese: unambiguous

Dareka-ga daremo-o aisiteiru. ($\exists > \forall, * \forall > \exists$)
 some-Nom everyone-Acc love

(8) a. English: ambiguous: Someone loves everyone.



b. Japanese: unambiguous: Dareka-ga daremo-o aisiteiru.



(8a) and (8b) are both the structures immediately before the EPP satisfaction. Thus, the subjects both in English and in Japanese fill in the [SPEC, v*P] in (8). The English subject QP, *someone*, becomes a deactivated NP when its uninterpretable Case-feature is

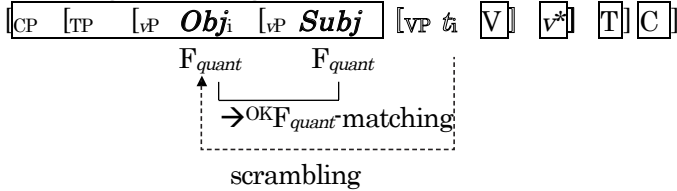
marked for deletion by T. Thus, the $[F_{quant}]$ of the English subject QP can be a probe for F_{quant} -matching when T merges with v^*P . The $[F_{quant}]$ of the object QP, *everyone*, still becomes a deactivated NP in situ and is visible to the subject QP in $[Spec, vP]$, because TP is not a strong phase and the complement of the v^*P -phase, namely, VP, is not transferred yet. As a result, F_{quant} -matching is possible between the subject QP and the object QP in English, resulting in an inverse scope reading at C-I interface. Thus, (7a)=(1a)) is two-way ambiguous at C-I, (i) *some* > *every* reading comes from the c-command relation between the QPs at the end of a derivation, namely, the C-I-input structure and (ii) *every* > *some* reading, that is, the inverse scope reading, comes through F_{quant} -matching in the derivation. The feature-matching operation creates a binary-absorbed F_{quant} and finally the binary-absorbed F_{quant} is interpreted as the appropriate inverse scope at C-I-interface. On the other hand, C, rather than T, is involved in licensing *ga*-subjects in Japanese as discussed in Ueda (2002, 2003, 2006). That is, Japanese *ga*-marked subjects can be a deactivated NP when C merges with TP. At this point, the complement of the lower strong phase v^*P , namely, VP, has been transferred and the object QP is invisible to the subject QP. Thus, F_{quant} -matching is impossible between the two QPs. Therefore, Japanese shows the fixed scope reading only (some > every) by means of their c-command relation at the end of the derivation, that is, the C-I input structure.

How about scrambling cases in Japanese such as (9) below? (10) is the schematic structure of (9). The ambiguous reading in the scrambling cases is also naturally predictable in my original *phase*-based approach. In the original *phase*-based approach, I adopt the idea that instead of subjects, scrambled objects can satisfy the EPP-feature in Japanese (Kuroda 1988, Miyagawa 2001). In (10), the EPP-feature of the head of C is satisfied with the scrambled object QP.^{3,4}

(9) Japanese scrambling cases: ambiguous

Dareka-oi daremo-ga t_i aisiteiru. ($\exists > \forall, \forall > \exists$)
 someone-Acc everyone-Nom love

(10) scrambling case: ambiguous



Given that the scrambling is also feature driven, the scrambled object becomes a deactivated NP when the head of C merges with TP. At this point, the subject in the Spec of v^*P also becomes a deactivated NP with the same C-head, but the EPP-feature on it is satisfied with the scrambled object. Both of the QPs, the subject QP and the scrambled object QP, are in the same Transfer domain and they can enter F_{quant} -matching. As the results, the scrambled sentence has the inverse scope reading, *every* > *some*, in (9). The *some* > *every* reading comes from the c-command relation at the end of the derivation.

Ueda (2002, 2003, 2006, 2013) illustrates that the original PBA properly predicts various scope facts of quite complex constructions both in English and in Japanese, such as ECM constructions, Double Object Constructions, scrambling constructions, Floating Quantifier subject constructions. However, under current Minimalist assumptions proposed by Chomsky (2008, 2013, 2015), how can we treat the scope phenomena mentioned above? Section 3 shows a crucial technical problem of our original PBA concerning *feature inheritance* introduced by Chomsky (2008).

3. Technical Problems

The original PBA, unfortunately, does not work out in the framework assuming *feature inheritance*: uninterpretable features,

[*uF*]/s, originally bear on a phase-head and then they are inherited from a phase head to a non-phase head. It was originally introduced by Chomsky (2008) and has been widely assumed in the current minimalist literature. If we adopt the feature inheritance, there is no longer distinction in timing of entering F_{quant} matching between English subject QPs and Japanese ones. We crucially make use of the time lag in the deactivation of subject NPs in the two languages in the original PBA. However, under Chomsky’s current system, even English subjects have to wait for C head-merger for its subject-deactivation because all the uninterpretable features are assumed to bear in a phase head (C in this case) and the features are inherited from the phase head to a non-phase head (T). After C merges with TP, the complement head, T, inherits [*uF*]/s from the phase head C. Whether or not subject deactivation is executed by T or C, merger of C must precede the subject deactivation. Thus, there is no time lag difference in the timing for entering F_{quant} matching between English and Japanese.

4. Theoretical Backgrounds

In order to solve the problem pointed out in the previous section, we will show a possible sentence derivation for Japanese, which is a language without forced agreement, on the basis of Chomsky’s (2013, 2015) FM & LA model, and Epstein, Kitahara, and Seely’s (2016) idea of extended Free-Merger, and Otsuka’s (2017) Radical Free Merger. Before proposing our analysis, I will introduce the theoretical backgrounds we assume in the remaining part of this paper.

4.1 Free Merger

Merger is an operation that two elements are combined symmetrically. Chomsky (2004, 2008), contrary to Chomsky’s (2000) *Merge over Move*, claims that Merge and Move are equivalent and calls the former *external merge* and the latter *internal merge*. Chomsky (2015) further claims both external merge and internal merge completely freely available in the derivation. Theoretically

speaking, *Merge* has the following four patterns: *internal Set-Merge*, *internal Pair-Merge*, *external Set-Merge*, and *external Pair-Merge*. Chomsky (2015) recognizes the first three types of Merger operations. Furthermore, EKS (2016) empirically show the fourth type of Merger application is also freely available in the CHL under the spirit of Free-Merger. They argue that *bridge* verbs in English are a realization of the fourth type of merger, namely, *external Pair-Merger*. EKS claim that the external Pair-Merger application to *bridge* verbs solves a(n) (in)visibility problem of a copy of R (Root-Verb) in Chomsky’s (2015) analysis. On the basis of EKS’s (2016) arguments, the possibilities of visibility of copies and phase-cancellation are summarized in Table 1 below.

types of Merger		visibility of the original copy	phase-cancellation
internal	Set-Merge	√	*
	Pair-Merge	√	√
external	Set-Merge	/	*
	Pair-Merge	/	√

Table 1

4.2 Labeling Algorithm

We have treated an output of Merge as a labeled set $\{K \{\alpha, \beta\}\}$ (Chomsky (1995a, b)). However, Chomsky (2013) suggests Merge does not encode a label. In Chomsky’s new system, Merge creates only a simple set $\{\alpha, \beta\}$, where projection, that is, labeling is no longer maintained as a defining property of Merge. The set, however, have to be identified at C-I interface to satisfy Full Interpretation. Thus, Chomsky (2013, 2015) proposes a Labeling Algorithm (LA). In a syntactic object $\{H, XP\}$, LA unambiguously selects H as the label by minimal search. On the other hand, the label of $\{XP, YP\}$ is ambiguous and is not determined. Chomsky (2013) proposes two

solutions: (i) Dislocate either XP or YP from {XP, YP}, and the lower copy is invisible to the minimal search (or labeling), thus the label will be the remaining head; (ii) The most prominent feature sharing between XP and YP is selected as the label (φ , φ or Q, Q).

A problem easily arises when we treat non-agreement forced languages like Japanese, whose T is assumed to be defective (Fukui 1995) and to have no agreement with respect to φ -features (Ueda 2002, 2003, 2013). How does Chomsky’s LA work out in languages without φ -feature agreement? Saito (2016) proposes an alternative view to Chomsky’s LA system that Case-feature is the sharing prominent feature for labeling in Japanese, instead of φ -feature in English. We will also consider this issue in section 5 below.

4.3 the CP-domain

We further assume the cartographic left peripheries in (11) as a CP structure (Rizzi 1997, 2014a, and 2014b and Maeda 2014).

(11) CP structure

$$[\text{ForceP Force } [\text{TopP1 Top } [\text{FocP Foc } [\text{TopP2 Top } [\text{FinP Fin }]]]]]$$

(Rizzi 1997)

CP minimally contains Force, which encodes the illocutionary force of the clause, that is, clause types, and Fin, which specifies (non)-finiteness. When necessary, CP may further project TopP1, FocP, and Top2. Following Maeda (2014), the left peripheries are derivationally constructed by Merge in Minimalist fashion. The lowest projection of the CP is FinP and the highest one is ForceP. The discourse related projections, TopP and FocP are derived between the ForceP and FinP as given in (11). The structure is amalgamated into a single head when there is no necessity to split like the original CP.

We continue to assume Japanese *ga*-marked subjects are finally licensed by a head of the left peripheries within the CP-domain (Ueda 2002, 2003, 2006, Fujimaki 2013, Ueda and Fujimaki 2015). If they

have a feature $[F_{Foc}]$, they forward their derivation up to the $[\text{Spec}, \text{FocP}]$ and finally $\{\text{NP}_{\text{subj}}, \text{FocP}\}$ is labeled as Foc, Foc .

4.4 *The Timing of Transfer*

Contrary to the original PBA, we assume that when phase ZP is derivationally completed, the complement of Z is transferred on the basis of Chomsky's (2000) Phase Impenetrability Condition: In phase α with head H, the domain of H is not accessible to operations outside α , only H and its edge are accessible to such operations (Chomsky 2000:108).

5. A Proposal : An FM & LA Approach to Scope Calculation

Under the assumptions given in section 4, we will demonstrate that our FM & LA approach solves the problems pointed out in section 3 and 4 and properly predicts the scope facts both in English and Japanese.

5.1 *English*

(12) is a typical example in English (=1a), which has ambiguous reading. The solid-white letter parts are the Transfer domain of each phase level, which becomes invisible to the higher phrase-level.

(12) The FM & LA approach

(=1a) English: Someone loves everyone. ($\exists > \forall, \forall > \exists$)

a. $v\text{P}$ -phase level:

Transfer 1: $[_{v\text{P}} \langle \langle \text{R}, v \rangle \rangle \text{Subj} \langle \langle \text{R}, v \rangle \rangle [_{\alpha} \text{Obj} [\text{R } \langle \langle \text{Obj} \rangle \rangle]]]]]]$

- (i) Set-Merge externally forms $\{\text{R}, \text{Obj}\}$.
- (ii) Set-Merge internally merges Obj to Spec-R .
- (iii) Set-Merge externally introduces v and then Subj into the derivation, yielding the $v\text{P}$ -phase
- (iv) R inherits $u\text{F}$ from v ,
- (v) R agrees with Obj , valuing Case ,
- (vi) α is labeled φ , φ under minimal search

- (vii) Pair-Merge internally forms $\langle R, v^* \rangle$ (R with v^* affixed)
- (viii) v^* becomes invisible (and thus no longer the phase-head)
- (ix) The phase-head status is activated on the copy of R.
- (x) The complement of R, *to_{ij}* gets transferred.

b. CP-phase level

Transfer 2: $[\text{Force+Fin}]_{\beta} \text{Subj } T \text{ } [\text{vP} \langle \langle R, v^* \rangle \text{ } \text{to}_{\text{Subj}} \langle R, V \rangle$
 $[\varphi, \varphi] \text{Obj } [\text{Transfer 1}]]$

- (i) Set-Merge externally forms $\{T, vP\}$.
- (ii) Set-Merge internally merges Subj to Spec-T.
- (iii) Set-Merge externally introduces the amalgamated Force + Fin, yielding the Force+Fin-Phase (= CP-phase).
- (iv) T inherits uF from Force in the amalgamated phase head Force + Fin.
- (v) T agrees with Subj, valuing Case.
- (vi) β is labeled φ , φ (= TP) under minimal search.
- (vii) The complement of Force + Fin, β gets transferred.

At the CP phase level in (12b), Case-features of the subject QP and the object QP are both valued. Both the deactivated QPs are in the same Transfer domain. The F_{quants} in the same Transfer domain can be rewritten as a binary absorbed F_{quant} and create the inverse scope ($\forall > \exists$) at the C-I interface. Unless the semantic rewritten operation happens at C-I interface, the two QPs are interpreted as their hierarchical C-I input structure ($\exists > \forall$) at the C-I interface.

5.2 Japanese

Let us turn to the Japanese counterpart given in (1b), here repeated as (13). Unlike English, Japanese (13) is unambiguous.

(13) (=1b) Japanese: unambiguous

Dareka-ga daremo-o aisiteiru. ($\exists > \forall$, $*\forall > \exists$)
 someone-Nom everyone-Acc love
 ‘There is someone, who loves everyone.’
 ‘*Each person is loved by a different someone.’

5.2.1 Agreement and Cases in Japanese

In Chomsky's (2013, 2015) LA model, ϕ -feature agreement plays a significant role to determine labeling, and Case valuation is executed as a by-product of this ϕ -feature agreement. However, as I mentioned in section 4.2, Japanese is one of the non-agreement forced languages (Kuroda 1988) and its Case system has been discussed in the history of generative grammar (Fukui 1983, 1986, 1995, Kuno 1973, Kuroda 1978, Saito 1983, 1985, 2016, Takezawa 1986 among others). How does the current Chomsky's LA system treat languages like Japanese? With respect to accusative objects, we adopt Kuroda's (1988) idea that Japanese accusative objects are valued both structurally and morphologically. On the basis of Saito (1983), Kuroda (1988) argues for (14) using the contrast given in (15).

(14) Case-markers can be phonetically null in the domain of the abstract Case assignor.

- (15) a. Hanako-o Masao-ga Taroo-ni syookai-sita.
 Hanako-Acc Masao-Nom Taroo-Dat introduced
 'Masao introduced Hanako to Taroo.'
- b. *Hanako- \emptyset Masao-ga Taroo-ni syookai-sita.
 Hanako Masao-Nom Taroo-Dat introduced
 'Masao introduced Hanako to Taroo.'

(Kuroda 1988)

In other words, Japanese accusative objects can be structurally valued in its canonical word order, that is, *SOV*. So, we assume the same derivation concerning accusative Case valuation both in English and Japanese.

Contrary to Accusative objects, English Nominative subjects and Japanese *ga*-marked subjects are valued/licensed in the different way (Ueda 2002, 2003, 2009, 2013). Unlike English Nominative valuation, Japanese *ga*-marking is independent from finite T (cf. Takezawa (1987) among others). Ueda (2003) observes that some

subordinate clauses with non-finite T permit a *ga*-marked subject in Japanese, as illustrated in (16). (17) provides a piece of evidence that these subordinate clauses do not allow any Tense morphology such as *-ru* ‘Pres.’ and *-ta* ‘Past.’

- (16) a. [Syusyoo-*ga* aredake huhyoo-o kai-*nagaramo*],
 Prime Minister-GA very much has a bad reputation-though
 konnkai-no senkyo-wa Zimintoo-*ga*
 this time-Gen election-Top the LDP-GA
 assyoosi-ta.
 win (the election) with wide margin-Past
 ‘The LDP won the election with wide margin this time [CP
 though the Prime Minister had extremely bad reputations.]’
- b. [Ame-*ga* fur-*temo*], watasi-wa dekake-ru.
 rain-GA fall-even if I-Top go out-Pres.
 ‘I’ll go out even if it rains.’
 (Ueda 2003: 531; with slight modification)

- (17) a. * ... kaw-ru/-ta *nagaramo*
 V-Pres./Past though
- b. * ... hu-ru/-ta-*temo*
 V-Pres./Past-even if
 (Ueda 2003: 531)

Furthermore, following Alexiadou and Anagnostopoulou’s (1998) argument with bound variable interpretation of overt pronouns (Sola 1992, Barbosa 1994), Ueda (2002, 2003) claims that contrary to *kara*-subjects, *ga*-marked subjects are licensed by a head within the CP-domain and show A’-status. As given in (18), in Catalan, bound variable interpretation is impossible when overt pronoun *ells* ‘they’ in the embedded clause is in the preverbal position, but it is possible in the post verbal position. They account for the contrast on the basis of the assumption that preverbal subjects occupy an A’-position. Thus, the pronoun cannot be interpreted as a bound

variable.

- (18) a. **Tots els estudiants*_i es pensen [CP que *ells*_i aprovaran.]
 all the students think that they pass
 ‘All the students think they will pass.’
 b. *Tots els jugadors*_i estan convecus [CP que guanyaran *ells*_i.]
 all the players are persuaded that win they
 ‘All the players are persuaded that they are the ones who will win.’

(Alexiadou and Anagnostopoulou 1998)

I observe the same contrast between *ga*-marked subjects and *kara*-marked subjects as shown in (19).

- (19) a. ??*Daremo*_i-ga [*karera*_i-ga Taroo-o sikaru to] it-ta.
 Everyone-GA they-GA Taroo-Acc scold Comp say-Past
 ‘Everyone_i said that they_i would scold Taroo.’
 b. *Daremo*_i-ga [*karera*_i-kara Taroo-o sikaru to] it-ta.
 Everyone-GA they-from Taroo-Acc scold Comp say-Past
 ‘Everyone_i said that they_i would scold Taroo.’

Therefore, we assume that *ga*-marked subject valuation differs from nominative subject valuation in English. *Ga*-marked subjects can have a certain feature related to Focus. They have to go up to [Spec, FocP] in the left peripheries for labeling (Foc, Foc) to meet Full Interpretation at C-I interface. Furthermore, following Totsuka (2013), Force and Topic are the phases in the cartographic split CP-domain (Rizzi 1997).

5.2.2 The Derivation in Japanese

Let us turn to the derivations in (20)=(1b), bearing the assumptions above in mind. The boxed portions below indicate the elements are Pair-Merged and become invisible in Syntax immediately after checking theta-roles, following Otsuka’ (2017)

Radical Free Merger.

(20) The FM & LA approach

(=(1b)) Japanese: Dareka-ga daremo-o aisiteiru. ($\exists > \forall$, $*\forall > \exists$)

a. vP-phase level

Transfer 1: $[_{vP} \text{Subj} [\langle R, v^* \rangle [_{\alpha} \text{Obj} [R \text{ } \textit{toObj}]]]]]$

- (i) Set-Merge externally forms $\{R, \text{Obj}\}$.
- (ii) Set-Merge internally merges Obj to Spec-R.
- (iii) Set-Merge externally introduces v^* and then Subj into the derivation, yielding the v^* P-phase.
- (iv) R inherits uF from v^* .
- (v) R agrees with Obj, valuing Case.
- (vi) α is labeled φ , φ under minimal search.
- (vii) Pair-Merge internally forms $\langle R, v^* \rangle$ (R with v^* affixed).
- (viii) v^* becomes invisible (and thus no longer the phase-head).
- (ix) The phase-head status is activated on the copy of R.
- (x) The complement of R, \textit{toObj} gets transferred.

b. CP-phase level

Transfer 2: $[_{\text{ForceP}} \text{Force} [_{\gamma} \text{Subj} \text{ Foc} [_{\beta} \textit{toSubj} \text{ Fin} [_{\alpha} \boxed{\text{T}} [\langle R, v^* \rangle \textit{toSubj} \langle R, v^* \rangle [_{\varphi, \varphi} \text{Obj} [\text{Transfer 1}]]]]]]]]]$

- (i) **Pair-Merge externally forms $\{\text{T}, \langle R, v^* \rangle\}$.**
- (ii) Set-Merge externally forms $\{\text{Fin}, \alpha\}$.
- (iii) Set-Merge internally merges Subj. to Spec-Fin.
- (iv) Set-Merge externally forms $\{\text{Foc}, \beta\}$.
- (v) Set-Merge internally merges Subj. to Spec-Foc.
- (vi) Set-Merge externally introduces the Force, yielding the CP-phase.
- (vii) Foc inherits uF from Force.
- (viii) Foc agrees with Subj, valuing Case.
- (ix) γ is labeled Foc, Foc under minimal search.
- (x) Pair-Merge internally forms $\langle \text{Force}, \text{Foc} \rangle$ (Foc with Force affixed).
- (xi) Force becomes invisible (and thus no longer the phase-head).

- (xii) The phase-head status is activated on the copy of Foc.
- (xiii) The complement of Foc, β gets transferred.

As shown in (20a), both English and Japanese have the same derivation at the *vP-phase* level. We can find the crucial difference between the two languages in the next CP-phase level, which is given in (20b-(i)). It depends on the property of T (Fukui 1986, 1995, Ueda 2002, 2003, 2013). What mechanism causes the different property of T? In English, T inherits uF from the amalgamated head Force+Fin as shown in (12b-(iv)). However, Japanese T cannot inherit uF from Force because either Foc or Top, or both is required between Force and Fin especially in the matrix clause in this language. These syntactic structures create either Topic-Comment or Focus-Presupposition interpretation at CI-interface. The functional heads, Top and Foc, block the uF-inheritance from Force to T. That is why Japanese language does not have agreement on T.

However, if $\{T, \langle R, v^* \rangle\}$ in (20b-(i)) were externally Set-Merged, the label would not be determined because T is too weak to be a label (Chomsky 2015). In English, T inherits uF from the phase-head Force+Fin, the subject internally merges to Spec-T, and agrees with T. Then α successfully gets φ , φ under minimal search. Therefore, in Japanese, T should not be externally Set-Merged, but Pair-Merged. In (20b-(i)), T, which is externally Pair-Merged, is invisible in Syntax, following Otsuka (2017). Thus, the subject NP does not internally/externally Set/Pair-merge to Spec, T in Japanese. At the transfer, α is labeled $\langle R, v^* \rangle$. Of course, T will be visible in CI-interface. The only derivation with the external Pair-Merger of T makes the sentence with a focalized *ga*-marked subject survives at CI-interface in Japanese in terms of labeling. As for β in (20b), Set-Merge externally forms $\{\text{Fin}, \langle R, v^* \rangle\}$ in (20b-(ii)). Then, the Subject NP internally merges to Spec-FinP, forming $\{\text{Subj}, \text{FinP}\}$ as in (20b-(iii)). The Subject further internally Set-merges to Spec-Foc in (20b-(v)). Next, Set-Merged externally forms $\{\text{Force}, \gamma\}$ as in (20b-(vi)), yielding the Force-phase. A relevant uF is inherited from

a phrase-head to non-phase-head, in this case, Force to Foc. Foc agrees with the subject NP valuing Case. γ is labeled Foc, Foc. In (20b-(x)), Pair-Merge internally forms $\langle \text{Force}, \text{Foc} \rangle$ (Foc with Force affixed). Force becomes invisible in Syntax and loses its phase-head status. The phase-head status is activated on the copy of Foc. The complement of Foc, that is, β , gets Transferred.

5.2.3 Scope in Japanese

Consider the structure of the CP-phase level given in (20b), repeated here as (21). The solid-white parts are the second Transfer domain. Contrary to Transfer 2 in English, the subject QP and the object QP are not in the same Transfer-domain. Thus, Japanese (1b)

(21) CP-phase level: Transfer 2

Dareka-ga daremo-o aisiteiru. ($\exists > \forall$, $*\forall > \exists$)

$[_{\text{ForceP}} \text{Force} [_{\gamma} \text{Subj Foc} [_{\beta} \text{tsuj} \text{Fin} [_{\alpha} \boxed{\text{T}} [_{\langle R, v^* \rangle} \text{tsuj} \langle R, v^* \rangle}]]]]]$
 $[_{\langle \phi, \phi \rangle} \text{Obj} [\text{Transfer 1}]]]]]]]$

Someone might suggest that *ga*-marked subjects are not always interpreted as Focus with [+Foc] feature. Probably, *ga*-marked subjects without feature [+Foc] are externally Pair-Merged to [Spec, v^*P] in a sense of Otsuka's (2017) Radical Pair-Merger as in (22).

(22) CP-phase level: Transfer 2

Dareka-ga daremo-o aisiteiru. ($\exists > \forall$, $*\forall > \exists$)

$[\langle \langle R, v^* \rangle, \text{Force} + \text{Fin} \rangle \langle \langle R, v^* \rangle, \text{Force} + \text{Fin} \rangle [_{\alpha} \boxed{\text{T}}] [_{\text{VP}} (\langle \langle R, v^* \rangle \boxed{\text{Subj}})]$
 $[_{\langle \phi, \phi \rangle} \text{Obj} [\text{Transfer 1}]]]]]]]$

In (22), the subject externally Pair-Merged to Spec, $v^*P(\langle \langle R, v^* \rangle$). The Pair-Merged subject NP is invisible in Syntax. Then T is also externally Pair-Merged. An amalgamated Force and Fin head is Set Merged with α since neither [+Foc] nor [Top] element contains in

this case. The head $\langle R, v^* \rangle$ internally Pair-Merged to Force + Fin and forms $\langle \langle R, v^* \rangle, \text{Force} + \text{Fin} \rangle$. Force+Fin becomes invisible, the phase status is cancelled and activated on the copy of $\langle R, v^* \rangle$. Thus, complement of the copy of $\langle R, v^* \rangle$, $[_{\phi, \varphi} \text{Obj} [\text{Transfer } 1]]$, gets transferred. This also properly predicts (22) is unambiguous because the subject QP and the object QP occupy a different Transfer domain at CI-interface.

6. Conclusion

This paper explored relative scope phenomena under Chomsky's (2013, 2015) FM & LA model and Otsuka's (2017) *Radical Free Merger*. We propose that Pair-Merger plays a significant role for languages without agreement to derive a sentence structure. We demonstrated that the proposed system appropriately predicts the differences in scope taking between English and Japanese. We called this relative scope calculation system *an FM & LA approach*. All the errors are, of course, my own.

Notes

1. See Takezawa (1987) for detail discussion about INFL licensing of Japanese *ga*-marked subjects. On the contrary to Takezawa (1987), Ueda (2002, 2003, 2006) argue that finite T is irrelevant to licensing *ga*-marked subjects in Japanese.
2. Inoue (1998) calls the *kara*-subject constructions *Disguised Subjectless Sentences* (DSSs).
3. Of course, unlike Ueda (2002, 2003, 2006, 2013), Kuroda (1988) and Miyagawa (2001) assume that scrambled objects occupy in [SPEC, TP], satisfying the EPP of T, not that of C.
4. This assumption is compatible with the defective property of Japanese finite T (Kuroda 1988, Fukui 1984, 1986, 1995). As for unavailability of the [Spec, TP] position in Japanese, Ueda (2002, 2009) discusses it in terms of the idea that Japanese is one of the non-agreement forced languages in the sense of Kuroda (1988). Ueda attempts to restate Kuroda's insight as the φ -feature

defectiveness of Japanese T in Chomsky's (2001) framework. The crucial mechanism is as follows: it is φ -features that allow T to be activated, but Japanese T has a null set of φ -features. Thus, Japanese T can neither be activated nor enter into an Agree-relation, nor have the EPP-feature. That is why Japanese [Spec, TP] is unavailable for *ga*-marked subjects. Case-feature marking/deletion of subject NPs must wait for the next probe, that is, C. Ueda (2009) suggests that under Chomsky's (2008) feature inheritance, there is no C-T feature inheritance in Japanese (Ueda 2002, 2009). This paper attempts to recapture this traditional issue on defective T in Japanese in terms of the current Minimalist perspectives (Chomsky 2013, 2015). We will propose a new approach to this issue in terms of an external Pair-Merger of T in section 5.

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